# Guidelines to enhance secondary school learners' mathematical competence and study orientation in a problem-solving learning context

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Thesis submitted in fulfilment of the requirements for the degree *Doctor of Philosophy in Education Sciences* at the North-West University

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**DECLARATION**

I the undersigned, hereby declare that the work contained in this thesis is my original work and that I have not previously in its entirety or in part submitted it at any university for a degree.

Signature

November 2017

Date

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## Acknowledgements

I would hereby like to thank:

- My husband Kobus for his support throughout this research journey. Thank you for your love and trust in me.
- My son Daniel for his support and specifically for the technical editing of this thesis.
- Prof Hercules Nieuwoudt, my promoter, for his guidance and assistance during this time. Thank you for sharing your wealth of knowledge and expertise with me. Enjoy the new and well-deserved season that lies ahead.
- The SETH Academy for the financial assistance in the study. The passion for what you do is contagious. Thank you for allowing me to do the research.
- The principal and teachers of the project school. Thank you for your kindness and cooperative attitudes. Thank you for the assistance with the data generation process of more than a year.
- The participants, the grade 8 and 9 learners at the project school who wrote the tests, completed the questionnaires, and those who were willing to be interviewed.
- Shawn Liebenberg for the statistical analysis of the data. Thank you for your help with the interpretation and documentation of the results.
- Hettie Sieberhagen for the language editing.
- Dorothy Laubscher and Hermien Dreyer for being such loyal and caring colleagues. Thank you for standing in for me during my study leave and the help with the analysis of the test questions.
- My family, friends and colleagues, for your interest in my research endeavour and your words of encouragement.
- My Heavenly Father for carrying me through and making all things possible. Without Him, I would not have accomplished my goal. This is for Your glory and honour!

## Abstract

Inadequate Mathematics performance causes global concern. Many secondary school learners lack the required level of mathematical competence to cope with the demands of school and higher education in the 21st century. Furthermore, inadequate study orientation in Mathematics contributes to deficient performance in Mathematics which is evident in several studies. This study aimed to determine how the mathematical competence and study orientation in Mathematics of secondary school learners can be enhanced in a problem-solving learning context. The study intended to yield guidelines to enhance both these aspects, thereby generating theoretical knowledge to the body of scholarship. The sampling strategy was convenience sampling, and the participants were the grade 8 and grade 9 learners at the project school of the SETH Academy. An embedded mixed method design was appropriate for this longitudinal study. In the quantitative experimental phase, the Study Orientation in Mathematics Questionnaire (SOM) was administered, followed by a Mathematics competence test. The qualitative phase entailed two open-ended questionnaires, task-based interviews with purposively selected learners, and individual interviews with four Mathematics teachers. Quantitative data were analysed statistically using a factor analysis, Cronbach α reliability coefficients, dependent *t*-tests and independent *t*-tests. Qualitative data were sorted, coded and analysed on ATLAS.ti™, a computer-assisted qualitative data analysis software, CAQDAS. Both data types were interpreted and integrated with the literature review to answer the research questions. Based on these findings, guidelines for enhancing the mathematical competence and study orientation of secondary school learners were formulated. These guidelines were designed around the two dominant themes in the study, namely mathematical competence and study orientation in Mathematics in a problem-solving learning context. The guidelines will be valuable to teachers, their learners, instructional designers and curriculum specialists in the creation, enactment and adjustment of Mathematics content and course material.



**Keywords:**

Embedded research design; Problem-solving; Mathematics; Mathematical competence; Mathematics learning; Mathematics teaching; Mixed method research; Study orientation in Mathematics.

## Opsomming

Ontoereikende Wiskunde-prestasie veroorsaak kommer wêreldwyd. Baie sekondêre skoolleerders beskik nie oor die vereiste vlak van wiskundige bevoegdheid om te voldoen aan die eise van skool- en hoër-onderwys in die 21ste eeu nie. Verder dra onvoldoende studie-oriëntasie in Wiskunde by tot swak Wiskunde-prestasie soos blyk uit verskeie studies. Die doel van hierdie studie was om vas te stel hoe die Wiskundige bevoegdheid en studie-oriëntasie in Wiskunde van sekondêre skoolleerders verbeter kan word in 'n probleemoplossings-leerkonteks. 'n Verdere doelwit van die studie was om riglyne te verskaf om albei hierdie aspekte te verbeter en sodoende teoretiese kennis te genereer wat bydra tot wetenskaplike kennis. 'n Gerieflikheidsteekproef is gebruik en die deelnemers was die graad 8 en graad 9 leerders by die projekskool van die SETH Akademie. 'n Ingebedde (embedded) gemengde navorsingsontwerp was geskik vir hierdie longitudinale studie. In die kwantitatiewe eksperimentele fase, is die Studie-oriëntasie in Wiskunde-vraelys (SOW) geadministreer, gevolg deur 'n Wiskunde bevoegdheidstoets. Die kwalitatiewe fase behels twee oop-einde vraelyste, taakgebaseerde onderhoude met doelgerigte geselekteerde leerders, en individuele onderhoude met vier Wiskunde-onderwysers. Kwantitatiewe data is statisties ontleed deur middel van 'n faktorontleding, Cronbach α betroubaarheidskoëffisiënte, afhanklike *t*-toetse en onafhanklike *t*-toetse. Kwalitatiewe data is gesorteer, gekodeer en ontleed op ATLAS. ti ™, 'n rekenaargesteunde kwalitatiewe data-analise sagteware, CAQDAS. Beide tipes data is geïnterpreteer en geïntegreer met die literatuuroorsig om die navorsingsvrae te beantwoord. Gebaseer op hierdie bevindings, is riglyne vir die verbetering van die Wiskunde-bevoegdheid en studie-oriëntasie van sekondêre skoolleerders geformuleer. Hierdie riglyne is ontwerp rondom die twee dominante temas in die studie, naamlik wiskundige bevoegdheid en studie-oriëntasie in Wiskunde in 'n probleemoplossingsleerkonteks. Die riglyne sal van nut wees vir onderwysers, hul leerders, onderrig-ontwerpers en kurrikulumspesialiste in die daarstelling, implementering en aanpassing van wiskundige inhoud en kursusmateriaal.



**Sleutelterme:**

Gemengde metodes; Ingebedde navorsingsontwerp; Probleemoplossing; Studie-oriëntasie in Wiskunde; Wiskunde; Wiskundige bevoegdheid; Wiskundeleer; Wiskunde-onderrig;

## List of acronyms and abbreviations

| | |
|---|---|
| **ANA** | Annual National Assessment |
| **CAPS** | Curriculum and Assessment Policy Statement |
| **DBE** | Department of Basic Education |
| **DHET** | Department of Higher Education and Training |
| **FET** | Further Education and Training |
| **ICT** | Information and Computer Technology |
| **IP** | Information processing |
| **KOM** | Competencies and Mathematical Learning |
| **KOM@ING** | Modeling and developing competence: Integrated IRT based and qualitative studies with a focus on Mathematics and its usage in Engineering studies |
| **KMO** | Kaiser-Meyer-Olkin |
| **MA** | Mathematics anxiety |
| **NDP** | National Development Plan |
| **NEPS** | National Educational Panel Study |
| **NRC** | National Research Council |
| **NSC** | National Senior Certificate |
| **NWU** | North-West University |
| **OECD** | Organisation for Economic Co-operation and Development |
| **PBL** | Problem-based learning |
| **PISA** | Programme for International Student Assessment |
| **PSB** | Problem-solving behavior |
| **RME** | Realistic Mathematics Education |
| **SA** | Study attitude |
| **SETH** | Science, Engineering, Technology and Health |
| **SFSA** | Science Forum South Africa |
| **SGB** | School Governing Body |
| **SH** | Study habits |
| **SM** | Study milieu |
| **SOM** | Study Orientation Questionnaire in Mathematics |
| **SOMT** | Study Orientation Questionnaire in Mathematics Tertiary |
| **STEM** | Science, Technology, Engineering and Mathematics |
| **TIMSS** | Trends in International Mathematics and Science Study |
| **ZPD** | Zone of Proximal Development |

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# CHAPTER 1 ORIENTATION TO THE RESEARCH JOURNEY

## 1.1 Introduction

The primary purpose of this research is to develop guidelines to enhance secondary school learners' mathematical competence and study orientation in a problem-solving learning context. An extensive literature search investigated the primary constructs, mathematical competence (Chapter 2) and study orientation in Mathematics (Chapter 3), and furthermore, to investigate the role of these constructs in a problem-solving learning context. Chapter 4 presents the empirical investigation, followed by the results, data analysis and interpretation in Chapter 5. The concluding Chapter 6, provides a summary of the findings, recommendations, and limitations of the study, and presents guidelines. Figure 1-1 presents an overview of Chapter 1.

## 1.2 Problem statement of the research

Concern regarding the poor general performance of South African learners in Mathematics and Science has characterised the past years (Maree, 2009, 2014). The 2014-2016 Annual National Assessment (ANA) Report reported that the overall Mathematics results in grades one to six showed an improvement of test scores. However, in grade 9, the performance of learners remained at a low level (11%) similar to the levels in 2012 (13%) and 2013 (14%) (DBE, 2014c). It is disturbing that only three percent of all the 2014 grade 9 learners obtained 50% or more in Mathematics. The analysis of the grade 9 learners' answers in the past two ANA's, revealed the following areas as challenges in this grade: learners have not mastered the necessary algebraic skills, learners struggle with applications in Geometry and to solve problems that require spatial manipulations. Learners are furthermore not familiar with mathematical properties and terminology and often misuse them (DBE, 2014c, pp. 8-9).

Furthermore, the Mathematics results in the grade 12 National Senior Certificate (NSC) examination of 2013-2016 add more concern regarding this problem (DBE, 2016, p. 151). The number of candidates increased by 1 907 from 2015 to 2016 and the general performance of candidates improved in 2016 as shown by 51,1% of candidates achieving 30% and higher, with 33,5% achieving 40% and above. However, the 2016 Diagnostic Report of the Department of Basic Education (DBE) reflects that the algebraic skills of the candidates were poor. Most candidates were deficient in fundamental and mathematical competencies that should have been obtained in the lower grades (DBE, 2016, p. 152). Table 1-1 displays the performance trends from 2013-2016.

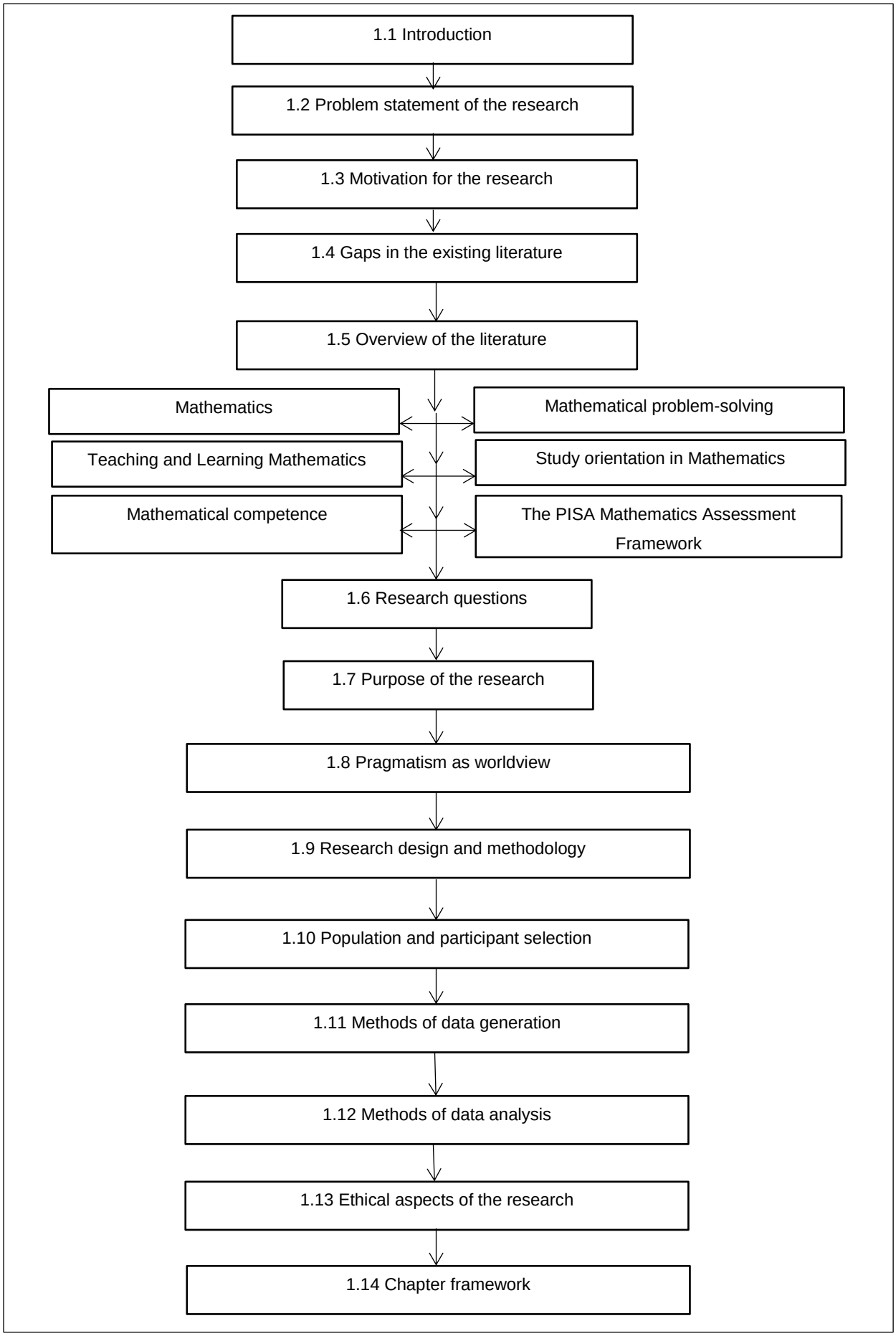



**Figure** 1-1**: An overview of Chapter 1**

**Table 1-1: Overall achievement rates in Mathematics (DBE, 2016, p. 151)**

| Year | Number of candidates | Achieved 30% and above | % achieved 30% and above | Achieved 40% and above | % achieved 40% and above |
|---|---|---|---|---|---|
| **2013** | 241 509 | 142 666 | **59,1** | 97 790 | **40,5** |
| **2014** | 225 458 | 120 523 | **53,5** | 79 050 | **35,1** |
| **2015** | 263 903 | 129 481 | **49,1** | 84 297 | **31,9** |
| **2016** | 265 810 | 135 958 | **51,1** | 89 084 | **33,5** |

Based on the above results, it is evident that the achievement levels in Mathematics at school are inadequate. These low achievement levels result in low university entrance and throughput rates in the Natural Sciences (Maree & Crafford, 2005, p. 85). The fact that almost 40% of all first-year students in Higher Education in these fields fail their first year of study intensifies this situation (Schaap & Luwes, 2013, p. 182). The question arises as to which factors contribute to the current trend. Many of the learners who eventually pass grade 12 with a high percentage in Mathematics seem incapable of making a success of their first-year university Mathematics.

Regarding Mathematics, Maree and Crafford (2005, p. 85) claim that many South African school learners lack the required knowledge and skills to learn efficiently and master mathematical problem-solving. Learners often show evidence of inadequate content knowledge and rote knowledge of basic concepts. They further contend that many learners lack a favourable study orientation. The concerns include: neglect with homework, lack of motivation, negative attitude towards Mathematics, deficient problem-solving abilities, inability to think critically, and inferior information processing skills. A well-established study orientation could lead to improved Mathematics achievement (Maree, 2009, 2014).

In November 2016, the DHET report that 47,9 percent of university students in South Africa do not complete their degrees. Causes for students to drop out vary according to their backgrounds. These include financial constraints, lack of academic readiness, lack of support from the universities, students who enrolled for wrong qualifications, and students who are living in extreme poverty, lack of food and inadequate accommodation. The shocking reality is that the dropout percentage not only affects students, but it also impacts the labour market and economy. Thus, the matter of students dropping out from the universities is a severe challenge and ought to be discussed and efficiently addressed by the relevant stakeholders (SFSA, 2016).

In her study on the mathematical competence and achievement of first-year engineering students, Labuschagne (2013, p. 134) establishes that students enter the university with the

skills to solve routine problems. However, many of them lack the understanding to apply their basic mathematical knowledge in new and unknown situations which engineering subjects require. Benade (2012, p. 120) confirms that the transition from secondary to tertiary Mathematics involves the development of pure mathematical thought to advanced mathematical thought, but students seem to be unprepared for the formal world of axioms, definitions and proof.

There is currently a huge demand in the labour force for students graduating in the fields of Mathematics, Technology, Science and Engineering. By the National Development Plan (NDP) for South Africa (National Planning Commission (South Africa), 2015, p. 341), the education, training and innovation system should cater for different needs and produce highly skilled individuals. The graduates from South African universities and colleges should have the knowledge and skills to meet the present and future needs of the economy and society. Furthermore, a key objective in the White Paper for Higher Education and Training (DHET, 2013, p. 33), is to move the balance of enrolment in tertiary education from humanities to commerce and business, and most of all to Engineering, Mathematics, Science, and Technology. Universities must provide for the education of sufficient numbers of professionals and other graduates in scarce skills areas.

Worldwide another aspect of concern is the fact that many secondary school learners are not adequately facilitated towards becoming mathematically competent (Boesen et al., 2014; Domazet, Baranović, & Matić, 2013; Haavold, 2010). The OECD (*Organisation for Economic Co-operation and Development)* launched the *Programme for International Student Assessment* (PISA) in 2003, and this takes place triennially in many countries worldwide (OECD, 2014b). The results show that few learners are able to answer the more difficult PISA problems which require the application of knowledge and skills. Turner (2011, p. 6) explains this by saying that the real-life problems people must solve are not packaged the way they are at school. We must decide on the relevant mathematical knowledge to use as well as how to apply that knowledge. He suggests that mathematical competencies should be developed in Mathematics classrooms to improve results and yield more learners who will pursue careers in the scarce subjects.

## 1.3 Motivation for the research

The Faculty of Engineering of the North-West University (NWU) at the Potchefstroom campus acknowledged the shortage of adequately prepared learners entering tertiary education in study fields where Mathematics and Physical Science are prerequisites (NWU, 2017). One reason for this is the low pass rate of grade 12 learners in Mathematics and Physical science (DBE, 2014b, p. 109; 2016, p. 151). Another reason is that the low numbers of learners who are fortunate enough to obtain university exemption seem unable to cope with the demands of studying

Mathematics at the university level, owing to various reasons. One of the aims of the Department of Basic Education is that learners who emerge from the FET band should demonstrate the ability to think logically and analytically and be able to transfer skills from familiar to unfamiliar situations (DBE, 2014a, p. 5). Despite this desired aim, learners may have the necessary mathematical knowledge and can solve routine problems, but they find it difficult to apply their knowledge with the necessary understanding. Application of mathematical knowledge with understanding develops reasoning skills which enable them to solve problems in unknown and unfamiliar situations. It is therefore imperative that reasoning skills develop at the school level for learners to be sufficiently prepared for university entrance and be successful in their studies (Benade, 2012, p. 23; Labuschagne, 2013, p. 134).

The above reasons prompted the Faculty of Engineering at the Potchefstroom Campus of the North-West University to respond pro-actively by establishing the SETH Academy (§4.6). They aspire to intervene in preparing secondary school learners for university entrance by focusing on their mathematical knowledge and skills, i.e. their mathematical competence, as well as aspects of Science, Technology and Engineering. The SETH academy commenced its activities in 2013 when a total of 27 grade 8 learners started the programme. In 2014, a new group of 36 grade 8 learners joined the academy. In 2015, there were three grades involved, namely grade 8, grade 9 and grade 10 with the first grade 12 group in 2017 (NWU, 2015, 2017).

Because of the current situation, the mentioned stakeholders planned and implemented the SETH Academy. The question, however, is whether the interventions of the SETH Academy are adequate and whether they bring about the desired outcomes concerning the mathematical competence of the learners. The people involved required the expertise of the Faculty of Education Sciences to assist them in doing this research as most of them are engineers who do not necessarily possess the required teaching and learning expertise.

To determine the impact of the SETH Academy on the mathematical competence of its learners, research was undertaken to gain more insight on the following aspects regarding the Mathematics interventions since Mathematics is at the heart of the Academy. They are:

- What do the learners learn in Mathematics and how do they learn this?
- How do they use, implement and apply the mathematical knowledge and skills that they gain?
- What changes do their experiences bring about regarding their attitudes, mathematical competence, and achievement?

The answers to these questions ought to shed light on the efficacy of the programme, specifically regarding the Mathematics intervention in the SETH Academy. The Mathematics

interventions of the SETH Academy are continuously revised to improve their quality and to increase their effectiveness.

There is a lack of research focusing directly on the preparation of secondary school learners for university or college entrance in Mathematics related study fields. Furthermore, mathematical competencies as constituents of mathematical competence are crucial in Mathematics learning and are often overlooked. Recent research showed that the more competencies a learner possesses and the greater the ability to activate these competencies, the more capable the learner will be to use the mathematical knowledge efficiently in solving contextualised problems. These competencies should be directly targeted and fostered in our Mathematics classrooms and in the SETH interventions (Turner, 2011, p. 13).

The focus of the SETH Academy's Mathematics interventions should therefore primarily be on the enhancement of the mathematical competence of their learners. Guidelines to develop mathematical competence and study orientation will be provided to the Faculty of Engineering to address this gap and to refine, change or adapt the programme as needed. Also, the effect of the SETH Academy on the learners' study orientation in Mathematics is investigated to give feedback and provide guidelines to the people involved.

The various stakeholders (Faculty of Engineering at the NWU, the Department of Basic Education, Industry and the project school) involved in the SETH Academy are interested in knowing whether their interventions have the desired outcomes regarding the mathematical competence of learners. They are also interested in knowing whether their time, money and efforts are paying off. If not, the programme should be adapted and streamlined to increase the efficacy thereof. Therefore, they require the contribution of the Faculty of Education Sciences to assist them and to provide guidelines regarding their specific needs. Their need motivated and initiated this research. The focus is specifically on how the mathematical competence and study orientation of these learners can be enhanced through participation in problem-solving learning activities in the SETH Academy (Hattingh & Hattingh, 2014b; NWU, 2016).

### 1.4 Gaps in the existing literature

The focus of this study is on the mathematical competence, study orientation in Mathematics and problem-solving Mathematics learning of 14- and 15-year old learners that are in grade 8 and 9 (secondary school). Various studies investigated facets of study orientation and their role on related factors such as achievement, study attitude, Mathematics anxiety, and others. In a quantitative study, a South African researcher, Erasmus (2013b) explored the relationship between emotional intelligence, study orientation and Mathematics achievement of middle adolescent boys and girls. Quaye (2015) used mixed method approaches to explore students' attitudes towards Mathematics and Mathematics achievement in secondary schools in England.

He focused on the role of ethnicity, social class and gender. Alves, Rodrigues, Rocha, and Coutinho (2016) worked with engineering students to determine their Mathematics anxiety, self-efficacy and perceived importance of Mathematics as contributing factors to the learning of mathematical concepts.

In South Africa, the research of Moodaley, Grobler, and Lens (2006) focused on causal attribution in Mathematics and on study orientation on the Mathematics achievement of grade 9 learners from secondary schools. A Portuguese study was done by Peixoto, Sanches, Mata, and Monteiro (2016) to quantitatively analyse the relationships between classroom and test emotions, cognitive appraisals, and Mathematics achievement of pre- and early adolescents. Senior high school learners in India were participants in the quantitative study of Singh (2016) where he researched academic achievement in Mathematics in relation to study habits and home-environment.

Regarding mathematical competence, the well-known Programme for International Student Assessment (PISA) is an international, large-scale assessment of 15-year old learners' mathematical competence (OECD, 2009, 2012, 2013b) (cf. § 1.5.6 & 2.7). The focus is on the nature of learners' mathematical competence regarding the acquisition of the eight competencies (§ 2.7.3). Another study on mathematical competence is that of Foster (2016) who investigated the confidence levels and competence in mathematical procedures of school learners in the United Kingdom. The influence of success in Mathematics on Mathematics anxiety perceived mathematical competence and Mathematics performance was the focus of a quantitative study done in the Netherlands. The participants were grade three to six learners (Jansen et al., 2013).

The mathematical competence of German engineering students was measured at the beginning of their studies by Neumann et al. (2015), and Steyn and Du Plessis (2007) conclude that the mathematical competence of first-year engineering students can be enhanced through adequate support. The German National Educational Panel Study (NEPS) compiled a framework to model and to assess the mathematical competence of German individuals over their entire lifespan (Neumann et al., 2013).

Problem-solving lies at the heart of teaching and learning Mathematics (NCTM, 2010). Various studies investigated problem-solving or an aspect of problem-solving. The teaching of problem-solving through the development of a problem-solving model was investigated in a grade 4 Mathematics classroom (Nieuwoudt, 2015). Initially, learners showed negative beliefs towards problem-solving, and a lack of knowledge regarding what precisely problem-solving entails. The teacher involved the learners in cooperative groups of six in solving different types of mathematical problems. By doing so, learners eventually formulated a problem-solving model

of their own. The model was afterwards successfully used to solve various mathematical problems, and this reflected their cognitive development to a certain degree (Nieuwoudt, 2015).

Buchwald, Fleischer, and Leutner (2015) executed an experimental field study of analytical problem-solving competence investigating the effects of transfer and training. The participants were grade 9 German learners. In another study by Fischer et al. (2015), also from Germany, different approaches to assessing the problem-solving competency applied in large-scale international assessments were investigated. They are analytic problem-solving and interactive problem-solving. A university student sample and a high-school sample were the participants. The results revealed that both approaches highly interrelated in both samples.

Researchers investigated the effects of Mathematics anxiety and metacognition on word problem-solving in children with and without mathematical learning difficulties. The results provide insight into factors that could mediate poor word-problem-solving performance that emerges under pressure when doing Mathematics. The results also suggest that anxiety during learning Mathematics ought to be considered in interventions with learners who experience learning difficulties in Mathematics (Lai, Zhu, Chen, & Li, 2015).

The different lenses/foci of the studies mentioned this far, in comparison to this study, are clear. Despite a few similar studies, as listed in Table 1-2 below, the need arises to investigate further the extent to which problem-solving enhances the mathematical competence and study orientation in Mathematics of South African secondary school learners.

**Table 1-2: Comparison of similar studies relating to mathematical competence, study orientation in Mathematics and problem-solving**

| Key factors | South Africa | Germany | Netherlands | Portugal | Own study |
|---|---|---|---|---|---|
| **Mathematical competence** | No | Yes | Yes | No | Yes |
| **Study orientation in Mathematics** | Yes | No | Mathematics anxiety | Mathematics anxiety Self-efficacy | Yes |
| **Problem-solving** | No | Yes | Yes | No | Yes |
| **Design** | Quantitative | Quantitative & qualitative | Quantitative | Quantitative | Mixed method |
| **Participants** | Grades 9 & 11 | First-year engineering students | Grade 3 to 6 learners | Undergraduate engineering students | Grade 8 and 9 learners |
| **Reference** | (Erasmus, 2013b) | (Neumann et al., 2015) | (Jansen et al., 2013) | (Alves et al., 2016) | |

## 1.5 Overview of the literature

A literature search was performed to investigate the essential constructs under investigation in this study. Common themes were determined and coded. Relevant documents were uploaded on ATLAS.ti™, and each document coded regarding the pre-selected codes. Networks could be drawn to highlight the relationships between various codes. This section presents the constructs used in the study. These constructs are Mathematics, the teaching and learning of Mathematics, mathematical competence, mathematical problem-solving, study orientation in Mathematics, and the PISA Mathematics Assessment Framework.

### 1.5.1 Mathematics

Mathematics is distinctive from other teaching subjects in that it is a relatively small body of knowledge, but of such a generality that it applies to a more abundant variety of situations than any other teaching subject (Freudenthal, 1968, p. 5). Mathematics is a human endeavour in which people discover relationships, execute algorithms, construct concepts, invent methods, communicate and solve problems presented by the real-world (Cangelosi, 2003, p. 7).

Mathematics is also described by some as a static discipline developed abstractly, while others view it as a dynamic discipline continuously changing due to discoveries (Dossey, 1992, p. 39). Other authors describe Mathematics as the science of pattern and order, i.e. to do Mathematics, which challenges the view that Mathematics is a discipline dominated by computation (Van de Walle, Karp, & Bay-Williams, 2014, p. 13; 2015). Schoenfeld (1992, p. 335) describes Mathematics as a living subject that searches for understanding patterns which permeate the world within us and the world around us.

The focus of this study is in secondary school Mathematics and therefore it is appropriate to define Mathematics according to the National Curriculum Statement (NCS) of the Department of Basic Education's policy document, the Curriculum Assessment Policy Statement (CAPS) (DBE, 2014a, p. 8). "Mathematics is a language which makes use of notations and symbols for describing geometric, numerical and graphical relationships. It is a human activity that involves observing, representing and investigating patterns and qualitative relationships in physical and social phenomena, and between mathematical objects themselves. It helps to develop the mental processes that enhance logical and critical thinking, accuracy and problem solving that will contribute to decision-making".

### 1.5.2 Teaching and Learning Mathematics

Freudenthal (1968, p. 4) contends that Mathematics has proved indispensable for the technological control and understanding of both the social structure and the physical world.

Mathematics must, therefore, be taught to be useful. Schoenfeld (1992, p. 335) asserts that in learning Mathematics, the focus ought to be on exploring patterns, finding solutions and formulating conjectures. The focus should not merely be on doing exercises and memorising formulas and procedures. Mathematics learnt in the former manner, is empowering.

The classroom activities and the repeated interactions between learners and teachers as learners learn are essential since they comprise the knowledge that is produced. Different teaching approaches can have different effects on learners' learning and achievement (Samuelsson, 2010). Variation of teaching approaches is imperative since different teaching approaches develop different mathematical competencies. Therefore, the mode of teaching approach is important in developing learners' mathematical competence (Samuelsson, 2008).

In this study, the teaching and learning of Mathematics occur via problem-solving. Learners learn Mathematics through exposure to essential tasks or problems. The teacher creates the context in which learners take risks, share and justify mathematical ideas. Learners are empowered to take mathematical ideas to the next level by linking them to previous ideas, responding with information beyond the desired response, and making assumptions and drawing conclusions (Van de Walle et al., 2015, pp. 38-39).

### 1.5.3 Mathematical competence

A person who can grasp the essential facets of a field efficiently, incisively, and with the certainty of judgement combined with an overview of the field, is competent in that field. Competence is an expertise (Niss & Højgaard, 2011, p. 49). Mathematical competence is composed of the following aspects: doing, using, understanding, having knowledge of, and having a view regarding Mathematics and mathematical activity in various situations where Mathematics plays or could play a role. These aspects suggest the possession of substantial procedural knowledge, factual knowledge, and concrete skills within Mathematics. These prerequisites are however insufficient in themselves to account for mathematical competence (Niss & Højgaard, 2011, p. 49).

Niss and Højgaard (2011, p. 49) of the Danish KOM-project (Competence Development and Mathematics Learning) regard mathematical competence as knowing, understanding, doing, and using Mathematics in various contexts and situations in which Mathematics plays or could play a role. Mathematical competence implies the presence of a variety of procedural and factual knowledge and concrete skills within the mathematical field, but these prerequisites are not sufficient in themselves to account for mathematical competence. A mathematical competency is a well-informed readiness to act appropriately in situations involving a mathematical challenge. Mathematical competencies play a crucial role in the development of a

person's mathematical literacy or a person's ability to apply mathematical knowledge in practical situations (Niss, 2011, p. 7).

Turner (2011, p. 3) defines the following set of six mathematical competencies, namely communication; mathematising; representation; reasoning and argumentation; strategic thinking, using symbolic, formal and technical language and operations. Mathematical competencies are a set of individual characteristics or qualities possessed to a greater or lesser extent by each person. The competencies are assessed in the triennial international survey, the *Programme for International Student Assessment* (PISA). The survey aims to evaluate the education systems worldwide by assessing the knowledge and skills of 15-year-old learners (OECD, 2014a).

To function optimally in everyday life and to experience success in an increasingly technological world and workplace, competence in Mathematics is essential. The Danish KOM project (Niss, 2011, pp. 7-9; Niss & Højgaard, 2011, pp. 49-51) identifies eight mathematical competencies which form two clusters as illustrated in Table 1-3 below.

**Table 1-3: Mathematical competencies as described by the KOM project (Niss & Højgaard, 2011)**

| The ability to ask and answer questions in and with Mathematics | The ability to deal with mathematical language and tools |
|---|---|
| Mathematical thinking competency | Representing competency |
| Problem tackling competency | Symbol and formalism competency |
| Reasoning competency | Communicating competency |
| Modelling competency | Aids and tool competency |

However, in their research to develop mathematical competencies from the intended to the enacted curriculum, Boesen et al. (2014, pp. 74-76) used the following six mathematical competencies, namely the problem solving-, reasoning-, procedural-, representation-, connection-, and communication competency. They further used competency-related activities (CRA's) to enable them to identify competencies in various practical situations. These are as follows:

- **To interpret**: This means to take in information related to the various competencies.
- **To do and to use:** Solving tasks by using one's knowledge. "Do" refers to developing knowledge within Mathematics as a discipline, while "use" refers to applying this knowledge in Mathematics as well as outside Mathematics.

- **To judge:** Actions such as evaluating, forming opinions and conclusions, reflecting on Mathematics and all the activities related to the learning, using, doing and understanding Mathematics.

The mathematical competencies have a dual nature in that each of them contains two sides. One side emphasises the individual's ability to understand, follow, analyse and judge other people's exercise of the tasks encompassed by that competency. The other side emphasises the individual's own independent performance and pursuit of these activities (Niss & Højgaard, 2011, pp. 70-71).

Kilpatrick, Swafford, and Findell (2001, p. 6) use the term mathematical proficiency to capture what they think it means for anyone who must learn Mathematics successfully. According to them, mathematical proficiency has five strands namely, conceptual understanding, procedural fluency, strategic competence, adaptive reasoning, and productive disposition. Conceptual understanding is the comprehension of mathematical relations, operations and concepts. Procedural fluency implies skill in carrying out procedures appropriately, flexibly, efficiently and accurately. Productive disposition is the inclination to view Mathematics as useful, sensible and worthwhile together with a belief in one's efficacy and conscientiousness. The fourth strand is adaptive reasoning and described as the ability to think logically, reflect, justify and explain. The fifth strand, strategic competence, means the ability to represent, formulate and solve mathematical problems. The most important aspect of the five strands is that they are interdependent and interwoven. These properties have implications for how learners acquire mathematical proficiency and how teachers develop that proficiency in their learners. In the context of this study, I define mathematical competence as the ability to recognise mathematical concepts, to use them and apply them in relevant contexts and situations to execute non-routine problem-solving tasks (based on the definition of Niss and Højgaard (2011)).

### 1.5.4 Mathematical problem-solving

South Africa, like many other countries, gives high priority to the value of problem-solving in Mathematics as means of enhancing learner understanding and creative thinking skills. The CAPS endorses this priority. "Mathematical problem-solving enables us to understand the world (physical, social and economic) around us, and most of all, to teach us to think creatively." (DBE, 2014a, p. 5; Kilpatrick et al., 2001, p. 5) Furthermore, the OECD in the PISA Report defines problem-solving as "an individual's capacity to engage in cognitive processing to understand and resolve problem situations where a method of solution is not immediately obvious. It includes the willingness to engage in such situations to achieve one's potential as a constructive and reflective citizen." (OECD, 2014b, p. 30)

Problem-solving plays a vital role in Mathematics teaching and learning. Problem-solving is the solving of any task or activity for which the learners initially have no strategy, rule or method to solve the problem. Initially, leaners have no idea that there is a specific correct solution to the problem. The task, therefore, has to be challenging, or the task must require exploration, a non-routine problem (Van de Walle et al*.,* 2014, p. 34). Mullis, Martin, Ruddock, O'Sullivan, and Preuschoff (2009, p. 45) add to this by saying that non-routine problems are often or very likely unfamiliar to learners. These problems would make a cognitive demand on the learners even if they have learnt the knowledge and skills required for their solution. These problems could be purely mathematical or may have real-life settings. Both types of problems require the transfer of knowledge and skills to new situations and interaction among reasoning skills is usually a characteristic.

Du Toit and Du Toit (2013, p. 507) further state that in problem-solving previously acquired experience and knowledge are applied to unknown situations that might pose significant hindrances to solving the problem. Problem-solving skills involve cognitive aspects such as being imaginative and flexible, thinking in different ways about a problem, using alternative strategies if difficulties are encountered, extending a solution to a broader or new context and searching for new solutions (Schoenfeld, 2007b, p. 71)**.**

Tall (2013, p. 176) views the activity that an individual pursues to reach a solution, as problem-solving. His working definition of problem-solving is the activity that occurs when a person faces a problem situation for which the exact nature of the problem and its solution are not initially evident. Since the solution is not immediately evident, it is needed to clarify what the problem is, to explore the knowledge structures the person already has that might help to resolve the problem, and to see what is required to bridge the gap between the two.

Schoenfeld (2007a, p. 60) believes four aspects of mathematical competence are necessary and sufficient for understanding the quality (and success) of learners' problem-solving attempts. They are the knowledge base, problem-solving strategies (heuristics), metacognition, and beliefs and dispositions.

The focus in the PISA (*The Programme for International Student Assessment)* assessment tasks is on the cognitive processes involved in problem-solving. There are four problem-solving processes. These are exploring and understanding; formulating and representing; planning and executing; and monitoring and reflecting (OECD, 2014b, p. 31).

The research that was done on problem-solving over recent years (Wilson, Fernandez, & Hadaway) highlights the following aspects:

- Problem-solving is a significant part of Mathematics; it is the sum and substance of the discipline;
- Mathematics has many applications which represent essential problems in Mathematics. People use Mathematics in the work, understanding and communication within other subjects like science, geography and accounting;
- There is an intrinsic motivation embedded in solving problems;
- Problem-solving can be fun, and
- Problem-solving allows learners to develop the art of problem-solving.

In the context of this study, I use the notion of problem-solving as the solving of any task or activity for which the learners initially have no strategy, rule or method to solve the problem (Van de Walle, Karp, & Bay-Williams, 2013, p. 34). The problems should be non-routine problems, also called open-ended problems, which require the use of mathematical skills and mathematical knowledge as well as the application thereof in an unknown situation (Guvercđn & Verbovskđy, 2014, p. 59).

### 1.5.5 Study orientation in Mathematics

Study orientation in Mathematics is a multi-faceted and an encompassing construct which refers to learners' emotions, views and beliefs, learning techniques, attitudes, and circumstances which influence their assimilation of Mathematics procedures and concepts (Erasmus, 2013b; Maree, Prinsloo, & Claassen, 2011; Steyn & Maree, 2003).

Study orientation in Mathematics comprises six fields as defined and described by Maree et al. (2011) in their Study Orientation Questionnaire in Mathematics (SOM). These fields are study attitude, Mathematics anxiety, study habits, problem-solving behaviour, study milieu, and information processing. Research has shown that a learner's study orientation plays an important role in Mathematics learning and achievement in Mathematics (Erasmus, 2013b, p. 14; Steyn & Maree, 2003, p. 51).

Study attitude in Mathematics refers to a learner's objective as well as personal attitudes and feelings towards Mathematics which are seen consistently and affect the learner's expectation, motivation and interest in the subject. Study attitude includes a learner's scientific worldview about the self, the nature of Mathematics, and the nature of learning Mathematics. Various factors, for example, the enjoyment of the subject, the usefulness thereof, the challenge it offers, and self-confidence are included in attitudes (Maree et al., 2011, p. 7).

Mathematics anxiety refers to a learner's adverse affective reaction in situations where numbers, Mathematics and Mathematics calculations are involved. It is a feeling of anxiety and tension or stress that prevents the learner from working with numbers and solving mathematical

problems in a relaxed and confident way (Ashcraft, 2002; Ashcraft & Moore, 2009, p. 197). Such anxiety manifests typically as erratic, repetitive behaviour, for example, biting nails, excessive sweating, scrapping of correct answers and playing with objects. When a learner is too afraid to ask questions or discuss problems with the teacher, this inhibits cognitive functioning, and the learner will not take any risks in class (Erasmus, 2013b, p. 14).

Study habits refer to the displaying of acquired, consistent and efficient study methods and habits. These include aspects such as planning one's time, preparation, working on previous assessments, completing familiar problems but also strange problems. This extend to a willingness to gain insight into specific aspects of Mathematics and to study the content and practise it in a focused way (Lai et al., 2015; Maree et al., 2011, p. 8).

Problem-solving behaviour in Mathematics includes cognitive and metacognitive learning strategies. These include planning, self-monitoring, self-regulation, decision making, and self-evaluation during mathematical problem-solving. Metacognition plays an essential role in the problem-solving process; can be learned and is connected to learning. Van de Walle et al. (2014, p. 45) describe metacognition in problem-solving as the "conscious monitoring (being aware of how and why you are doing something) and regulation (choosing to do something or deciding to make changes) of one's thought processes." When the problem-solving is successful, it can be regarded as evidence of high achievement in Mathematics

(Du Toit & Du Toit, 2013, p. 581).

The study milieu includes factors relating to the social, physical and experienced environment of learners. Learners come from different social backgrounds and environments. Learners from non-stimulating environments are often behind their peers, have problems and are slower due to limited experiences. These circumstances, as well as a non-understanding of the language of Mathematics, tend to lead to Mathematics anxiety and a lack of self-confidence which could inhibit Mathematics performance (Maree et al., 2011, p. 9; Steyn & Maree, 2003).

Information processing entails the specific way in which a learner deals with information and processes the information. Information processing refers to aspects such as general and specific learning and summarising and reading strategies. Critical thinking and understanding strategies, for example, the optimal use of sketches, tables and diagrams are also seen as ways of information processing. Information processing is an indicator of the extent to which learners understand Mathematics (Steyn & Maree, 2003, p. 51).

The working definition of study orientation in this study is regarding the five fields as described in the SOM questionnaire (cf. § 3.4): study attitude, Mathematics anxiety, study habits, problem-

solving behaviour, and study milieu. The reason is that the questionnaire focuses on the first five fields only in grade 8 and grade 9, and all six fields in grades 10 to 12.

### 1.5.6 The PISA Mathematics Assessment Framework

The Programme for International Student Assessment (PISA) is an internationally standardised assessment that was developed by participating OECD countries and administered to 15-year-olds in educational programmes. PISA covers the domains of Reading, Mathematics and Science not merely regarding whether students can reproduce specific subject matter knowledge, but also whether they can extrapolate from what they have learned and apply their knowledge in novel situations. Emphasis is on the mastery of processes, the understanding of concepts and the ability to function in various situations within each domain (OECD, 2009, p. 10).

The PISA study regarding Mathematics intends to develop measures that indicate how well countries have prepared their learners (15-year olds) to become reflective, dynamic and intelligent citizens. To achieve this goal, PISA has developed assessments that measure the degree to which learners can utilise what they have learnt. The prominence is on knowledge, mathematical processes and understanding to solve problems arising from everyday experience. PISA provides a diversity of problems with varying levels of built-in hints and structure moving to real problems where the learners must think for themselves (OECD, 2009, p. 122).

The PISA Mathematics Assessment Framework forms the theoretical framework for assessing mathematical competence in this study. The framework is founded on the same eight mathematical competencies established by the Danish KOM Project (§ 1.3.3). They are thinking and reasoning, argumentation, communication, modelling, problem posing and solving, representation, using symbolic, formal and technical language and operations, and the use of aids and tools (OECD, 2013b, p. 31). PISA describes clusters of cognitive mathematical competencies to report learners' skills, weaknesses and strengths from an international perspective (OECD, 2009). These clusters are based on the kinds of cognitive demands required to solve various mathematical problems. The three clusters are: reproduction, connections and reflection, and are discussed in more detail in § 2.7.4.

## 1.6 Research questions

The study aimed to address the following primary research question: *What guidelines can be developed to enhance the mathematical competence and study orientation of secondary school learners in a problem-solving learning context?* The following sub-questions guided the study to answer the primary research question:

1. What does mathematical competence entail?
2. What does study orientation in Mathematics entail?
3. How can the mathematical competence and the study orientation of secondary school learners be enhanced through problem-solving?

## 1.7 Purpose of the research

The purpose of this research was to: Develop guidelines to enhance the mathematical competence and study orientation of secondary school learners in a problem-solving learning context. The following objectives guided the study to achieve this aim:

1. Determine what mathematical competence entails.
2. Determine what study orientation in Mathematics entails.
3. Establish how the mathematical competence, and the study orientation in Mathematics of secondary school learners, can be enhanced through problem-solving.

## 1.8 Pragmatism as worldview

Creswell (2014, pp. 5-6) states that although philosophical orientations remain hidden in research, they still influence the practice of research and need to be identified. A paradigm is a general philosophical orientation about the world and the nature of research that the researcher brings to the study (Botma, Greeff, Mulaudzi, & Wright, 2014, pp. 39-40). A paradigm defines a researcher's view of the world or reality, how to deal with the nature of knowledge, and which methods to apply when acquiring knowledge (Botma et al., 2014, pp. 39-41; Hall, 2005).

A worldview in mixed method research comprises assumptions and beliefs regarding knowledge that briefs a study. Worldviews vary in the way we gain knowledge of what we know (epistemology) and the role that those values and beliefs play in research (axiology). Furthermore, how we view reality (ontology), undertake the research process (methodology), and utilise the language of research (rhetoric) (Creswell & Plano Clark, 2011, p. 417). Table 1-4 illustrates these five mentioned elements related to pragmatism.

**Table 1-4: Elements of pragmatism and their implications for practice (Creswell & Plano Clark, 2011, p. 42)**

| Element of worldview | Pragmatism |
|---|---|
| **Ontology** (what is the nature of reality?) | There are single and multiple realities, e.g. researchers test hypothesis and supply multiple stances. |
| **Epistemology** (What is the relationship between the researcher and the researched?) | Practicality, e.g. researchers collect data by "what works" to address the research question. |
| **Axiology** (What is the role of values?) | Multiple standpoints, e.g. researchers include biased and unbiased views. |
| **Methodology** (What is the process of research?) | Combining, e.g. researchers collect quantitative and qualitative data and integrate them. |
| **Rhetoric** (What is the language of research?) | Informal or formal, e.g. researchers may engage in both formal and informal writing styles. |

The selected worldview for this study is pragmatism. Pragmatism links with mixed method research (Hall, 2005). The focal point is on the primary importance of the question asked rather than the methods, on the use of various strategies of data collection to enlighten the problems under study, and on the consequences of the research (Creswell & Plano Clark, 2011, p. 41).

There are different forms of the philosophy, but pragmatism as a worldview originates from situations, actions, and consequences rather than form preceding conditions (Creswell, 2014, pp. 10-11). Ivankova et al. (2010, p. 265) contend that pragmatism is considered the best philosophical foundation for justifying the combination of different methods in one study. The truth is what works best for understanding the research problem. Pragmatists believe that the study's research questions are more important than the techniques applied to answer them or the philosophical views that underpin each method. Furthermore, a fundamental argument of pragmatism is that qualitative and quantitative methods are compatible (Ivankova, Creswell, & Plano Clark, 2016, p. 315) meaning that both approaches have enough similarities in their core values to allow their combination in one study (Tashakkori & Teddlie, 2010, pp. 138-140).

The reason for choosing this paradigm is the fact that pragmatism opens the door to multiple methods, different assumptions, and various forms of data collection and data analysis (Creswell, 2014, p. 11) As a researcher, I am interested in solutions to problems as well as useful and workable applications. The emphasis is on the research problem, and I want to use different approaches to understand the research problem instead of focusing on methods (Creswell, 2014, p. 245; Creswell & Plano Clark, 2011, p. 415). As a result of choosing this paradigm, my research develops and constructs theory (Trafford & Leshem, 2012, p. 94).

## 1.9 Research design and methodology

Because of the different type of sub-questions, it was imperative to follow a mixed method design in this study. The first two sub-questions: *What does mathematical competence entail* and *What does study orientation in Mathematics entail*, are quantitative in nature. The third sub-question: *How can the mathematical competence and the study orientation of secondary school learners be enhanced through problem-solving*, implies a qualitative form of investigation.

An embedded experimental mixed method design seemed appropriate for the study. In an experimental mixed method design, the researcher collects, analyses and integrates both qualitative and quantitative data embedded within a quantitative experimental design framework. This design is beneficial in this study because the process of the SETH intervention is qualitatively investigated in conjunction with testing its effects quantitatively (Ivankova et al., 2016, p. 320). The quantitative phase embedded the qualitative phase. The collection and analysis of the qualitative data set followed the quantitative data collection, i.e. a sequential design. The qualitative data set was based on the quantitative data set, with unequal priority, playing a secondary role to understand the quantitative results and to support the experimental quantitative design in the study (Creswell & Plano Clark, 2011, pp. 90-91). The notation for the study is QUAN(qual) (Creswell & Plano Clark, 2011, p. 109). The quantitative phase was a quasi-experimental design with an experimental group, the SETH learners and a control group, the non-SETH learners.

Figure 1-2 below provides a diagrammatic presentation of the embedded mixed method design employed in the study.

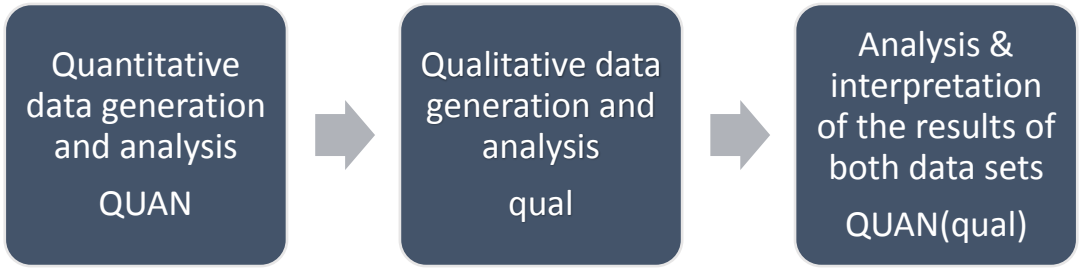



**Figure 1-2: The embedded mixed method design in the study**

## 1.10 Population and participant selection

The population in the study was the learners of the project school of the SETH Academy. The SETH Academy is a community project of the Faculty of Engineering of the North-West

University at the Potchefstroom Campus. All the grade 8 and 9 learners of the school participated in this study. It seemed appropriate to include all these learners in the study because their mathematical competence, study orientation in Mathematics and problem-solving abilities are investigated within the school context and environment. Three groups were involved: grade 8 (2016), grade 9 (2016) and grade 8 (2017). Each group consisted of SETH learners (experimental group) and non-SETH learners (control group) as shown in Table 1-5 below.

**Table 1-5: The composition of the three samples in the study**

| | Grade 8 (2016) | Grade 9 (2016) | Grade 8 (2017) |
|---|---|---|---|
| **SETH learners** | 37 | 28 | 39 |
| **Non-SETH learners** | 63 | 74 | 64 |
| **TOTAL** | **100** | **102** | **103** |

## 1.11 Methods of data generation

An embedded experimental mixed method design, as illustrated in Figure 1-3 below, was implemented due to the difference in nature of the research sub-questions. The quantitative investigation embedded the qualitative investigation. Data were first generated quantitatively followed by the qualitative phase. A discussion of the generation of the various data types follows:

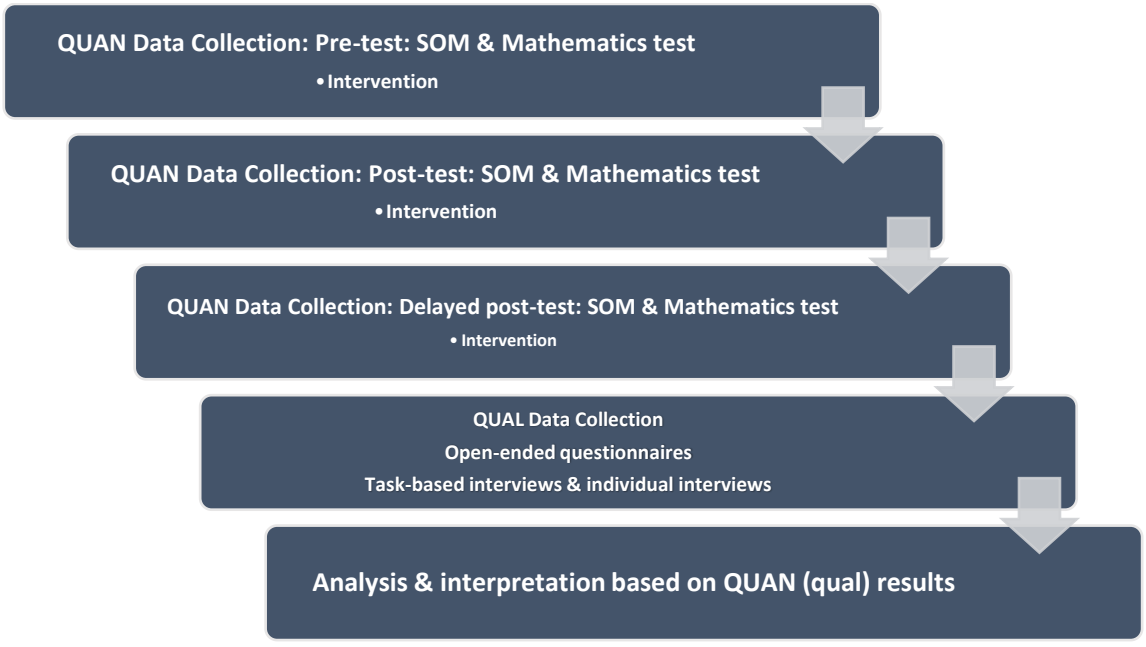



**Figure 1-3: Data generation process in the study**

### 1.11.1 Quantitative phase

In the quantitative experimental phase, the Study Orientation in Mathematics Questionnaire (SOM) was used to determine learners' study orientation in Mathematics. The SOM is a standardised questionnaire for the South African population, and measures study orientation regarding the following six fields: study attitude, Mathematics anxiety, study habits, problem-solving behaviour, study milieu and information processing. Refer to § 3.4 for an in-depth discussion of this questionnaire.

The grade 8 (2016) and grade 8 (2017) learners wrote a Mathematics pre-test and post-test. The grade 9 (2016) learners completed a pre- and post-test and a delayed post-test during the research. The intent was to determine the learners' levels of mathematical competence. Refer to § 4.8.3 for more information on these tests.

### 1.11.2 Qualitative phase

The qualitative phase followed the quantitative phase. The SETH learners completed two open-ended questionnaires on two occasions during the research. The questionnaires intended to determine the SETH learners' views, feelings, experiences, and the value of their involvement in the SETH Academy on their Mathematics performance and learning in general (§.4.9.3 and § 5.3.1)

I conducted task-based interviews with 24 purposefully selected SETH and non-SETH learners. The purpose was to determine their feelings during problem-solving, on problem-solving skills, their ability to use metacognition and to reflect on their solutions to problems (§ 4.9.3 & § 5.3.2).

There were individual interviews with the four grades 8 and 9 Mathematics teachers at the school. The goal of the interviews was to determine their views on the influence of the activities of the SETH Academy on learners' learning in general and performance in Mathematics since they are involved with these learners (§ 4.9.3 & § 5.3.3).

## 1.12 Methods of data analysis

The quantitative data and qualitative data were analysed separately and are discussed in the following section.

### 1.12.1 Quantitative phase

The results of the SOM questionnaire were analysed statistically. Firstly, the reliability of the SOM questionnaire as measuring instrument was determined with Cronbach's $\propto$. The reliability coefficients can vary between zero and one (Pietersen & Maree, 2016c, p. 239). The reliability

level is acceptable at 0,8, although levels of 0,67 or above are acceptable in the case of human participants (Cohen, Manion, & Morrison, 2011, pp. 639-640; Field, 2005, pp. 667-670).

A factor analysis confirmed the construct validity of the SOM. Construct validity involves the extent to which a measuring instrument conforms to the theoretical context in which it is situated (Cohen et al., 2011, p. 188).

The results of learners' performance in the SOM questionnaire had to be compared. This comparison necessitated the execution of *t*-tests. The *t*-test is used to determine if there are statistically significant differences between the means of two groups, using parametric data drawn from random samples with a normal distribution (Pietersen & Maree, 2016a, pp. 250-254). It is used to compare the means of two groups, e.g. in a pre-test and post-test as required in this study (Cohen et al., 2011, p. 642; Field, 2005, pp. 296-298). An independent *t*-test was implemented to establish the changes in study orientation between the SETH learners and non-SETH learners. Paired *t*-tests were applied to establish the changes in study orientation of the SETH sample in each of the three tests and those of the non-SETH sample in each of the three tests (Cohen et al., 2011; Field, 2005).

A similar procedure was enacted for the mathematical competence pre-test and post-test. The reliability of the test was determined with Cronbach's $\propto$. A factor analysis determined the validity of each construct in the test. Independent *t*-tests were executed to determine the statistical differences between the SETH learners and non-SETH learners. Paired *t*-tests were applied to establish the changes in study orientation of the SETH sample in each of the three tests and those of the non-SETH sample in each of the three tests. The qualitative phase followed the quantitative phase and is discussed in the subsequent section.

### 1.12.2 Qualitative phase

The responses in the two SETH questionnaires were captured on ATLAS.ti™, coded and analysed and discussed under the central themes and sub-themes that emerged (Nieuwenhuis, 2016a).

The task-based interviews with the purposively selected SETH and non-SETH learners were first transcribed. These interviews were in Afrikaans and English. The transcribed interviews were uploaded on ATLAS.ti™ under a hermeneutic unit after that coded, and themes and sub-themes identified. The responses were discussed under the identified themes (Nieuwenhuis, 2016a).

There were four individual interviews with the Mathematics teachers conducted in Afrikaans. They were firstly transcribed, but not translated into English. After that uploaded on ATLAS.ti™

under a new hermeneutic unit. Themes and sub-themes were identified after coding the interviews and discussed in detail (Nieuwenhuis, 2016b).

## 1.13 Ethical aspects of the research

The context of this study was the SETH Academy which is a community project at a project school of the Faculty of Engineering of the North-West University. This project commenced in 2013 and had prior approval from the North-West Department of Education. I firstly attained ethical clearance for my research from the North-West University's Ethics Committee. The ethical clearance number for the study is NWU-HS-2015-0235 (Refer to Addendum 1).

Then permission was obtained from the North-West Education Department, Kenneth Kaunda District because the project school falls under their jurisdiction (cf. Addendum 4). The school principal and the School Governing Body (SGB) of the particular school granted their permission for the research at their school (cf. Addendum 4).

Since secondary school learners who are minors were participants in the study, their parents gave written informed consent. The parents of the participants were assured that their children would remain anonymous, all information would be treated confidentially, and that their participation in the research would not jeopardise their school activities and activities in the SETH Academy in any way. The learners signed an informed assent form, and the four Mathematics teachers in the research project also signed a written consent form (cf. Addendum 4) (Botma et al., 2014, p. 56; Creswell, 2014, pp. 92-95).

The following ethical principles were applied throughout this study. The participants received a specific code (S for a SETH learner and L for a non-SETH learner) to ensure their anonymity. They were protected from any possible harm; the research data remained confidential throughout the study, and the participants had the right to withdraw at any time or during any stage of the research project (Leedy & Ormrod, 2013, p. 263; Trafford & Leshem, 2012, p. 100).

## 1.14 Chapter framework

This section summarises the structure and content of the report:

**Chapter 1:**

Chapter 1 provides the background for the study regarding the problem statement and motivation. The gap in the existing literature and an overview of the relevant literature are given. The research questions and objectives of the study are formulated. This chapter further focuses on the embedded mixed method research design, data generation and data analysis, and the ethical aspects followed and adhered to during the study.

**Chapter 2:**

This chapter grounds the conceptual and theoretical framework for mathematical competence, one of the essential constructs in the study. The focus is on the teaching and learning of school Mathematics which entails problem-solving learning contexts, understanding, metacognition, communication and the role of affective factors during the learning process. Mathematical competence is discussed regarding eight mathematical competencies of the KOM project. The PISA Mathematics Assessment Framework, an instrument to measure mathematical competence, is unpacked. The role of affective factors on mathematical competence is discussed. The chapter concludes with possible ways to enhance mathematical competence

**Chapter 3:**

Chapter 3 supplies the theoretical and conceptual framework for study orientation in Mathematics, another construct in the study. Study orientation is discussed regarding study attitude, study habits, study milieu, Mathematics anxiety, problem-solving behaviour, and information processing. The SOM questionnaire as measuring instrument for study orientation is described. Furthermore, the role of study orientation on mathematical performance and mathematical competence is investigated. The effect of affective and conative factors on study orientation is discussed, and finally, ways to enhance study orientation come under the spotlight.

**Chapter 4:**

In Chapter 4, the embedded mixed method research design and methodology are described based on a pragmatic worldview. The measuring instruments and various underlying aspects of the quantitative and qualitative phases are discussed in detail. The ethical aspects adhered to are given, my role as a researcher is defined, and constraints of the study are pointed out.

**Chapter 5:**

The quantitative data and qualitative data are analysed and interpreted. The interpretation of these two types of data sets is explained. This interpretation leads to answers to the research sub-questions. Strategies employed to ensure validity and reliability in both types of data analysis are discussed.

**Chapter 6:**

The final chapter supplies a synopsis of the research. The findings and recommendations are stated, and a conclusion is drawn. The value of the research and limitations thereof are provided with suggestions for future research. Guidelines are developed to answer the primary

research question: *What guidelines can be developed to enhance secondary school learners' mathematical competence and study orientation in a problem-solving learning context?*

# CHAPTER 2 TEACHING AND LEARNING MATHEMATICS FOR MATHEMATICAL COMPETENCE

## 2.1 Introduction

It has become increasingly important to prepare learners effectively for work, life, and citizenship in the 21st century, but it remains a somewhat daunting task. The rapid technological explosion, globalisation, changing markets, and environmental and political challenges make an urgent appeal to all the educational stakeholders involved. Learners must develop skills, acquire the knowledge needed for "survival" and success in the 21st century, and prepare for jobs that do not yet exist. Some of these skills are higher-order thinking skills, self-directed learning, collaboration, communication, critical thinking, problem-solving, and Information and Communication Technology (ICT) literacy (Pásztor, Molnár, & Csapó, 2015; Rand Corporation, 2012).

Lesh and Zawojewski (2007, p. 764) state that there is growing recognition that a severe discrepancy exists between the lower order skills emphasised in school curriculum materials and assessments and what learners need beyond school. Various authors (Haavold, 2010; Samuelsson, 2010; Turner, 2011) remark that even high achieving learners often lack conceptual understanding, use artificial reasoning and find non-routine or open problems challenging.

Furthermore, problems with the transition from secondary to tertiary education pertain to many topics. One significant obstacle consistently documented in literature worldwide is students' severe difficulties with university Mathematics. Neumann et al. (2015) report that in Germany 48 percent of engineering students fail their first year of engineering studies. Mathematics at tertiary level differs significantly from school Mathematics. This fact is sometimes called the "abstraction shock" and emphasises the problem with formal Mathematics. Learners are not well prepared for tertiary education, have trouble at the beginning of their studies and cannot meet university demands (Benade, 2012; Labuschagne, 2013).

The question arises of what could be done at secondary school level to alleviate this severe imbalance and to improve the mathematical learning and achievement of all learners. This question necessitates an in-depth study of the mathematical competence and study orientation in Mathematics as an answer to this question since mathematical competence and study orientation in Mathematics are two crucial predictors of success and achievement in Mathematics. Chapter 2, therefore, entails an in-depth discussion on mathematical competence, the nature of school Mathematics, the constructivist teaching and social-cultural learning of Mathematics, and problem-solving. Chapter 3 focuses on study orientation in

Mathematics, the other significant contributing factor to mathematical competence and subsequent achievement in the subject. These two constructs form the theoretical framework or lenses through which the empirical study is executed. Figure 2-1 represents an overview of Chapter 2.

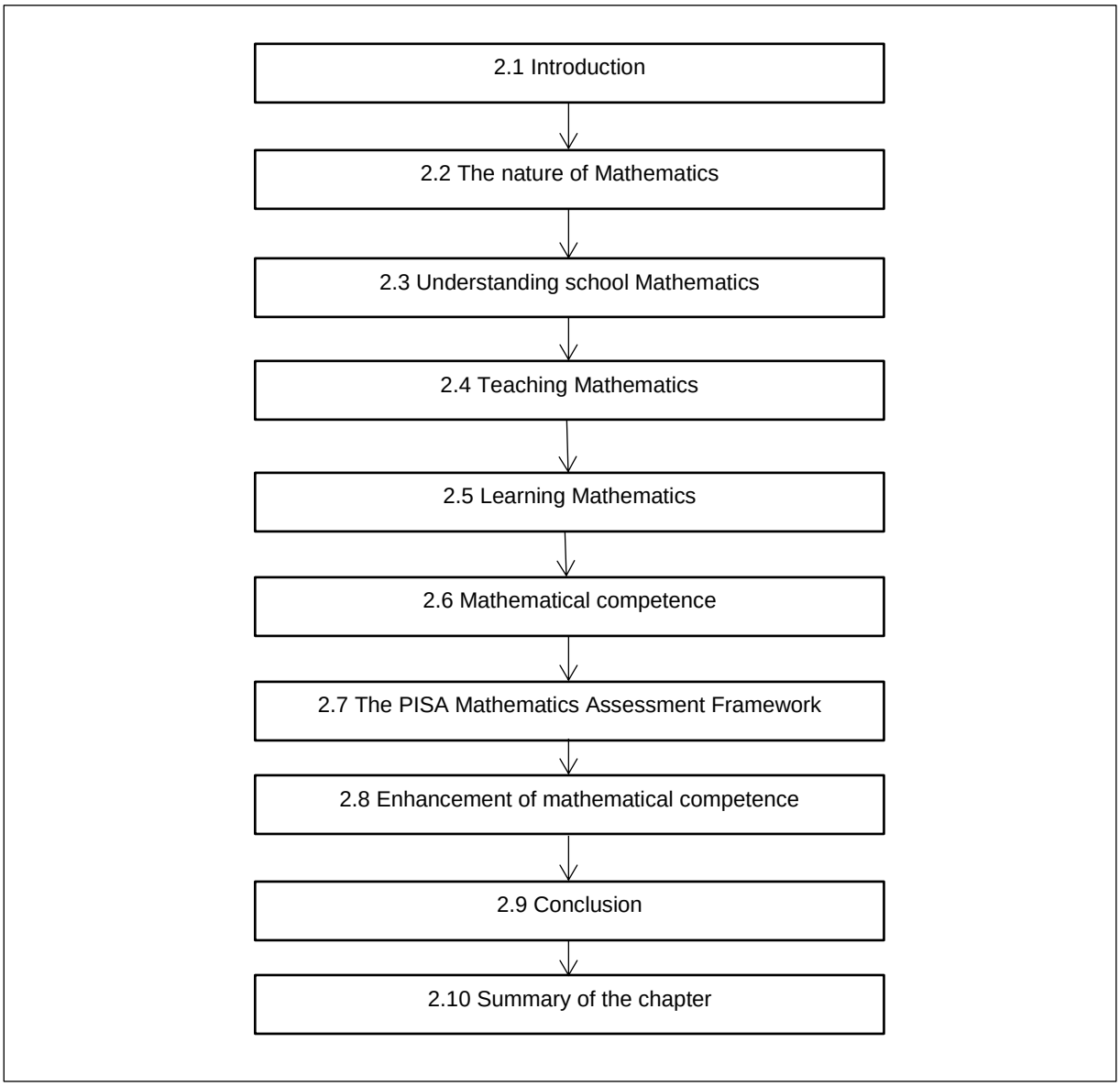



**Figure 2-1: An overview of Chapter 2**

Figure 2-2 below displays the emergent themes emanating from the literature review done on ATLAS.ti™.

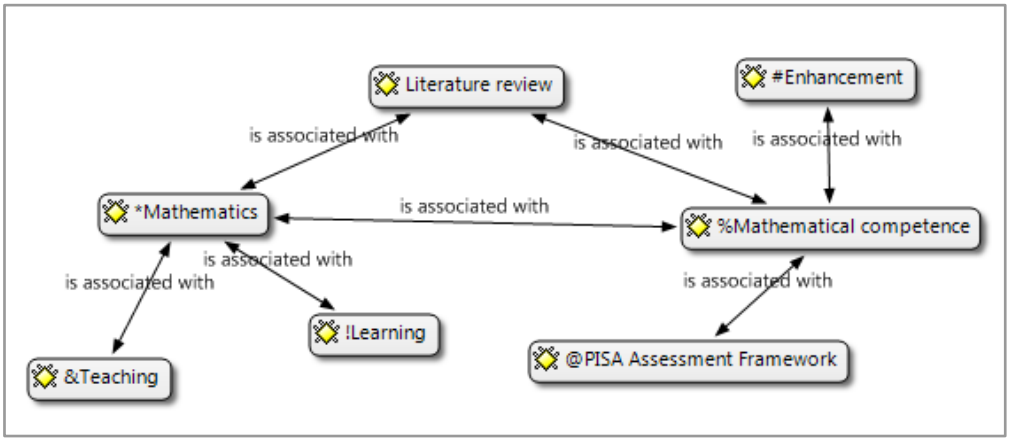



**Figure 2-2: Emergent themes from the literature review done on ATLAS.ti™:**

## 2.2 The nature of Mathematics

Mathematicians, academics, educators and other stakeholders have had different views on the nature of Mathematics dating back to ancient times. Even the Greek philosophers Plato and Aristotle differed on their views of Mathematics. Plato (as cited by Nieuwoudt (2006, p. 11)) regarded Mathematics as a static body of absolute true knowledge which starts in the external world outside the person. Humans had to discover Mathematics through suitable activities, and he thus viewed Mathematics as a static product. On the other hand, Aristotle (as cited by Nieuwoudt (2006, p. 11)) viewed Mathematics as a process of doing, learning and problem-solving. To him, Mathematics is invented and created in the human mind and can gradually expand.

Mathematics is a system of concepts or ideas, processes and principles tightly interwoven (Arhin, 2015). Lai et al. (2015) describe Mathematics as one of the most practical, objective and logical academic disciplines. Mathematics is abstract and communicated through models or applications, symbols, diagrams, and language only (Siemon et al., 2013). Mathematics is the study of the structure; an explanation is mathematical if it focuses on structural properties of the situation (Lesh & Zawojewski, 2007, p. 782).

Mathematics is a human endeavour in which ordinary people construct concepts, discover relationships, invent methods, execute algorithms, communicate and solve problems posed by the real-world (Cangelosi, 2003). Other authors describe Mathematics as the science of pattern and order, which challenges the view that Mathematics is merely a discipline dominated by computation (Van de Walle et al., 2014).

Singh (2016, p. 107) describes theoretical Mathematics as the science of patterns and relationships which investigates possible relationships between abstractions without knowing whether they have counterparts in the real world. Investigations focus on identification which includes finding basic rules and ideas from which all other ideas and rules are logically deduced. Progress in the subject results in more relationships found between parts developed separately, e.g. the spatial representation of geometry and the symbolic representations of algebra. These cross connections then assist in developing insight into various parts.

De Lange (2006, p. 20), holds a similar view to that of Singh, that Mathematics is the language that describes patterns; patterns invented by people and patterns in nature. These patterns can arise from the world around us or from human thinking and can vary in nature, i.e. be dynamic or static, quantitative or qualitative, visual or mental, and real or imagined.

There are three dominant views of Mathematics namely, the Platonist (static-formalist) view, a dynamic, problem-solving view (constructivist) view, and an instrumentalist view. In the static-formalist view, Mathematics is seen as stable consisting of interrelated structures and truths bound by intrinsic and logical meanings. In the dynamic, problem-solving perspective, Mathematics is a problem-driven process and not a finished product. People construct their understanding and meaning of mathematical concepts. In the instrumentalist view, Mathematics is viewed as a bag of 'tools', made up of facts, rules, and skills to be used by a skilled person (Nieuwoudt, 2006). Doing Mathematics, engaging in the science of pattern and order, takes time and effort from both the teacher and learner in the school.

## 2.3 Understanding school Mathematics

Mathematics is one of the most critical school subjects but viewed as one of the most difficult and the most feared by learners worldwide. Competence in Mathematics is a strong predictor of favourable outcomes for young adults. Poor Mathematics skills inhibit learners' access to good jobs and their chances in life (Erasmus, 2013a). Enhancing the development of mathematical skills is imperative in not only accounting for the best way to teach skills and competencies, but in understanding learners' emotional and cognitive experiences regarding the subject too (Domazet et al., 2013, p. 121; Peixoto et al., 2016, p. 5).

Mathematics plays a crucial role in all societies. School learners worldwide study Mathematics with relatively similar content and methods. This importance confirms the assumptions that Mathematics is relevant, important and necessary for every citizen in modern society. These assumptions may change over time, but the importance is the usefulness of what is taught in the lives of learners as well as its role outside of school Mathematics (Jessen, Kjeldsen, & Winslow, 2015; Smith & Morgan, 2016). There are many reasons for the importance of

Mathematics in the school curriculum. One of them is that Mathematics has a functional role regarding participating in the real world outside and beyond the Mathematics classroom (Smith & Morgan, 2016).

Niss (1996) gives three reasons why school Mathematics exists. They are:

- The cultural, ideological and political development and preserving of society;
- The socio-economic and technological development of society; and
- The provision of prerequisites to individuals which will assist them in coping with social and private lives in careers, in education or as citizens of a country.

These reasons for including Mathematics in school curricula are established in current curriculum documents worldwide, e.g. the National Council of Teachers of Mathematics (NCTM), the Danish KOM-project, the curriculum in Singapore, and more.

The focus of this study is in secondary school Mathematics, specifically in the Senior Phase (grade seven to nine). The focal point is the nature of Mathematics, specific aims, specific skills, and content areas as envisaged by the official South African Curriculum, the Curriculum and Assessment Policy Statement (CAPS) of the Department of Basic Education (DBE, 2011).

This study uses the following working definition of Mathematics: “Mathematics is a language that makes use of symbols and notations to describe numerical, geometric and graphical relationships. It is a human activity that involves observing, representing and investigating patterns and quantitative relationships in physical and social phenomena and between mathematical objects themselves. It helps developmental processes that enhance logical and critical thinking, accuracy and problem-solving that will contribute to decision-making.” (DBE, 2011, p. 8)

The teaching and learning of Mathematics at school level aim to develop:

- A love for Mathematics and a spirit of curiosity,
- An appreciation for the elegance and beauty of Mathematics,
- Recognition that Mathematics is a creative part of human activity,
- Deep conceptual understanding to make sense of Mathematics,
- Competence and confidence to deal fearlessly with any mathematical situation,
- A critical awareness of how mathematical relationships apply in cultural, economic, social and environmental contexts, and
- The acquisition of specific skills and knowledge required for:
    - the application of Mathematics to social, physical and mathematical problems,
    - further study in Mathematics

- the study of related subject matter in other subjects (DBE, 2011).

Mathematical Literacy deals with 'real' problems. Real problems are not entirely mathematical but placed in specific real-life contexts. Learners must solve these problems using the knowledge, competencies and skills they have obtained through schooling and life experiences. Mathematization plays an essential role in this solving process and is discussed in more detail in Section 2.7.2.1 (De Lange, 2006, p. 17).

## 2.4 Teaching Mathematics

The teaching approach in the Mathematics classroom plays a vital role in the development of learners' mathematical competence (Samuelsson, 2010). Over the years, traditional teaching featured in most schools. Mathematics is a product where the outcome of learning is correct answers. This approach is based on teacher-centred teaching where teachers introduce new concepts, and their use is shown in examples (Samuelsson, 2008). Learners copy these examples and practise similar questions in the examples given. Learners are then assessed on similar problems as done in the class. Part of the learning is the ability to repeat definitions and formulas. This teaching method is seldom interactive, most of the communication is one-way where learners are the recipients. A significant amount of drill and practice and rote learning takes place. The focus is on algorithms and not on meaningful learning with understanding (Domazet et al., 2013; Nieuwoudt, 2006).

Learners are not often engaged in investigations, application of mathematical concepts outside the classroom, doing their projects, expressing their mathematical problems, communicating their reasoning and ideas about Mathematics in written form. Visualisation tools, ICT, the mass media (TV and newspapers), mathematics software (GeoGebra and Geometer Sketchpad) are seldom used as resources. Unfortunately, traditional teaching methods and tools do not enhance and foster the development of understanding and mathematical competence. Various constructivist teaching methods must deliberately be used to enhance the development of mathematical competence (Domazet et al., 2013, p. 125) and highlighted in the next two sections.

### 2.4.1 Constructivist teaching

Constructivism is rooted in Jean Piaget's work developed during the 1930s and translated into English two decades later. Constructivism is a psychological and philosophical perspective which contends that learners construct or form much of what they understand and learn through social and individual activities. Constructivist teaching incorporates principles of constructivism to enable learners to construct their learning (Schunk, Pintrich, & Meece, 2010, p. 376).

Constructivism views learners, not as blank slates, but as constructors/creators of their learning. Integrated networks are the result of constructing knowledge and the tools with which new knowledge is constructed. Networks can be modified, rearranged, or added to as learning occurs. Learner plays an active part in this process. Learners can modify their existing networks through reflective thought, i.e. the effort to link existing ideas to new ideas. These changes can happen through the processes of assimilation and accommodation. Assimilation is when a network expands because a new concept fits in with the existing knowledge. On the other hand, accommodation necessitates the changing or replacement of the network because the new idea does not fit in with existing ideas (Van de Walle et al., 2014, pp. 19-20).

Constructivism incorporates a variety of views that emphasise the importance of learners constructing knowledge for themselves from their own experiences. These views include discovering relationships and constructing concepts (Cangelosi, 2003, p. 417). Schunk et al. (2010, pp. 330-331) suggest the following constructivist teaching principles applicable to this study. These are:

- Constructivist teaching involves problem-solving, inquiry, exploration, and active forms of learning. Teachers facilitate learning by assisting learners to make associations with pre-knowledge to understand new concepts;
- Constructivist teaching encompasses the use of authentic tasks and problems. Learning involves creating, applying, and extending knowledge;
- Constructivist teaching creates communities of learning in the classroom. Learners learn through discourse, self-reflection and social interactions, and
- Constructivist teaching involves an emphasis on growth of knowledge and conceptual understanding of concepts and skills. Multiple assessments are used to detect changes in learners' understanding and knowledge over time.

However, numerous studies in educational contexts reveal that teaching strategies used in classrooms are still direct instruction or traditional approaches. It is therefore unrealistic to expect the existence and development of functional and realistic mathematical competence under these conditions (Samuelsson, 2008).

### 2.4.2 Problem-solving teaching approach

In the context of this study, a problem-solving teaching approach assumes teaching and learning *through* problem-solving. This approach implies that learners learn Mathematics *through* models, situations, problems, and real-life contexts (Nieuwoudt, 2015). These models and contexts enable them to understand the concepts so that they can progress to more abstract concepts (Wessels, 2009). This approach is an upside-down approach from teaching

for problem-solving where problems are given at the beginning of the lesson with skills developing because of working with the problems. The problems become the vehicle through which the required content is learned (Van de Walle et al., 2014, p. 32).

It is essential to describe first what is meant by a "problem" to understand the process of problem-solving. An activity or task becomes a problem when the problem-solver must find a more productive way of thinking about the given task or situation. Therefore, the problem-solver must interpret the situation by modelling it regarding Mathematics (Lesh & Zawojewski, 2007, p. 782). Van de Walle et al. (2014, pp. 34-35) view a problem as any activity or task for which learners do not have prescribed rules or methods or a specific correct solution method. A learner must find a task or activity problematic for it to become a "problem". They mention three essential features of a problem: the problem must take learners' current understanding into account, the problematic aspect of the problem must be related to the Mathematics learners should learn, and the problem must require explanations and justifications for methods and answers.

Lesh and Zawojewski (2007, p. 782) view problem-solving as the process of interpreting a problem situation mathematically and of sorting out mathematical concepts from a variety of topics within and outside Mathematics in order to solve the problem. Lester and Kehle (2003) define problem-solving as seeing situations mathematically and not merely applying rules, procedures or skills efficiently.

General competencies, for example problem-solving, are particularly essential to cope with a changing and challenging society. On the one hand, problem-solving is a cross-curricular competency which is vital for successful learning at school, work and in various areas of life. On the other hand, the enhancement of problem-solving as a subject-specific competency is a vital teaching aim in subject areas such as Mathematics and Science (Buchwald et al., 2015).

## 2.5 Learning Mathematics

Learning theories are the result of the analysis of people when they learn and develop new understandings. Learning theories are tools or lenses for interpreting how a person learns. In this study, constructivism is the best lens to view how a learner might internalise an idea. The social-cultural theory for learning is the lens to analyse the influence of the social and cultural aspects of the classroom on learners' learning (Van de Walle et al., 2014, p. 19).

Learning occurs in five domains known as affective, cognitive, static, dynamic and psychomotor. Each domain has its concepts, theories, principles, and processes. Individual differences result in various learning approaches, learning skills and probably learning difficulties. Many factors affect a learner's learning. Physical factors are the most evident. Study orientation skills, the

learning atmosphere and physical aspects affect learners' learning and are directly related to their academic performance/achievement (Awang & Sinnadurai, 2011, p. 314). The way in which learners learn determines their level of mathematical competence (Haavold, 2010). The social-cultural learning theory applies to this study because the focus is on fostering mathematical competence in a problem-solving learning context and is analysed in the next section.

### 2.5.1 Social-cultural learning

Just as the work of Piaget relates to constructivism, the work of Vygotsky mainly influenced social-cultural theory. These theories share universal concepts, but the social-cultural theory has several unique features. These features are as follows:

- Thinking processes exist between learners in social learning settings. Learners move ideas from these social settings into their psychological realm,
- The way in which a learner learns information depends on whether it was within a learner's Zone of Proximal Development (ZPD). ZPD refers to knowledge which is out of the reach of learners to learn on their own but is accessible if learners have support from peers or others more knowledgeable than themselves,
- Semiotic mediation is another significant concept in social-cultural theory. Semiotic mediation is the way in which a learner's attitude, beliefs, and goals are simultaneously affected and affect socio-cultural practices and schools, and
- Social interaction is necessary for mediation. The community of practice is influenced by the culture the teacher creates and the culture of the learners in the classroom (Van de Walle et al., 2014, p. 20).

The social-cultural learning theory forms the foundation for this study because learning depends on new knowledge which falls within the ZPD of the learners, occurs through interaction between learners and the teacher, is influenced by tools of mediation, and by the culture in and outside the classroom. Furthermore, the focus is on problem-solving to enhance mathematical competence and study orientation in Mathematics.

### 2.5.2 Learning through problem-solving

The point of departure in this study is that learners learn Mathematics through problem-solving and that they learn to problem-solve through generating mathematical models. The construct problem-solving plays an essential role in Mathematics curricula worldwide. Most of the time it is related to the real world, but also includes working with predominantly Mathematics problems as well as extra-curricular scenarios (Smith & Morgan, 2016).

Problem-solving is one of the critical types of cognitive processes which takes place during learning (Human, 2009). People studied problem-solving for a long time, but interest in the topic has expanded with the growth of cognitive learning theories. Some theorists regard problem-solving as a critical process in learning, especially in Mathematics and Science. The constructs, problem-solving and learning are not synonymous, but the first is involved in the second specifically when learners show some evidence of self-regulation over learning, and when the learning is challenging and without apparent solutions (Schunk, 2012, p. 299).

Problem-solving plays a vital role in coping with the demands of an ever-changing world. It is a cross-curricular competency which is related to general cognitive abilities, and as a domain-specific competence, e.g. in Mathematics. Results of the Programme for International Student Assessment (PISA) show that cross-curricular problem-solving can be seen as a resource for the improvement of domain-specific problem-solving competence in Mathematics (Buchwald et al., 2015, p. 18).

In the PISA framework, real-life contexts relate to problem-solving by using processes of formulating situations mathematically and interpreting mathematical results. These contexts differ from merely using mathematical techniques (Smith & Morgan, 2016). The working definition of problem-solving in PISA is "an individual's capacity to use cognitive processes to resolve real, cross-disciplinary situations where the solution path is not immediately obvious." The cognitive processes used in problem-solving are problem-solving processes and reasoning skills (Greiff, Holt, & Funke, 2013, p. 73).

It is essential to focus on what a problem is in a problem-solving learning context to understand the construct problem-solving. A problem is a situation in which a learner must reach some outcome and find a way to reach it, but there is no routine method available to solve the problem. The problem could be to answer a question, do a calculation or plan something (NCTM, 2010). All problems have generalities despite the subject area and complexity. Problems have an initial state, a goal and involve performing operations to achieve the goal. Problem-solving is, therefore, the attempt of people to achieve a goal or solve a problem for which they do not see an automatic solution. During problem-solving the problem has to be represented in some way, viewed as knowledge acquisition, followed by the use of a problem-solving process, known as knowledge application (Greiff et al., 2013; Schunk, 2012).

Polya is known for his heuristic methods to solve problems. Heuristic methods are general methods which use principles that lead to a solution. Polya suggests the following steps involved in problem-solving. They are: understand the problem, devise a plan, carry out the plan, and look back (Schunk, 2012, p. 302). The stages are as follows:

1. **Understand the problem**: The learner analyses the problem regarding the given, the missing information and what is required to do to solve the problem. For example: write the problem more straightforwardly or use a graph or sketch to represent the problem.
2. **Devise a plan**: The learner organises the facts and variables and chooses an appropriate method to solve the problem.
3. **Carry out the plan**: The learner uses proofs to see if the chosen strategy was suitable and thinks about other possible strategies.
4. **Look back**: The learner checks the answer to see if it is realistic and a solution to the problem (Tzohar-Rozen & Kramarski, 2014).

Despite the usefulness of Polya's problem-solving steps, Schoenfeld (1992, p. 352) believes that these heuristic strategies do not provide enough detail to enable learners to use them if they are not already familiar with them.

Multi-step problem-solving requires the execution of multiple cognitive experiences and actions. These include the use of existing knowledge (definitions, facts, and competencies) and problem-solving strategies (e.g. analysis). Learners find it difficult to understand Mathematics texts, to find different methods to solve problems, and lack confidence to calculate and verify solutions (Schoenfeld, 1992; Tzohar-Rozen & Kramarski, 2014). Furthermore, the reasoning ability plays a crucial role in solving non-routine problems. It also strengthens learners' ability to face real-life problems and solve them successfully (Putra, Zulkardi, & Hartono, 2015).

Researchers such as Schoenfeld (1992) and De Corte (2015) show that learner problem-solving difficulties arise from ineffective activation of their knowledge rather than from a lack of mathematical knowledge. Learners often lack the metacognitive skills required to control, monitor and reflect on the solution processes. During the past years, researchers have tried to identify and understand the cognitive mechanisms at the heart of learners' word problem-solving. Some of these mechanisms are executive functioning, processing speed and working memory. Early research findings show that metacognition develops alongside general cognitive ability and might be a better predictor of Mathematics performance than general aptitude (Lai et al., 2015).

Metacognition consists of three components namely metacognitive knowledge, metacognitive experience and metacognitive skills. Metacognition is an indication of awareness (self-image), the monitoring of one's cognitive system, and its functioning (self-regulation). Self-image involves strengths and limitations about the abilities of others. These include self-consciousness and self-evaluation, beliefs about, and self-efficacy concerning others. Self-regulation is the ability to use cognitive knowledge to achieve cognitive goals, especially in the face of cognitive hindrances. Strategies and motivation are two further aspects of metacognitive

ability. Strategies are the processes learners use to monitor the problem-solving process which is an important metacognitive skill. Motivation refers to learners' beliefs about themselves, their performance, and their teachers and parents. Motivation is an essential factor of metacognition and can activate the self-regulation process (Lai et al., 2015; Panaoura & Philippou, 2003, 2007).

Cognitive or metacognitive problems result in negative feelings towards the subject and thus hamper learning and achievement. In addition to cognitive factors, problem-solving involves affective factors as well. Meta-analysis studies prove that negative emotions and attitudes have severe consequences. These are avoiding Mathematics, a sense of hopelessness, stress, and eventually, flight at different stages of the solution process. These symptoms appear as early as elementary school and peaks in grades five and six (Lai et al., 2015; Tzohar-Rozen & Kramarski, 2014). Furthermore, mathematical problem-solving is shaped by affective and cognitive factors. Mathematics anxiety is an essential affective factor which obstructs success in mathematical problem-solving. High levels of Mathematics anxiety are related to less efficient mathematical problem-solving (Lai et al., 2015). (Refer to § 3.4.5)

Metacognition is an excellent forecaster of problem-solving skills in Mathematics. Learners who report using memorisation strategies often perform lower in all subjects, whereas students reporting the more significant use of metacognitive strategies perform higher in Mathematics (Erbas & Bas, 2015; Maree, Fletcher, & Erasmus, 2013, p. 206).

### 2.5.3 Learning for understanding

Constructivist and social-cultural theories emphasise the importance of learners building connections among new ideas and existing ideas (pre-knowledge) during learning. These connected ideas then form a network of ideas. The more connections to a network of ideas, the better the understanding. Understanding is a measure of the quantity and quality of connections of a new idea with existing ideas. It is not an all-or-nothing proposition; it varies with each learner and depends on the existence of appropriate ideas and the formation of new connections (Van de Walle et al., 2014, p. 23). Understanding exists on a continuum from a relational understanding, i.e. understanding what to do and how to do it, to an instrumental understanding, i.e. doing something without understanding (Van de Walle et al., 2014, p. 24). The two ends of this continuum were named by Richard Skemp, an educational psychologist who had influenced Mathematics Education significantly (Skemp, 1976, 1978).

Understanding of Mathematics is essential for a learner's readiness for life in modern society. Daily encountered problems and situations more and more expect some level of understanding of Mathematics, mathematical tools and mathematical reasoning before they can be fully

understood and solved. Mathematics is a critical tool for learners when confronted with problems in various aspects of their lives (OECD, 2013b).

### 2.5.4 Deeper learning

Learners need to master subject content and develop skills that enable them to collaborate with other learners and apply that knowledge in new situations and contexts. These capabilities will prepare them for the demands of tertiary education and the workplace. Learners who have the required skills to collaborate with others, deal with and critically address new challenges, will have access to more opportunities in tertiary education, career and civic life. Deeper learning entails a range of competencies related to human interaction and self-management, more profound understanding of core subject content, and the ability to apply that understanding in new and different contexts (Bitter & Loney, 2015, p. 1).

The National Research Council (NRC) reviewed deeper learning theory and research recently. Their definition is "the process through which an individual becomes capable of taking what was learned in one situation and applying it to new situations." (National Research Council, 2012, p. 20) The deeper learning process produces competencies that include mastery of content and the ability to apply that knowledge to solve problems and answer questions (Bitter & Loney, 2015, p. 3).

The National Research Council identifies three domains and the related competencies associated with deeper learning (National Research Council, 2012). The three domains are the cognitive domain, the interpersonal domain, and the intrapersonal domain. The *cognitive domain* involves in-depth content knowledge where learners build a solid foundation in subject content areas and apply this knowledge in completing new tasks. Critical thinking and complex problem-solving are aspects of the cognitive domain. Learners think creatively and analytically to evaluate information and create solutions to complicated problems. In the *interpersonal domain,* the focus is on collaboration, i.e. learners working in teams to achieve common goals and communication – learners structure their data, thoughts and findings in verbal and written communication. The third domain is the *intrapersonal domain.* This domain focuses on learners' monitoring and direction of their learning, and learners' developing academic mindsets, i.e. positive attitudes and beliefs about their academic abilities and their identities as learners (Bitter & Loney, 2015, p. 3; National Research Council, 2012).

### 2.5.5 Mathematical thinking

Every person can think mathematically and learn to do it more efficiently if exposed to relevant teaching and learning situations. Mathematical thinking plays a crucial role in learning Mathematics and becoming mathematically competent. Learners must have sufficient

opportunities and suitable rich tasks to develop their mathematical thinking. Improving mathematical thinking requires actively working on problems regularly and then reflecting on the solution upon completion (Siemon et al., 2013).

Problem-solving is an approach to developing learners' mathematical thinking. Schoenfeld (1992) notes different meanings attributed to problem-solving, namely exercises, problems, models, and investigations. He describes an exercise as a question asked to a learner who has been taught a solution method or has solved a similar problem before. Exercises are also known as procedures or knowledge and can be described as teaching for problem-solving (Van de Walle et al., 2014), i.e. there is a known method to solve the problem. A problem is a question for which the learner does not initially know which direction to take to solve the problem. The solution path becomes known once the problem is solved. It becomes an exercise when the same problem appears again. Van de Walle et al. (2014) calls this teaching through problem-solving. An investigation is a task or situation for exploration in any chosen direction. Models develop from using Mathematics to solve questions which arise from real contexts. Each type of mathematical thinking has a place in a school curriculum, but many learners have only experienced exercises and few real problem situations to solve.

The four cognitive levels of mathematical thinking that the Curriculum and Assessment Policy Statement (CAPS) expects to develop in the senior phase are listed in Table 2-1 below:

**Table 2-1: Cognitive levels in grades 7-9 (DBE, 2011, p. 157)**

| Cognitive levels | Description of the required skill | Examples |
|---|---|---|
| **Knowledge (≈25%)** | • Straight recall<br>• Use of mathematical facts<br>• Appropriate use of mathematical vocabulary<br>• Use of correct formulae | Write down the y-intercept of the function<br>$y = 2x - 3$<br>Give two properties of a rectangle<br>Determine the area of a circle with radius of 10 cm |
| **Routine procedures (≈45%)** | • Perform well-known procedures<br>• Simple applications & calculations that might involve many steps<br>• Identification & use of correct formula | Solve for $x$: $x - 6 = 9$<br>Determine the mean of five grade 8 learners' marks if they achieved 67, 45, 82, 69 and 53.<br>R600 is invested at 8% per annum interest for 5 years. Determine the amount of interest earned at the end of the period |
| **Complex procedures (≈20%)** | • Problems involving complex calculations and higher order reasoning<br>• Require conceptual understanding<br>• No obvious route to the solution | Use a paper cutting activity to show that the interior angles of a triangle are supplementary<br>A car travels at a constant speed and travels 60 km in 30 min. How far, travelling at the same constant speed, will the car travel in 1 hour 15 min? |
| **Problem-solving (≈10%)** | • Higher order understanding and processes are often involved<br>• Unseen, non-routine problems (not necessarily complicated)<br>• Might require the ability to break the problem down into its constituent parts | The sum of three consecutive numbers is 87. Find the three numbers<br>The total age of a father and his son is 84 years. In 6 years' time, the father will be twice as old as his son was 3 years ago. How old are they now? |

An important aspect of mathematical thinking is metacognition. Metacognition is thinking about thinking. Van de Walle et al. (2014, p. 45) describe metacognition as the "conscious monitoring (being aware of why and how you are doing something) and regulation (choosing to do something or deciding to make changes) of your thought processes." Metacognition is related to learning, and metacognitive behaviour can be learned by incorporating it in classroom discussions. Efficient problem-solvers can monitor their thinking regularly and change it when needed (Du Toit & Kotze, 2009).

The THINK framework suggested by Thomas (2006) is used to ensure that learners develop metacognitive skills. Each letter in the mnemonic represents the following aspect of problem-solving: T- talk about the problem, H- how can it be solved? I- identify a strategy to solve the

problem, N- notice how the strategy helped to solve the problem, K- keep thinking about the problem. Does it make sense? Is there another way to solve it? The problem-solving abilities of learners who used this framework improved more than those who did not. The THINK framework has similarities with Polya's four steps of problem-solving (§ 2.5.2).

### 2.5.6 Communication in Mathematics

The communicating competency forms an integral part of mathematical competence (Refer to § 2.6.2). Learners must be able to communicate about Mathematics, in Mathematics and with Mathematics. This competency involves two sides of the coin, i.e. being capable of understanding, to study and interpret texts and expressions of *others*, but also being capable of expressing *oneself* about mathematical ideas in different ways and levels of technical correctness (Niss & Højgaard, 2011).

Doing and understanding Mathematics involves good communication. When doing Mathematics, a learner recognises a challenge and is stimulated to understand a problem situation. By reading, decoding and interpreting questions, objects or statements, the learner forms a mental model of the situation. These actions are essential steps in understanding and formulating a problem. During the solving process, results must be summarised and presented. Once a solution is reached, the learner might need to present the solution and provide justification or explanation to other learners (OECD, 2013c).

### 2.5.7 The role of affective factors on mathematical learning

Over the past decades, the recognition of the impact of beliefs on Mathematics learning has formed part of a significant development. Besides cognitive factors, conative factors (motivation and volition) and affective factors (positive emotions, self-confidence, and beneficial beliefs) play a determining and an essential role in learners' Mathematics learning. The current view of researchers is that the overall aim of Mathematics teaching and learning is to gain adaptive competence. This view implies the ability to apply knowledge and skills efficiently and innovatively in different situations. This view is the opposite of routine expertise which involves the ability to complete school tasks accurately and fast, but often without understanding. There is now a consensus that the integrated acquisition of five cognitive, motivational and affective components is a prerequisite for becoming adaptively competent in Mathematics (Refer to § 2.6.5) (De Corte, 2015, p. 2).

Motivation plays a vital role in starting the learning process, although difficulties, temptations and disturbances can distract learners from what they intend to learn. Volition can assist learners to control their motivation and negative, unwanted emotions. Motivation enables goal setting and volition allows striving to achieve the goal. Volition maintains motivation, assists

with actions taken according to the motivation, and takes care of low motivation in the case of conflicting implicit and explicit motives. Volition's role in emotion control ought to be valued because emotional experiences can change a learner's perceptions of learning processes and learning outcomes (Molokoli, 2005). Emotion control influences learning and performance. Emotions link closely to motivation. Emotions influence cognition regarding decision-making, use of strategies and memory (Kim & Bennekin, 2013, p. 795).

However, learning Mathematics can be a stumbling block that causes emotional and motivational problems. Difficulty in learning Mathematics often results in decreased motivation and emotional problems, such as anxiety and hopelessness, which interfere with a learner's studies in general.

Volitional control can assist in regulating emotions and keeping learners motivated. Examples of volitional control are learner intention control, planning during learning, initiating mathematics activities, learner impulse control and learner failure control (Kim & Bennekin, 2013, p. 794; Molokoli, 2005, p. 51).

## 2.6 Mathematical competence

Mathematical competence forms one of the primary lenses through which this study is conducted and explored in this section. As background; the words "competence" and "proficiency" are often used similarly. However, there is a slight difference between these two words. Competence implies having the ability or skill that is needed to do something. Proficiency means a person is skilled and can do something well. A person who has competence in a specific field can master the essential aspects of that field effectively, incisively and with an overview and a certainty of judgment. The word "expertise" could also be seen as competence (Niss & Højgaard, 2011, p. 49).

Competence in Mathematics is crucial in establishing a technological and scientific oriented society. A generation of learners must develop who are competent in Science and Technology to progress in the age of globalisation. Mathematical skills enable learners to explore fields such as Engineering, Computer Science, Technology, Business and Economics. Mathematics assesses the learners' intelligence to think and solve daily-life problems. The memory power of Mathematics drives the ability to memorise facts, solve mental puzzles, remember concepts, and manipulate numbers. Mathematics further provides relevant knowledge and computational skills that assist in solving mathematical problems (Veloo, Krishnasamy, & Abdullah, 2015).

In *Adding it Up*, Kilpatrick et al. (2001, p. 116) use the term "mathematical proficiency". Their approach is an attempt to capture what it takes to learn Mathematics, what is characteristic of a learner who has succeeded in learning Mathematics. They admit that no single term can

capture the essence of learning Mathematics. They suggest that mathematical proficiency has five interwoven strands namely, conceptual understanding, procedural fluency, adaptive reasoning, strategic competence, and productive disposition. They explain conceptual understanding as the understanding of mathematical concepts, processes, and relationships. They explain procedural fluency as the skill of executing procedures correctly, efficiently, flexibly and appropriately. Adaptive reasoning in their view is a learner's ability to reflect, explain, justify and think logically. Productive disposition is a habitual tendency (inclination) to view Mathematics as useful, worthwhile, and sensible together with a trust in one's diligence and efficacy. These five strands are interwoven and interdependent in the developing of mathematical proficiency in Mathematics (Van de Walle et al., 2015).

Mathematical competence implies the ability to judge, understand, do and to utilise Mathematics in a variety of mathematical contexts and situations in which Mathematics plays or could play a role. Mathematical competence, therefore, focuses on what it takes to *do* Mathematics. (Niss, 2011). Haavold (2010) differentiates mathematical competence into a descriptive point of view and a normative point of view. A normative view relates to an ideal standard or model. This view dictates how things should be, and it is inherent value driven. A descriptive view, on the other hand, tries to describe the world as it is. It gives factual statements regarding reality. Mathematical competence is an inclusive concept and involves multiple dimensions. The way in which mathematical competence is defined in a school context depends on the context and purpose. The content which the learners must learn, the context or situations in which the content is, and the cognitive processes involved when the content is studied.

Mathematical competence consists of a variety of mathematical competencies discussed in detail in the following sections. Mathematical competence is a reliable indicator of positive outcomes for young people's ability to be part of tertiary education and influences their future careers and earnings (OECD, 2014a).

### 2.6.1 Research on mathematical competence

Over the years, researchers have realised the importance of mathematical competence in the learning of Mathematics and investigated various related aspects. These aspects include its importance and role in Mathematics learning, developing or enhancing mathematical competence, the role of affective and conative factors on mathematical competence, and measuring mathematical competence.

Kriegbaum, Jansen, and Spinath (2015, p. 140) investigated the role of various motivational constructs in anticipating mathematical competence in fifteen-year-old German learners and their effect beyond previous achievement and intelligence. These learners gave self-reports on

their self-efficacy, interest, goal orientation, and Mathematics-specific self-concept in addition to the PISA standardised achievement test. A nation-wide representative data set from PISA 2003 and 2004 was used. Cross-sectional, every motivational construct contributed accumulatively to predicting mathematical competence beyond intelligence. Intelligence and prior performance were controlled longitudinally and one year later the effect of learners' self-efficacy, interest, learning goals and self-concept on their anticipated mathematical competence was evident. The study showed that intelligence and recent achievement contributed to the most substantial part of mathematical competence. Task-specific self-efficacy followed this result as the most reliable motivational predictor. These results confirm the critical role of motivation in anticipating academic performance.

Ashcraft (2002, p. 182) studied the effect of Mathematics anxiety on individuals. Mathematics anxiety interferes with cognitive processing by compromising ongoing activity in the working memory. Mathematics anxiety results in a tendency to avoid Mathematics; a consequence of this is that Mathematics-anxious individuals have lower mathematical competence and lower achievement.

The research of Neumann et al. (2015, p. 465) was embedded in another project called KoM@ING in an attempt to determine the mathematical competence of engineering students on a general level. KoM@ING aims to model the role of engineering students' mathematical competence for their studies from a quantitative and a qualitative view. This research aimed to develop a large-scale instrument to assess engineering freshmen's mathematical competence by applying Rasch analysis to determine measures of student abilities as well as item difficulties. This measure was necessary due to a lack of instruments to measure students' achievement objectively. A measuring instrument would help to plan student interventions to cope with the demand of university, promote students' learning, decrease the failure rate, and increase the number of engineering graduates (Neumann et al., 2015, p. 466). This study also studied students' problem-solving abilities since problem-solving lies at the heart of engineering studies. The significance of problem-solving is that it is a disposition of engineering competence in general and mathematical competence in particular (Neumann et al., 2015, pp. 467-468).

Steyn and Du Plessis (2007, p. 881) researched first-year engineering students on an extended programme at the University of Pretoria (South Africa). The results of the study revealed that mathematical competence was enhanced through academic support combined with the development of mathematical and non-mathematical skills. Analysis of student feedback showed that support given at first-year level was an essential tool to enhance mathematical competence and for the successful completion of studies in engineering.

Teaching approaches in the classroom affect the development or not of learners' mathematical competence as documented by Domazet et al. (2013, p. 122), three Croatian researchers. Various constructivist teaching approaches, such as investigative - and problem-based teaching should be used in classrooms to enhance the development of mathematical competence. Investigative or problem-based learning is a teaching method in which students are exposed to real-life or realistic problems that are vague and not well-structured before they are exposed to new concepts and skills training covering the problem (Domazet et al., 2013, p. 123). In these approaches, learning is connected to the retention of knowledge, even after an assessment, and to the daily application of mathematical knowledge. However, teaching strategies in Croatian classrooms mostly still fall under traditional teaching or direct instruction, i.e. the transmission of abstract mathematical knowledge. In such classrooms, it is unrealistic to expect the development of broader mathematical competence to be present and visible in assessment results (Domazet et al., 2013, p. 125).

A study in the Netherlands was conducted to investigate the question whether Mathematics anxiety and perceived mathematical competence mediated the relationship between mathematical skills and their use in everyday life if gender differences are considered (Jansen, Schmitz, & Van der Maas, 2016, p. 1). Results showed that for both men and women, higher skills were linked to (associated with) higher perceived mathematical competence which associated with more use of Mathematics in everyday life. Women showed higher levels of Mathematics anxiety, lower perceived mathematical competence, and lower use of Mathematics in everyday life in comparison to men. Women's skills were at a lower level than those of men. For women only, Mathematics anxiety mediated the relationship between maths skills and the use of maths in everyday life. The study supported the idea of a circle that links motivational and affective factors, skills and the use of Mathematics in everyday life that was not reported earlier in the literature (Jansen et al., 2016, p. 9).

### 2.6.2 Mathematical competencies

The Danish KOM project (Competencies and the learning of Mathematics) was initiated by the Ministry of Education and other official bodies in 2001 to reform the Danish Mathematics education from school to university. The fundamental idea of this project was to base Mathematics curricula on the concept of 'mathematical competency' instead of syllabi in the familiar way of lists of topics, concepts, and results. This idea provides a broader conceptual framework which encloses (captures) the views on Mathematics teaching and learning at any educational level. Mogens Niss, director of the KOM project, together with his team developed eight mathematical competencies as an answer to the question "What does it mean to master Mathematics?" (Niss, 2011; Niss & Højgaard, 2011).

A mathematical competency is a significant component of mathematical competence, clearly distinguishable and evident due to its specific nature. In the KOM project, Niss and his Danish colleagues distinguish between eight mathematical competencies which they believe constitute mathematical competence. They further organise them into two groups: the first group is the ability to ask and answer questions in and with Mathematics. The second group of competencies deals with the ability to manage and deal with mathematical language and tools. A mathematical competency is, therefore, a well-informed readiness to act appropriately in situations involving a specific type of mathematical challenge (Haavold, 2010; Niss & Højgaard, 2011). The competencies are presented in Table 2-2 below.

**Table 2-2: Mathematical competencies classified into two main groups (Niss & Højgaard, 2011)**

| **The ability to ask and answer questions in and with Mathematics** | **The ability to deal with mathematical language and tools** |
|---|---|
| Mathematical thinking competency | Representing competency |
| Problem tackling competency | Symbol and formalism competency |
| Reasoning competency | Communicating competency |
| Modelling competency | Aids and tool competency |

All the competencies have a dual nature, i.e. they have a productive as well as an analytical aspect. The analytical aspect of a competency focuses on interpreting, understanding, assessing and examining mathematical procedures and concepts, for example, understanding the use and nature of mathematical modelling. The productive aspect of a competency focuses on the carrying out or construction of procedures such as using a mathematical representation in a problem situation or providing a chain of arguments to solve a problem. Furthermore, all eight competencies focus on physical or mental activities, processes, and behaviours and are therefore behavioural. Although they are distinct, clearly delineated and not connected, they are firmly related and form a continuum of overlapping clusters (Niss, 2011, p. 7). It is imperative to remember that each competency has its nature and identity, although they are interwoven and mutually connected. Not one of them can be reduced to the other remaining ones. The pragmatic assumption exists that these eight competencies encompass and enclose the essence of mathematical competence. (De Lange, 2006, pp. 24-25; Niss, 2011, p. 50). A brief discussion of the two main groups of competencies with their four related competencies follows:

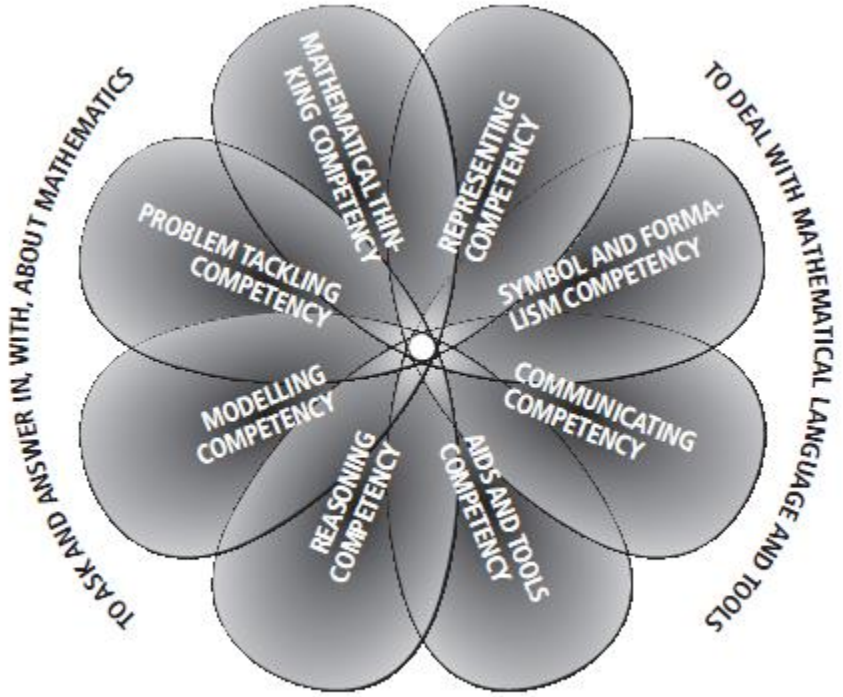



**Figure 2-3: A visual representation of the eight mathematical competencies (Niss & Højgaard, 2011, p. 51)**

#### 2.6.2.1 Asking and answering questions in and with Mathematics

Mathematical questions and solutions play an essential role in the study of Mathematics. The four underlying competencies are the mathematical thinking competency, the problem tackling competency, the modelling competency, and the reasoning competency. A description of each of them follows in the successive sections and suitable examples given.

##### 2.6.2.1.1 Mathematical thinking competency

Mathematical thinking plays a crucial role in learning Mathematics. Mathematical thinking competency, therefore, focuses on mastering mathematical modes of thought. The core of this competency is the actual nature of mathematical questions and answers. Typical questions in Mathematics are "Is there …?", "How many…?" and "Is it possible that …?" The answers most often take the form of "Yes, because…" or No, because…". Mathematical thinking implies an awareness of the types of questions that characterise Mathematics, the ability to pose such questions, and insight into the types of answers that one can expect (De Lange, 2003, p. 77; 2006, p. 24).

Mathematical thinking competency is used in the following two examples: In how many ways can the number three be expressed as the difference between two natural numbers? Moreover,

are there any polynomials which have asymptotes? The thinking competency plays an essential role in Mathematics teaching and learning (cf. § 2.5.5).

#### 2.6.2.1.2 Problem tackling competency

Problem tackling competency involves formulating and solving mathematical problems. This competency partly involves the ability to put forward different kinds of mathematical problems, i.e. pure/applied, closed or open-ended. Furthermore, it involves being able to solve such mathematical problems in their already formulated form. whether posed by oneself or by others and, if possible in different ways (De Lange, 2003, p. 77; 2006, p. 24; Niss, 2011, p. 7; Turner, Dossey, Blum, & Niss, 2009, p. 26).

Examples of this competency are the following questions: If you only had coins with a value of 3 and 5, which amounts would you be able to pay? Can you make a triangle out of three sides with arbitrary length?

#### 2.6.2.1.3 Modelling competency

Modelling competency implies being able to analyse and build mathematical models concerning other areas. Furthermore, it involves analysing the foundations and properties of existing models and performing dynamic modelling. On the one hand, a learner must be able to analyse the foundations and properties of existing models and to assess their range and validity. On the other hand, this competency involves the ability to perform dynamic modelling in given contexts (De Lange, 2003, p. 77; 2006, p. 24; Niss & Højgaard, 2011, p. 58; Turner et al., 2009, p. 27).

Active modelling involves a range of different actions or elements (Wessels, 2009). They are:

- Structuring the real situation or area to model;
- Implementing mathematization of the situation which means to translate the problem formulation into mathematical terms resulting in a mathematical model;
- Work with the resulting model, including solving the mathematical problems that may arise;
- Validating the completed model internally about the model's mathematical properties and externally about the situation or area modelled.
- Analysing the model critically regarding its usability and relevance, and its relation to other alternative models;
- Communicating with others about the model and its results, and
- Monitoring and controlling the entire modelling process (OECD, 2009).

Examples, where modelling competency comes into play could be a study of what the floor plan of a house can be if its area is 120 $m^2$, and investigating the cost of using a cell phone.

#### 2.6.2.1.4 Reasoning competency

Reasoning competency involves the ability to reason mathematically which includes capabilities such as following and assessing chains of arguments used by others. Furthermore, knowing what a mathematical proof is, and how it differs from other types of mathematical reasoning, e.g. heuristics. The ability to uncover the basic ideas in every line of argument, distinguishing main lines from details and ideas form technicalities. Furthermore, devising formal and informal mathematical arguments and transforming arguments to valid proofs, i.e. proving statements (De Lange, 2003, p. 77; 2006, p. 24; Niss, 2011, p. 7; Turner et al., 2009, p. 26).

Lithner (2008, pp. 4-5) distinguishes between imitative reasoning and creative reasoning. He describes imitative reasoning, a more primitive way of reasoning, as based on previous attempts and experiences, but without any sign of originality. Learners try to solve exercises (common to most school textbooks) and problems by copying previous solutions or by remembering algorithms. Learners choose their problem-solving strategies based on superficial properties familiar to them from previous experience and not on intrinsic mathematical properties. On the other hand, creative reasoning is the creation of new creative and fair solutions to tasks or problems. Creative thinking does not necessarily imply superior thinking or geniality. The following two conditions must be met for the reasoning to be creative. Firstly, the way of reasoning must be new to the learner or the person reasoning. Lithner refers to this as a novelty. Secondly, the reasoning process/sequence must contain strategy choices and implementations supported by reasons why the conclusions are accurate and founded in the intrinsic mathematical properties of the aspects involved in the reasoning. It is clear from this that reasoning creatively is at a higher level and much more demanding than imitative reasoning.

There is a lack of focus on mathematical reasoning and problem-solving in secondary schools. Learners are seldom asked to explain their solutions or to communicate their mathematical arguments to their peers or other people. University students manage to get good marks by focusing on the topics or content at a superficial level instead of developing a deep understanding (Haavold, 2010, p. 5). Mathematics is by its nature a subject where the ability to reason plays an important role. Examples where reasoning is required are: When you square a number, the result is always higher than the original number. Is this true for all numbers? Moreover, use a paper cutting activity to prove that the exterior angle of a triangle is equal to the sum of the two opposite interior angles.

#### 2.6.2.2 The ability to use mathematical language and tools

Mathematics has its distinct language, symbols and tools. To become mathematically competent, learners must not only know the mathematical language, symbols and tools but also be able to use these aspects correctly and with ease. The four underlying competencies are the representing competency, the symbolism and formalism competency, the communicating competency, and the aids and tools competency (Niss, 2011). A discussion with suitable examples follows in the next section.

##### 2.6.2.2.1 Representing competency

The ability to understand and use different kinds of representations of mathematical entities such as objects and situations forms the basis of representation competency. It involves the understanding and usage of different types of representations of mathematical situations, objects and phenomena. It also supposes the understanding and usage of the relations between different representations of the same entity as well as knowing their limitations and strengths. Choosing representations and switching between them is another characteristic of this competency (De Lange, 2003, p. 77; 2006, p. 24; Niss, 2011, p. 8; Turner et al., 2009, pp. 27-28).

The following serve as examples of the representing competency: Understanding and utilising different representations of $\pi$ and the relationship between them, and the concept of a linear function in the school Mathematics context.

##### 2.6.2.2.2 Symbol and formalism competency

Symbol and formalism competency involves the ability to deal with mathematical symbols and formal mathematical language. It consists of being able to decode and interpret symbolic and formal language and understanding its relation to formal language. Further, this competency implies understanding the nature and rules of formal mathematical systems (both syntax and semantics) and translating from natural language to formal/symbolic language. The competency also involves the ability to handle and manipulate statements and expressions that contain symbols and formulae (De Lange, 2003, p. 77; 2006, p. 24; Niss, 2011, p. 65; Turner et al., 2009, p. 26).

Examples are: $4 < 7$ means that four is smaller (or less) than seven and being able to solve an equation such as $x^2 + 5x + 6 = 0$.

#### 2.6.2.2.3 Communicating competency

Communication plays a critical role in our everyday lives and in learning Mathematics. The communication competency implies being able to communicate in, with, and about Mathematics. There are two sides of the coin: Firstly, a learner must be able to study and interpret written, visual and oral expressions of other people. Secondly, a learner also must be able to express himself in various ways and at different levels of theoretical or technical precision about mathematical matters (De Lange, 2003, p. 77; 2006, p. 24; Niss, 2011, p. 67).

The following serves as an example of the communicating competency: we know that we are not allowed to divide by zero. Why not? Is this only a rule or what?

#### 2.6.2.2.4 Aids and tools competency

Aids and tools competency involves making use of technological aids and tools. A feature of this competency is awareness of the existence and properties of different aids and tools useful in mathematical activities, and furthermore, to be able to use these tools and aids efficiently and reflectively (De Lange, 2003, p. 77; 2006, p. 25).

There are numerous examples to indicate the use of aids and tools in the Mathematics classroom (Van de Walle et al., 2015). In the lower grades, it involves the ability to use concrete materials, e.g. abacuses, geoboards, compasses, dice, and graph paper to support conceptualisation. Other aids and tools are calculators, computers, spreadsheets, and software packages such as GeoGebra and Mathcad or MATLAB (Niss & Højgaard, 2011, p. 69).

### 2.6.3 Mastery of mathematical competencies

Each of the eight competencies discussed above must be mastered to become increasingly mathematically competent. There are three dimensions to which a competency is mastered or expanded over time. The first one is the *degree of coverage*. The degree of coverage involves the extent to which the learner has mastered the specific aspects of the competence. The second dimension is the *radius of action* which shows the spectrum of contexts and situations in which the learner can activate and use that competence. The third and last dimension is the *technical level*. The technical level is an indication of how technically and conceptually advanced the tools and entities are with which the learner can activate the competency (Niss, 2011, p. 10).

### 2.6.4 Influence of affective factors on mathematical competence

Various authors and experts in teaching and learning acknowledged the importance of motivation in the learning process and achievement (Besançon, Fenouillet, & Shankland, 2015;

Kriegbaum et al., 2015; Lai et al., 2015; Mohamed & Waheed, 2011; Skaalvik, Federici, & Klassen, 2015). De Corte (2015, p. 2) mentions that mathematical competence requires the acquisition and integration of five cognitive, motivational and affective components. They are as follows:

1. Well-established and accessible mathematical knowledge including the facts, concepts, rules, and symbols which form the foundation of Mathematics as a discipline.
2. The use of heuristic methods to find strategies to analyse and transform problems; for example, drawing a graph or a table to represent a problem. These methods increase the chance of obtaining the correct solution because of a more organised approach to the problem.
3. Positive affective factors which include attitudes and emotions toward Mathematics and Mathematics Education. Furthermore, the subjective views about Mathematics, and Mathematics teaching and learning (epistemic beliefs), views held about the self as a learner of Mathematics (motivational beliefs) and the social context in the Mathematics classroom.
4. Self-regulatory skills which regulate a person's cognitive processes or activities (meta-cognitive skills/cognitive self-regulation); for example, planning and monitoring problem-solving processes. Self-regulatory skills are the ability to regulate one's volitional processes or activities (motivational self-regulation). An example is the motivation to solve a specific problem and to maintain attention while doing so.
5. Meta-knowledge firstly implies a person's cognitive functioning or meta-cognitive knowledge. This is the belief that one can develop one's cognitive potential through effort and learning. Secondly, knowledge about one's own emotions and motivation which can be employed to improve learning. For example, being aware of one's fear to be a failure in Mathematics (De Corte, 2015; Schoenfeld, 1992).

Kriegbaum et al. (2015, p. 147) found new evidence on the cumulative (incremental) power of motivational constructs in anticipating mathematical competence in PISA. They examined the following motivational constructs; ability self-concept, self-efficacy, enjoyment, interest, learning goals, and instrumental motivation. These constructs predicted standardised test achievement higher than previous achievement and intelligence. Their results confirm that motivation plays a critical role in foretelling standardised test achievement and that PISA competencies measure more than intelligence.

## 2.7 The PISA Mathematics Assessment Framework

The challenge is to identify, recognise and classify the level of each competency for a specific learner. There are several frameworks and taxonomies which describe mathematical

competence, for example, the PISA framework and the TIMSS study to mention only two. This study is based on the PISA Mathematics Assessment Framework because the focus is on what learners can do with Mathematics and they focus on 15-year old learners (OECD, 2013b).

The Programme for International Student Assessment (PISA) is a worldwide evaluation of 15-year-old school learners' achievement in Mathematics, Science, and Reading Literacy. The PISA study commenced in the year 2000 and has been repeated triennially after that. The study is coordinated by the Organisation for Economic Co-operation and Development (OECD) with the aim to improve teaching outcomes. Their focus is on literacy in Mathematics, Science, and Reading (OECD, 2013c; Turner et al., 2009, p. 24).

Many countries ascribe three primary objectives to Mathematics education: preparing learners for society, preparing them for later schooling and the world of work, and to show learners the beauty of Mathematics as a discipline. PISA addresses the first two objectives. PISA gives feedback on how learners perform tasks intended to measure mathematical literacy and not how well they master their school curriculum. The TIMMS study does that better (De Lange, 2006, p. 33).

This assessment framework forms the theoretical framework for assessing mathematical competence in this study due to the following reasons:

- The participants are 14 and 15-year old Mathematics learners;
- Learning takes place within a problem-solving learning context;
- The focus is on the nature of learners' mathematical competence regarding the acquisition of the eight competencies;
- Learners' ability to use and apply their mathematical skills and knowledge in real-life contexts is required; and
- Assessing learners' levels of mathematical competence which forms the basis of this framework.

PISA assumes that mathematical knowledge is not culture-bound and that it is internationally comparative. PISA does not explicitly assess the Mathematics curriculum, but rather what learners can do with their mathematical knowledge and skills. It strongly features the Mathematics literacy context which is rooted in Realistic Mathematics Education (RME) teaching and learning theory (Domazet et al., 2013, p. 110). The PISA mathematical literacy assessments require learners to apply their mathematical knowledge in real-life contexts. Learners must possess mathematical competencies as well as extensive mathematical knowledge and skills. In Mathematics, PISA assesses to what extent learners can analyse, interpret and reason in various situations. PISA is based on six competency levels which

describe what a learner should be able to do on each level and learners' achievement measured accordingly. The PISA assessment aims to answer the following question "What knowledge and which skills do the learners have and how can they use or apply those to real-life situations or contexts?" (OECD, 2009, 2013b).

The PISA Assessment Framework defines Mathematics literacy as follows: "Mathematical literacy is an individual's capacity to identify and understand the role that Mathematics plays in the world, to make well-founded judgments, and to use and engage with Mathematics in ways that meet the needs of that individual's life as a constructive, concerned and reflective citizen." (OECD, 2009, p. 84; 2013b, p. 5). A discussion of the PISA Mathematics framework follows in the subsequent section.

### 2.7.1 Theoretical framework of the PISA Mathematics domain

The PISA Mathematics framework provides a framework of how mathematically literate 15-year-old learners are, i.e. how learners use Mathematics when dealing with real-world problems. Three components are distinguished from understanding the domain better. They are the contexts or situations in which the problems are located; the mathematical content used to solve the problems, organised by specific overarching ideas, and the mathematical competencies which must be activated to connect to the real world, in which the problems are generated, with Mathematics, and therefore solve the problem (OECD, 2009, p. 90). A discussion of each of the three components follows in the next section.

#### 2.7.1.1 Situations or contexts

Learners must engage with Mathematics, doing and using Mathematics in a range of contexts. Dealing with problems that require mathematical thinking, the choice of representations and mathematical procedures often depends on the contexts in which the problems are presented. The context is an aspect of an individual's world in which the problems fall. There are four contexts used in the PISA framework, namely personal, educational or occupational, public and scientific. They are located at a certain distance from the learners, with the closest situation a learner's personal life, next school life, followed by the society and community in daily life. Scientific situations are the furthest away. The context of a question (item) is its setting within a situation and involves all the aspects needed to formulate the problem (OECD, 2009, pp. 90-91; 2013b, p. 21).

#### 2.7.1.2 Mathematical content

The PISA content includes the big overarching ideas: space and shape, change and relationship, quantity, and uncertainty (OECD, 2013b). These ideas are used in PISA to meet

the needs of the coverage of the domain and the historical development and reflect the significant strands of the school curriculum. Mathematical content can be arranged in enough areas to provide a variety of questions across the curriculum and maintain a broad focus for the presentation of real-life problems. Every overarching idea is a general notion with a generalised content dimension involving specific concepts and phenomena that make sense and are experienced in and across various situations. The implication is that overarching ideas and traditional content strands cannot be described in detail in relation to one another. Every idea represents a specific viewpoint and has a core and properties that can intersect with other overarching ideas (OECD, 2009, p. 94).

#### 2.7.1.3 Mathematical competencies

PISA was initially founded on the same eight mathematical competencies as described by the KOM project (De Lange, 2006, pp. 24-25; Niss & Højgaard, 2011, pp. 52-69; OECD, 2009, p. 106). They are mathematical thinking, problem tackling/solving, reasoning, modelling, representing, symbolism and formalism, communicating, and aids and tools. However, in the PISA 2015 Draft Mathematics Framework, these competencies are now referred to as mathematical capabilities. They changed to only seven: communication, mathematising, representation, reasoning and argument, devising strategies for solving problems, using symbolic, formal and technical language and operations, and using mathematical tools (OECD, 2013b, pp. 13-14). These competencies were discussed in § 2.6.2 and discussed again in § 2.7.3.

### 2.7.2 Mathematical processes

Learners must use their mathematical knowledge, skills and mathematical processes required at school to solve mathematical problems. In PISA, the fundamental process learners use to solve real-life problems is called mathematization. Other authors (De Lange, 2006; Turner, 2011) use the term “modelling”. The process of mathematization follows in more detail.

#### 2.7.2.1 The nature of mathematization

Mathematization lies at the heart of Realistic Mathematics Education (RME) of the Netherlands, a teaching theory for Mathematics. An essential characteristic of RME is that rich, realistic problem situations play a prominent role in the learning process. The implication is that learners can imagine these problem situations because they are within their experience and knowledge. Learners are then facilitated to solve the contextual problems presented (Veloo & Zubainur, 2014). In RME, problems can be from the real world, but also from fairy tales, or the formal world of Mathematics. However, the problems must relate to experiences in the learners’ mind. The problems are the source for starting the development of mathematical procedures, tools

and concepts, and as the context in which learners later apply their knowledge of Mathematics (Van den Heuvel-Panhuizen & Drijvers, 2014, p. 521).

Mathematization plays an essential role in solving mathematical problems. Mathematization forms the basis of problem-solving in PISA. Mathematization is viewed and described in the PISA Assessment Framework. Mathematization starts with a mathematical problem in a realistic context (Wessels, 2009). This means that the problem should form part of the learners' real-world and must make sense to them. The problem is then organised per mathematical concepts, and the relevant Mathematics which is involved is identified. The reality is gradually trimmed away through processes of making assumptions, formalising and generalisation. These processes enhance the mathematical features of the problem situation. The real-world problem is translated into a mathematical problem which should be a good or accurate representation of the situation. The next step is to solve the mathematical problem. The final, often neglected step, is to make sense of the solution regarding the real situation. The limitations of the solution should also be identified (De Lange, 2006, pp. 18-19; OECD, 2009, pp. 105-106).

#### 2.7.2.2 The process of mathematization

PISA uses mathematization, as described by RME, as the problem-solving process. This process includes the following activities:

- The learners must identify the specific Mathematics related to the real-life problem situation;
- The problem must then be represented, appropriate assumptions made and organised per mathematical concepts;
- The relationships between the formal, symbolic language needed to solve the problem and the language used in the problem must be understood;
- Patterns, regularities, and relationships must now be found;
- Aspects which are known problems must be recognised; and
- The problem can then be translated into a suitable mathematical model (OECD, 2009, p. 105).

The whole process continues within Mathematics once the learner has translated the problem into a mathematical form. Learners ask questions such as "How many?" and "How do I find?" and use known mathematical concepts and skills. They work on their model of the problem situation and determine regularities, change these, and identify connections to create an excellent mathematical argument. This part is the deductive part of the modelling cycle although other non-deductive processes may also be employed. In this part of the process, the

following activities play an essential role: argumentation, generalisation, using and changing between different representations, adjusting and refining mathematical models as well as integrating and combining them and, using technical, formal and symbolic language and processes (OECD, 2009, p. 105).

The final step in solving a problem is reflecting on the overall mathematization process and results. The learner must now critically interpret the answer(s) and reflect on the whole process. Although this type of reflection ought to take place during all stages of the process, it is vital in the final stage. The reflection process involves the following aspects:

- Realising the limitations and extent of the mathematical concepts;
- reporting on the process and the solution;
- being aware of the model and its limitations; and
- reflecting on mathematical arguments and justifying and explaining results (OECD, 2009, p. 106).

To solve mathematical problems successfully, learners must possess a series of mathematical competencies. A discussion of the nature and characteristics of such competencies follows in the subsequent section.

### 2.7.3 Cognitive mathematical competencies

The PISA Assessment Framework is founded on the eight cognitive mathematical competencies as presented in the work of Niss and his Danish colleagues of the KOM project (Niss, 2011; Niss & Højgaard, 2011). These competencies describe the required activities when solving mathematical problems and are viewed as necessary prerequisites for learners to efficiently engage in understanding situations where Mathematics could add to the understanding and eventually to solutions. These competencies overlap to a certain extent and are not disjoint. They must be jointly activated in the mathematical problem-solving process (Turner et al*.,* 2009, p. 24). The competencies form a set of qualities possessed by every learner to a lesser or greater degree. Research shows that the more competencies a learner possesses which he/she can activate, the better the learner can solve problems which relate strongly to higher levels of mathematical literacy. On the other hand, a lack of mathematical competencies cause learners to be unable to solve problems efficiently and leads to Mathematics anxiety (Turner, 2011, p. 3).

PISA uses the following terms to describe these eight competencies, although other authors might use different terms and a different number of competencies to describe mathematical competence (Turner, 2011, p. 3). They are discussed in Table 2-3 below:

**Table 2-3: Eight mathematical competencies of the PISA Assessment Framework (OECD, 2009, p. 106)**

| Mathematical competency | Characteristics |
|---|---|
| **Thinking and reasoning** | Posing questions characteristic of Mathematics ("Is there...?", "If so, how many?", "How do I find...?")<br><br>Knowing the kinds of answers Mathematics can offer to such questions<br><br>Distinguishing between different kinds of statements (definitions, theorems, conjectures, hypotheses, examples, conditioned assertions)<br><br>Understanding and dealing with the extent and limits of given mathematical concepts |
| **Argumentation** | Knowing what mathematical proofs are and how they differ from other kinds of mathematical reasoning<br><br>Following and assessing chains of mathematical arguments of different types<br><br>Possessing a feel for heuristics ("What can or cannot happen, and why?")<br><br>Creating and expressing mathematical arguments |
| **Communication** | Expressing oneself, in a variety of ways, on matters with a mathematical content, in oral as well as in written form<br><br>Understanding others' written or oral statements about such matters |
| **Modelling** | Structuring the field or situation to be modelled<br><br>Translating reality into mathematical structures<br><br>Interpreting mathematical models regarding reality<br><br>Working with a mathematical model<br><br>Validating the model<br><br>Reflecting, analysing and offering a critique of a model and its results<br><br>Communicating about the model and its results (including the limitations of such results)<br><br>Monitoring and controlling the modelling process |

**Table 2-3 continued.**

| | |
|---|---|
| **Problem posing and solving** | Posing, formulating and defining different kinds of mathematical problems (for example “pure”, “applied”, “open-ended” and “closed”)<br><br>Solving different kinds of mathematical problems in a variety of ways |
| **Representation** | Decoding and encoding, translating, interpreting and distinguishing between different forms of representation of mathematical objects and situations<br><br>The interrelationships between the various representations<br><br>Choosing and switching between different forms of representation, according to situation and purpose |
| **Using symbolic, formal and technical language and operations** | Decoding and interpreting symbolic and formal language<br><br>Understanding its relationship to natural language<br><br>Translating from natural language to symbolic/formal language<br><br>Dealing with statements and expressions containing symbols and formulae<br><br>Using variables, solving equations and undertaking calculations |
| **Using aids and tools** | Knowing about and being able to make use of various aids and tools (including information technology tools) that may assist mathematical activity<br><br>Knowing about the limitations of such aids and tools |

### 2.7.4 The competency clusters

PISA describes the cognitive activities which the above cognitive mathematical competencies involve regarding three clusters. They are the *reproduction cluster*, the *connections cluster* and the *reflection cluster*. These clusters give structure to describe and give feedback on learners' abilities productively, strengths and weaknesses form an international view (De Lange, 2006, pp. 25-27; OECD, 2009, p. 107). A discussion of each cluster regarding their required mathematical competencies and how each competency manifests in each cluster follows. Figure 2-4 is a visual representation of the types of procedures required in each of the three clusters. A summary of the increasing difficulty levels in each of the three clusters is in Table 2-4 that follows the discussion.

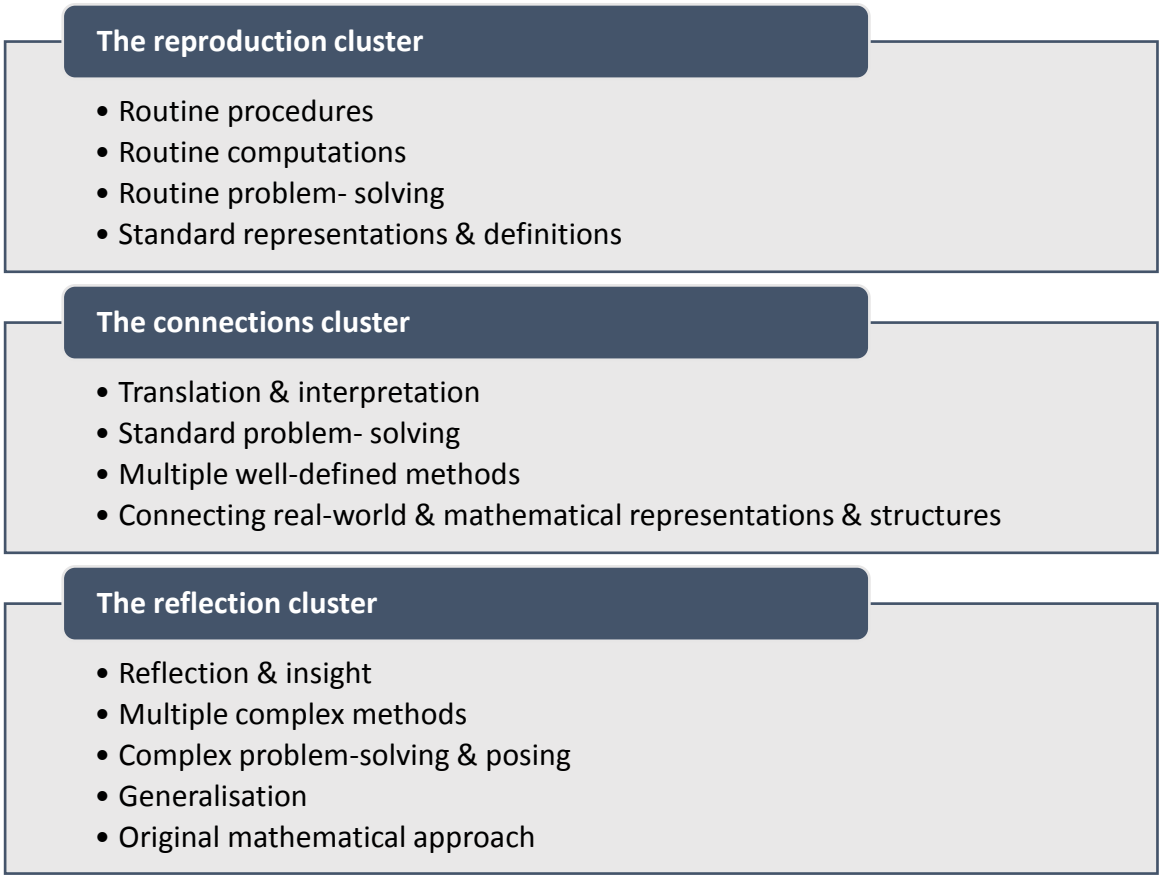



**Figure 2-4: Diagram representing the competency clusters (OECD, 2009, p. 115)**

#### 2.7.4.1 Reproduction cluster

The reproduction cluster is the first of the three competency clusters. The mathematical competencies in this cluster involve the reproduction of practised knowledge. These include those mathematical processes, skills, and knowledge most often used in classroom tests and standardised tests. They include knowledge of facts, definitions, calculations and representations of common problems. Assessment questions which measure the reproduction cluster can be described with these keywords: executing routine and familiar operations and the reproduction of knowledge practised before (De Lange, 2006, pp. 25-27; OECD, 2009, pp. 107-108).

Examples of questions in the reproduction cluster are:

- Solve the equation: $7x - 3 = 13x + 15$
- What is the average of 7; 12; 18; 14; 9; 20?
- Determine the area of a circle with diameter 10 cm.

#### 2.7.4.2 Connections cluster

The connection cluster builds on the reproduction cluster by integrating and applying problem-solving in situations which are non-routine but still, involve familiar or seemingly familiar contexts. Assessment questions which measure the connections cluster can be described well with the following words: connecting, integrating and a limited (modest) expansion of practised material (De Lange, 2006, pp. 25-27; OECD, 2009, pp. 110-111).

Examples of connections cluster problems are:

- A pizza restaurant serves two round Hawaiian pizzas with the same thickness but different sizes (thus different areas). The smaller pizza has a diameter of 30 cm and costs R 72,90. The larger pizza has a diameter of 40 cm and costs R 92,90. Which of the two pizzas is better value for money? Show your reasoning.
- The height h of water in a cylindrical container with radius r = 5 cm is equal to 10 cm. Peter must measure the volume of an irregularly shaped rock. He decides to place the rock inside the container filled with water. The height of the water inside the container rises to H = 13,2 cm**.** Calculate the volume of the rock in cubic centimetres.

#### 2.7.4.3 Reflection cluster

The mathematical skills, knowledge, and processes in this cluster include an element of reflectiveness from the learner's side regarding the processes used or needed to solve a problem. They relate to learners' abilities to plan strategies and implement them in problem situations which consist of more elements and may be more original or unfamiliar than those in the connections cluster. This cluster thus focuses on mathematical thinking, generalisation and insight on the part of the learner. Typical words in assessment questions that measure the reflection cluster are argumentation, generalisation, advanced reasoning, abstraction, and modelling applied to new and unfamiliar contexts (De Lange, 2006, pp. 25-27; OECD, 2009, pp. 112-113).

The following examples belong to the reflection cluster:

- A rectangular piece of the field was booked for a pop concert. The area where the fans had to stand, was 100m by 50m. All the tickets were sold out, and the field was filled with fans who were standing during the concert. Choose the best estimation of the total number of people who attended the concert.

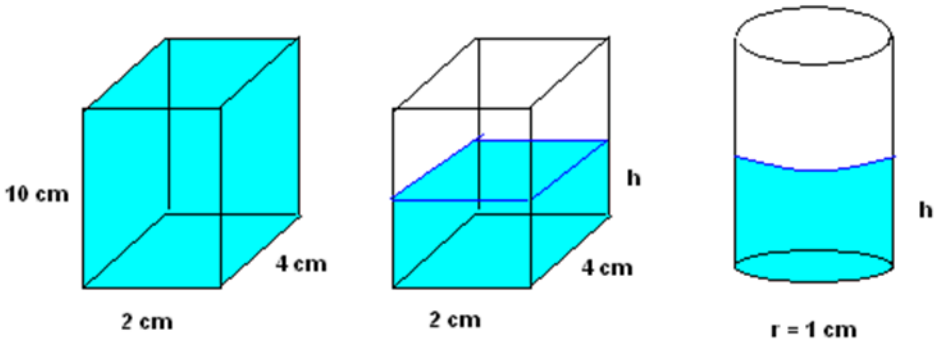
  A. 2 000 C. 20 000 E. 100 000

  B. 5 000 D. 50 000

Show your reasoning and all your calculations.

- The cuboid on the left was initially filled with water. Water is then emptied from it into the cuboid on the right and the rectangular cylinder on the right in such a way that the height h in both containers (the right cylinder and the cuboid) are equal. Calculate the height h of the water in these two containers to the right. (Round your answer to the nearest tenth of a cm)

Mathematics questions can be assigned to one of the three competency clusters in the following way: analyse the demands of the question, rate each of the eight cognitive competencies for the




question and place the question in the most suitable cluster about that competency. Table 2.4 below summarises the increasing level of difficulty in the various competencies among the three clusters.

**Table 2-4: Comparison of the increasing difficulty levels of mathematical competencies in the three competency clusters (OECD, 2009, pp. 107-112)**

| Mathematical competency | Reproduction cluster | Connections cluster | Reflection cluster |
|---|---|---|---|
| **Thinking and reasoning** | Asking the most basic forms of questions ("How many...?", "How much is...?")<br><br>Understanding the corresponding kinds of answers ("so many...", "this much...")<br><br>Distinguishing between definitions and assertions<br><br>Understanding and dealing with mathematical concepts in the sorts of contexts in which they were first introduced or have subsequently been practised | Asking questions ("How do I find...?", "Which Mathematics is involved...?")<br><br>Understanding the corresponding kinds of answers (provided using tables, graphs, algebra, figures, etc.)<br><br>Distinguishing between definitions and assertions and between different kinds of assertions<br><br>Understanding and dealing with mathematical concepts in contexts that are slightly different from those in which they were first introduced or have subsequently been practised | Asking questions ("How do I find...?", "Which Mathematics are involved...?", "What are the essential aspects of the problem or situation…?")<br><br>Understanding the corresponding kinds of answers (provided by tables, graphs, algebra, figures, specification of key points, etc.)<br><br>Distinguishing between definitions, theorems, conjectures, hypotheses and assertions about special cases<br><br>Reflecting upon or actively articulating these distinctions<br><br>Understanding and dealing with mathematical concepts in contexts that are new or complex<br><br>Understanding and handling the extent and limits of given mathematical concepts, and generalising results |
| **Argumentation** | Following and justifying standard quantitative processes, including computational processes, statements and results | Simple mathematical reasoning without distinguishing between proofs and broader forms of argument and reasoning<br><br>Following and assessing chains of mathematical arguments of different types<br><br>Possessing a feel for heuristics (e.g. Of what can or cannot happen, or be the case, and why?", "What do I know and | Simple mathematical reasoning, including distinguishing between proving and proofs and broader forms of argument and reasoning<br><br>Following, assessing and constructing chains of mathematical arguments of different types<br><br>Using heuristics (e.g. Of what can or cannot happen, or be the case, and why?", "What do I know, and what do I want |

**Table 2-4 continued**

| | | | |
|---|---|---|---|
| | | what do I want to obtain?") | to obtain?", "Which properties are essential?", "How are the objects related?") |
| **Communication** | Understanding and expressing oneself orally and in writing about simple mathematical matters, such as reproducing the names and the fundamental properties of familiar objects, citing computations and their results, usually not in more than one way | Understanding and expressing oneself orally and in writing about mathematical matters ranging from reproducing the names and fundamental properties of familiar objects<br><br>Explaining computations and their results (usually in more than one way), to explaining matters that include relationships<br><br>It also involves understanding others' written or oral statements about such matters | Understanding and expressing oneself orally and in writing about mathematical matters ranging from reproducing the names and basic properties of familiar objects, and explaining computations and their results (usually in more than one way)<br><br>Explaining matters that include complex relationships, including logical relationships<br><br>It also involves understanding others' written or oral statements about such matters |
| **Modelling** | Recognising, recollecting, activating and exploiting well-structured, familiar models; interpreting back and forth between such models (and their results) and reality<br><br>Elementary communication about model results | Structuring the field or situation to be modelled<br><br>Translating reality into mathematical structures in contexts that are not too complex but different from what students are usually familiar with<br><br>It also involves interpreting back and forth between models (and their results) and reality, including aspects of communication about model results | Structuring the field or situation to be modelled<br><br>Translating reality into mathematical structures in contexts that may be complex or mostly different from what students are usually familiar with<br><br>Interpreting back and forth between models (and their results) and reality, including aspects of communication about model results: gathering information and data, monitoring the modelling process and validating the resulting model<br><br>It also includes reflecting through analysing, offering a critique, and engaging in more complex communication about models and modelling |

**Table 2-4 continued**

| | | | |
|---|---|---|---|
| **Problem posing and solving** | Posing and formulating problems by recognising and reproducing practised standard pure and applied problems in closed form<br><br>Solving such problems by invoking and using standard approaches and procedures, typically in one way only | Posing and formulating problems beyond the reproduction of practised standard pure and applied problems in closed form<br><br>Solving such problems by invoking and using standard approaches and procedures, as well as more independent problem-solving processes in which connections are made between different mathematical areas and modes of representation and communication (schemata, tables, graphs, words, pictures) | Posing and formulating problems well beyond the reproduction of practised standard pure and applied problems in closed form<br><br>Solving such problems by invoking and using standard approaches and procedures, but also more original problem-solving processes in which connections are made between different mathematical areas and modes of representation and communication (schemata, tables, graphs, words, pictures). It also involves reflecting on strategies and solutions |
| **Representations** | Decoding, encoding and interpreting familiar, practised standard representations of well-known mathematical objects<br><br>Switching between representations is involved only when the switching itself is an established part of the representations implied | Decoding, encoding and interpreting familiar and less familiar of mathematical objects<br><br>Choosing and switching between different forms of representation of mathematical objects and situations<br><br>Translating and distinguishing between different forms of representation | Decoding, encoding and interpreting familiar and less familiar representations of mathematical objects<br><br>Choosing and switching between different forms of representation of mathematical objects and situations<br><br>Translating and distinguishing between different forms of representation<br><br>It further involves the creative combination of representations and the invention of non-standard ones |
| **Using symbolic, formal and technical language and operations** | Decoding and interpreting routine basic symbolic and formal language practised in well-known contexts and situations<br><br>Handling simple statements and expressions containing symbols and formulae, including using variables, solving equations and undertaking | Decoding and interpreting basic symbolic and formal language in less well-known contexts and situations,<br><br>Handling statements and expressions containing symbols and formulae, including using variables, solving equations and undertaking calculations using familiar procedures | Decoding and interpreting symbolic and formal language practised in unknown contexts and situations<br><br>Handling statements and expressions containing symbols and formulae, including using variables, solving equations and undertaking calculations<br><br>It also involves the ability to deal with complex statements and |

**Table 2-4 continued**

| | | | |
|---|---|---|---|
| | calculations by routine procedures | | expressions and with unfamiliar symbolic or formal language, and to understand and to translate between such language and natural language |
| **Use of aids and tools** | Knowing about and being able to use familiar aids and tools in contexts, situations and ways close to those in which their use was introduced and practised | Knowing about and using familiar aids and tools in contexts, situations and ways that are different from those in which their use was introduced and practised | Knowing about and using familiar or unfamiliar aids and tools in contexts, situations and ways that are entirely different from those in which their use was introduced and practised<br><br>It also involves knowing about limitations of aids and tools |

### 2.7.5 Factors which underpin increasing levels of item difficulty and mathematical competence

There are a variety of factors that indicate increasing levels of item difficulty and mathematical competence. They include the following:

#### 2.7.5.1 The type and level of mathematical skill required

This involves single-step problems requiring learners to reproduce basic mathematical facts and perform simple calculation processes, multi-step problems involving more advanced mathematical knowledge, complex decision-making, information processing, and problem-solving and modelling skills (OECD, 2009, p. 121).

#### 2.7.5.2 The type and degree of reflection and interpretation required

This includes the nature of the demands arising from the problem context; the extent to which the mathematical demands of the problem are clear or to which students must impose their mathematical construction on the problem, and the extent to which insight, complex reasoning, and generalisation are required (OECD, 2009, p. 121).

#### 2.7.5.3 The kind of representation skills required

This includes problems where only one type of representation is required, as well as problems where students must switch between different types of representation or search for appropriate types of representation themselves (OECD, 2009, p. 121).

#### 2.7.5.4 The kind and degree of mathematical argumentation required

The types of problems where no arguing is necessary, problems where students may apply well-known arguments, and problems where students must create mathematical arguments, understand other people's argumentation or judge the correctness of given proofs or proofs (OECD, 2009, p. 121). The empirical difficulty of a question is obtained by determining which aspects of the mathematical competencies are needed to plan and find a solution. Easy questions require the use of few competencies in a direct way. Difficult questions need the more complex use of several competencies. Therefore, to determine the complexity of test questions, the number of competencies required as well as the complexity of the activation thereof, need to be considered (OECD, 2013b, p. 31).

### 2.7.6 Levels of mathematical competence

At the lowest level of mathematical competence, learners execute single-step procedures that involve the recognition of familiar contexts and mathematically well-formulated problems. This also involves the reproduction of well-known mathematical processes or facts and applying easy computational skills (OECD, 2009, p. 121).

At higher mathematical competence levels, learners complete more complex tasks with more than a single processing step. They also combine different parts of information or interpret different representations of mathematical concepts or information, recognising which elements are relevant and meaningful and how they relate to one another. They typically work with given mathematical models or formulations, frequently in algebraic form, to identify solutions, or they carry out a small sequence of processing or calculation steps to produce a solution (OECD, 2009, p. 121).

At the highest level of mathematical competence, learners play a more active and creative role in their approach to mathematical problems. They interpret more complex information and negotiate several processing steps. They produce a formulation of a problem and often develop a suitable model that facilitates its solution. Learners at this level can identify and apply relevant tools and knowledge in an unfamiliar problem context. They have insight in identifying a suitable solution strategy and display other higher-order cognitive processes such as argumentation to explain or communicate results, reasoning, and generalisation (OECD, 2009, p. 121).

The six described levels of mathematical competence developed in PISA are summarised in Table 2-5 below starting with the lowest level and progressing to the highest level:

**Table 2-5: Summary of the six proficiency levels in Mathematics (OECD, 2009, p. 122)**

| Levels of mathematical competence | Description of what learners can do at each level |
|---|---|
| **Level 1** | Learners at this level can:<br>• answer questions in familiar contexts with all needed information given and questions formulated<br>• identify information and execute routine procedures<br>• complete tasks which are apparent and follow directly from a given stimulus<br>• recognise and interpret situations in various contexts. |
| **Level 2** | At this level, learners can:<br>• extract relevant information from a single source<br>• apply basic algorithms, procedures, conventions, and formulae<br>• reason directly and make literal interpretations of answers |
| **Level 3** | Learners at this level can:<br>• choose and apply basic problem-solving strategies<br>• execute well-described procedures, even those which include sequential decisions<br>• communicate their results and interpretations briefly<br>• develop short communications to report their reasoning, results and interpretations |
| **Level 4** | At this level, learners can:<br>• construct and communicate their actions, interpretations, and arguments<br>• efficiently work with models for complex, concrete situations which might make assumptions or involve specific constraints<br>• choose and integrate various representations, including symbolic ones and can link them directly to aspects of real-world situations<br>• use well-developed skills and reason flexibly, with some insight, in real-world contexts |
| **Level 5** | Learners at this level can:<br>• construct and use models for complicated situations<br>• make assumptions and identify constraints<br>• choose, compare and evaluate suitable problem-solving strategies for complex problems which are related to these models<br>• use higher-order thinking and reasoning skills, representations, symbolic and formal language and show insight into the problem situation<br>• reflect, formulate and express their reasoning and interpretations |
| **Level 6** | At the last and highest level, learners can:<br>• think and reason at an advanced level<br>• model complex situations and use, generalise and conceptualise information based on their investigation<br>• connect different information sources and representations and translate between them<br>• use and apply their insight, understanding, symbolic and formal mathematical relationships, and operations to develop new strategies and approaches for solving new problem situations<br>• formulate and communicate their reflections and procedures efficiently executed as well as correctly |

## 2.8 Enhancement of mathematical competence

To prepare secondary school learners efficiently for higher education, it is imperative that their mathematical competence is at the required level. The main prerequisite for the effective process of competence development is a learners' impression of an unrestricted, secure, errors-allowing learning environment in which they tend to participate actively (Domazet et al., 2013, p. 122). However, when teachers dictate teaching methods as demands and not as recommendations, learners are inclined to escape from constructivist learning situations by finding methods that result in the mathematical behaviour the teacher expects. This type of behaviour does not culminate in deep understanding which is an essential aspect of Mathematics learning (Cobb, 1988; Schoenfeld, 1988).

Engaging in problem-based learning (PBL) strategies in the classroom can enhance competence development in contrast to mathematical skills and knowledge developed through traditional teaching methods (Domazet et al., 2013, p. 123). Problem-based learning consists of the presentation of a real-life problem before the exposure to the mathematical concept mentioned in the learning outcome of the lesson. Learners formulate the problem in their way, explore the problem through group discussion, notes from the teacher and examples from textbooks. They predict solutions, experiment with different real-life scenarios, and execute their projects. Various methods of solving the problem are encouraged. On completion of the task, learners present their solution as a group, the teacher sums up and reinforces the new concepts learnt (Domazet et al*.,* 2013, p. 124; Tarmizi, Tarmizi, Lojinina, & Mokhtara, 2010).

The application of Mathematics to real life and the interaction of knowledge from various domains necessitate learners to combine mathematical conceptual knowledge with the communication skills and problem-solving, positive beliefs and attitudes, and critical and creative thinking skills (Tarmizi et al., 2010, p. 4864). Problem-based learning (PBL) as an example of a constructivist teaching method has made a significant difference to the cognitive effort spent on real-life problems. However, on its own, PBL does not have a significant impact on conventional assessment performance compared to traditional teaching (Tarmizi et al*.*, 2010, p. 4865). Despite its value in enhancing the mathematical competence of learners, PBL is not the only teaching strategy to employ in competence-oriented classrooms, neither is all the Mathematics content knowledge appropriate for PBL and teaching (Domazet et al*.*, 2013, p. 124).

In conclusion, learners must be exposed to suitable problem-solving tasks in which all eight mathematical competencies are developed (§ 2.6.2). Mathematical competence is enhanced through constructivist teaching methods such as investigative and problem-solving teaching in

which the learners take responsibility for their learning and understanding of Mathematics, i.e. a learner-centred approach (Domazet et al., 2013, p. 122).

## 2.9 Conclusion

The mathematical aim of the PISA study is to develop guidelines which indicate, from the perspective of the use of Mathematics, how efficiently countries have prepared their 15-year-old learners to become active, reflective and intelligent citizens (OECD, 2014a). To achieve this aim, PISA has developed assessments which focus on determining the extent to which learners can use or apply what they have learned. PISA further emphasises knowledge, mathematical processes, and understanding to solve problems that arise out of the day-to-day experience (OECD, 2016). This provides a variety of problems with varying degrees of built-in guidance and structure, while simultaneously pushing towards authentic problems where learners must think themselves (OECD, 2009).

## 2.10 Summary of the chapter

This chapter presented the theoretical framework ("lens") for mathematical competence as one of the constructs in this study. Mathematical competence was theorised regarding the eight mathematical competencies of the Danish KOM project. The themes, Mathematics and the teaching and learning of school Mathematics were discussed. The PISA Mathematics Assessment Framework as measuring instrument for mathematical competence was justified. Ways to enhance mathematical competence were mentioned. In the following chapter, the theoretical framework for study orientation, the second investigating "lens", is laid out.

## CHAPTER 3 STUDY ORIENTATION IN MATHEMATICS

### 3.1 Introduction

Chapter 2 provided the conceptual and theoretical framework, based on the literature review, for mathematical competence as employed in this study. Chapter 3 lays the theoretical foundation for study orientation in Mathematics as used in the study. The following aspects related to study orientation in Mathematics are discussed: the importance of study orientation, The Study Orientation Questionnaire in Mathematics (SOM), the role of affective and conative factors, the measurement and enhancement of study orientation, and its effect on Mathematics achievement. These two chapters form the lenses through which the empirical investigation is undertaken. Figure 3-1 represents an overview of Chapter 3.

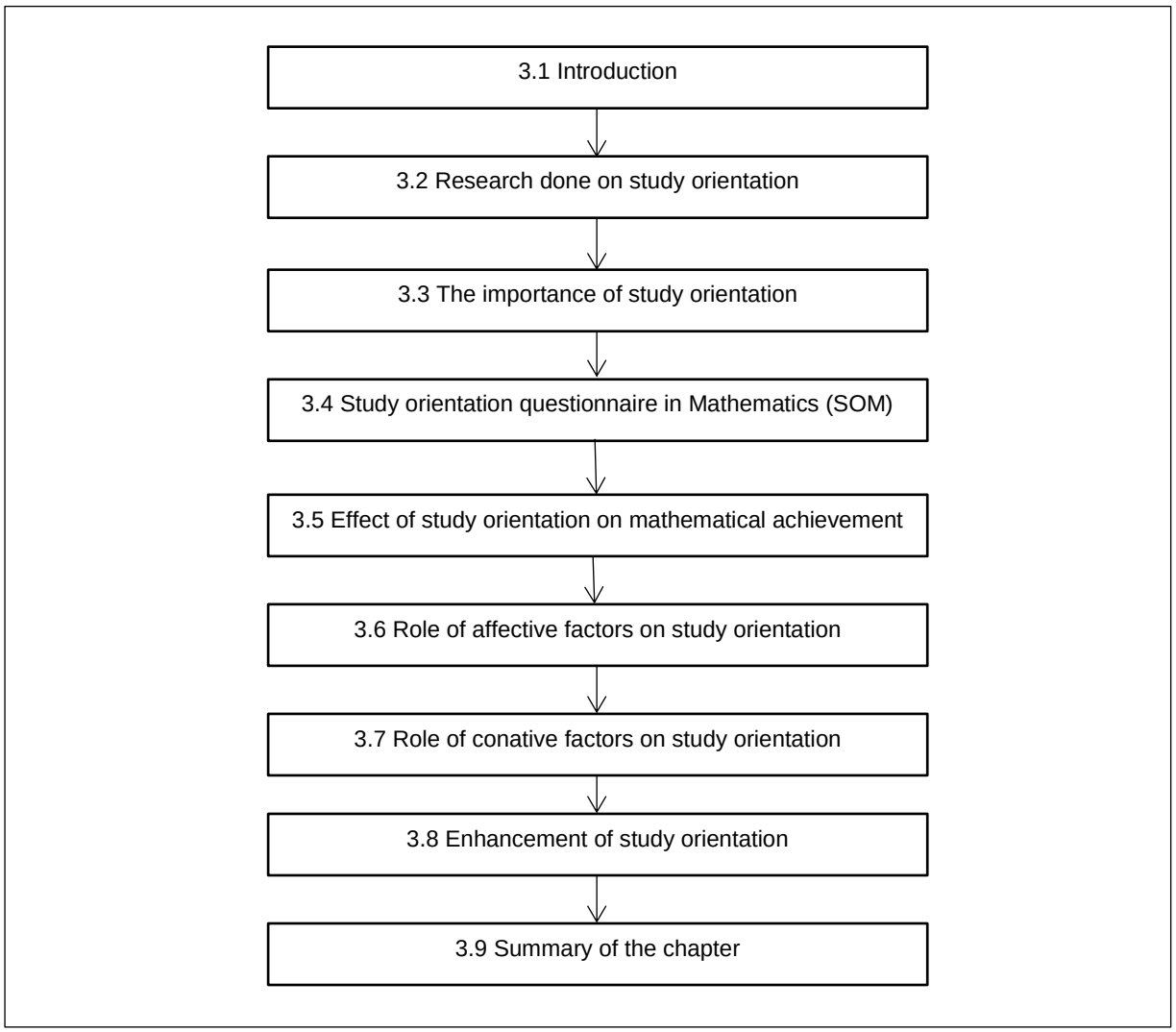



**Figure 3-1: An overview of Chapter 3**

Figure 3-2 displays the emergent themes from the literature review done on ATLAS.ti™.

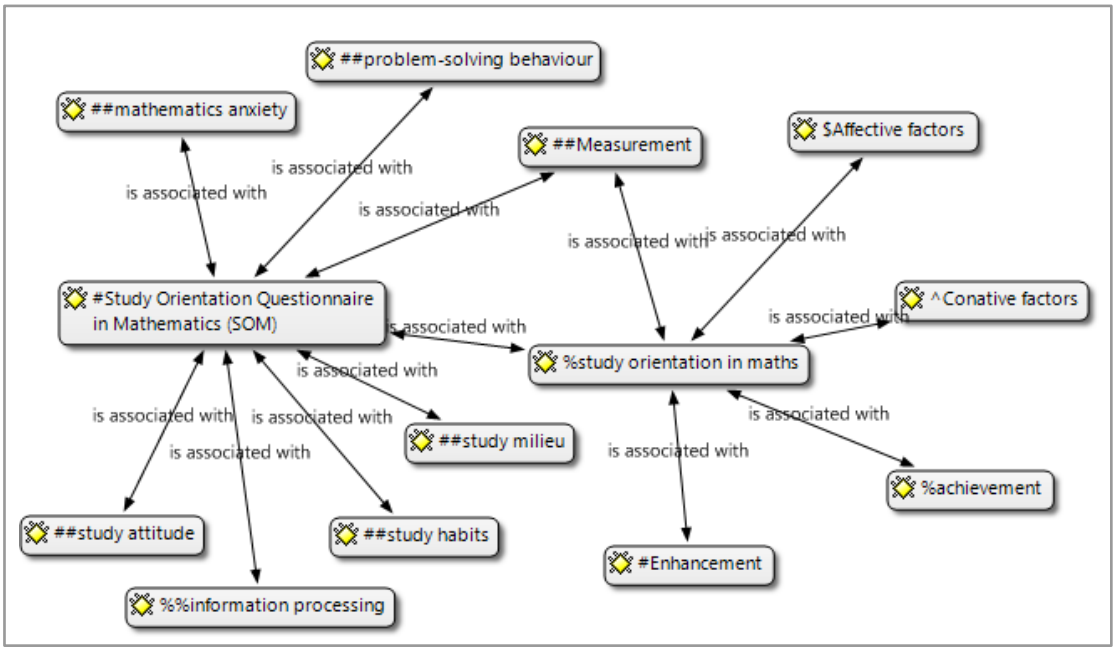



**Figure 3-2: Emergent themes from the literature review done on ATLAS.ti™**

It is a common phenomenon that learners with high intellectual aptitude and ability for Mathematics often underachieve in the subject. On the other hand, few learners with a low intellectual ability and aptitude for the subject perform well in Mathematics. Many learners avoid Mathematics or underachieve in the subject. Mathematics is particularly vulnerable to poor teaching, and it is possible that traditional teaching approaches deprive some learners of effective learning. For various reasons, priority is not given to learners' study orientation in Mathematics, although negative study orientation is viewed as a contributor to poor performance (Maree et al., 2011, p. 1). This is the reason for investigating the role of learners' study orientation in Mathematics on learners' mathematical competence, their problem-solving abilities and subsequent achievement in Mathematics.

## 3.2 Research on study orientation in Mathematics

Various researchers have realised the role and importance of study orientation in Mathematics. In a quantitative study, Erasmus (2013b, p. 18) reports that boys and girls differ concerning the combination of facets of emotional intelligence and the fields of study orientation. These aspects could be possible indicators of Mathematics achievement. In another quantitative study, the findings of Awang and Sinnadurai (2011, p. 320) support previous findings that an improvement in study orientation skills increases the academic performance of learners. However, these study orientation skills develop over time.

Steyn and Maree (2003, p. 47) studied the thinking style preferences of first-year engineering students taking a first course in Calculus. The Study Orientation Questionnaire in Mathematics

Tertiary (SOMT) was used to measure the study orientation of these students. Analysis of this data indicated the expected level of performance of students in the first-semester course in Calculus. They found that most of the fields of the SOMT, although not simultaneously, can be regarded as significant indicators of performance in Mathematics on the 5% level (Steyn & Maree, 2003, p. 55).

In another study, the empirical relationship between study orientation, as measured by the SOM, and Mathematics achievement was investigated concerning gender and ethnicity. The learners' attributions regarding the reasons for their performance in Mathematics were further investigated. The results indicated the necessity of a set of study orientation variables as indicators of achievement in Mathematics for boys and girls and the various racial groups. Problem-solving behaviour and study milieu seemed to be the most significant individual predictors of Mathematics achievement for both genders, and different racial groups. The causal attribution of achievement scales jointly contributed significantly to the explanation of the variance in Mathematics achievement for the racial groups (Moodaley et al., 2006, p. 634).

## 3.3 The importance of study orientation in Mathematics

Study orientation in Mathematics is a multi-faceted and an encompassing construct which refers to learners' views and beliefs, learning techniques, and circumstances which influence their assimilation of mathematical procedures and concepts. Study orientation in Mathematics and mastering new concepts in Mathematics are related (Maree, Molepo, Owen, & Ehlers, 2005) It also includes learning techniques which facilitate learners' ability to become skill proficient. The inherent classroom experiences determine study orientation (Molokoli, 2005, p. 22).

Study orientation is a prerequisite for deeper learning which entails learning for the transfer or application of knowledge in different contexts, critical reasoning, and problem-solving (Bitter & Loney, 2015; Erasmus, 2013b). The study orientation of a learner, in general, plays a significant role in the learning of a subject and the subsequent achievement in the subject. There is a significant statistical association between achievement and aspects of study orientation in Mathematics (Maree et al., 2011, p. 2).

## 3.4 Study Orientation Questionnaire in Mathematics (SOM)

In 1997, Maree, Prinsloo and Claassen developed the Study Orientation Questionnaire in Mathematics (SOM), a standardised questionnaire for secondary school learners in South Africa. This questionnaire is a non-cognitive test and enables Mathematics teachers, principals, psychologists and other stakeholders to identify learners with a negative study orientation and to gain a better understanding of learners with poor performance in the subject. One can use these results to help learners to improve their study orientation and eventually realise their

academic potential at a higher level as well as to determine learners' affective characteristics in identifying the cognitive ability of learners in mastering Mathematics (Maree et al., 2011, p. 7).

The primary premise of the SOM is a problem-solving approach to Mathematics teaching and learning aimed at enhancing problem-solving behaviour in Mathematics (See § 2.5.2). The focus, therefore, shifts from a traditional approach to teaching and learning to a learner-centred approach. This shift in focus has the following implications: learners think actively, they focus on processes too and not only skills and concepts, but they also interact socially and become more involved in the Mathematics classroom. Furthermore, they appreciate the use and importance of Mathematics, they have a functional knowledge of the language and structure of Mathematics and have a positive attitude to learning and discovery in Mathematics. This approach implies that learners will still learn rules and principles in Mathematics, but they will learn them in problem-solving learning contexts instead of only memorising them (Maree et al*.,* 2011, p. 9).

In the SOM, study orientation encompasses five fields in grades eight and nine (76 questions) and an extra field in grades ten to twelve (92 questions). These fields are study attitude, Mathematics anxiety, study habits, problem-solving behaviour, study milieu, and information processing. In grades 7 to 9, we use only the first five fields mentioned above, while in grades 10 to 12 the sixth field information processing is added. These six fields further relate to how learners feel and respond to aspects of their Mathematics achievement (Steyn & Maree, 2003). This theory forms the basis of this study because study orientation is a predictor of learners' mathematical competence and their Mathematics achievement, and a prerequisite for deeper learning (Bitter & Loney, 2015; National Research Council, 2012).

### 3.4.1 Rationale for each field of the SOM

The SOM provides a summary of each of the six fields and is a measure of learners' study orientation in Mathematics. The completion of the SOM should always be followed up by task-based interviews. Learners' study problems in Mathematics are never only learning problems, but teaching and learning problems (Maree et al*.,* 2011, p. 13). Refer to Addenda 5.1 and 5.3 for the SOM questionnaire and the composition of questions in each of the six fields. The various fields are only mentioned here but discussed in more detail in § 3.4.2 to § 3.4.7.

***Field 1: Study attitude in Mathematics (SA)***

This field consists of 14 questions which focus on attitudes towards Mathematics and aspects of Mathematics, and objective as well as subjective feelings and experiences. Attitudes comprise aspects such as the enjoyment of Mathematics and the challenge it offers, the usefulness of the subject, and self-confidence. It also includes learners' views regarding the nature of

Mathematics, the nature of learning, and the nature of self. These attitudes and feelings are consistently evident and affect learners' outlook towards and their interest in Mathematics. Learners' study attitude is the incentive behind their study attitude to Mathematics. Unfortunately, many learners have a negative attitude towards Mathematics (Maree et al., 2011, p. 10; Mohamed & Waheed, 2011).

***Field 2: Mathematics anxiety (MA)***

Fourteen questions measure Mathematics anxiety. Mathematics anxiety is when learners feel anxious, experience stress and start panicking when they meet with Mathematics. These feelings manifest as repetitive and aimless behaviour, e.g. biting nails, sweating, an urge to go to the bathroom, crossing out a correct answer, and playing with objects. When learners are emotionally disturbed, their motivation in Mathematics is affected negatively (Ashcraft, 2002). Mathematics anxiety increases when learners have not mastered the technical language of Mathematics adequately. Learners' risk-taking stance in Mathematics and their cognitive functioning defer when they become too afraid to discuss their problems with teachers and to ask questions. To a certain degree, self-confidence is viewed as the opposite to this field (Maree et al., 2011, p. 10).

***Field 3: Study habits in Mathematics (SH)***

Seventeen questions in the SOM measure study habits in Mathematics. This field focuses on the extent to which study attitude in Mathematics results in specific study habits in Mathematics. Study habits include consistent, effective study habits and methods, a willingness to study and gain insight in Mathematics, to work consistently, to keep up in Mathematics and not to waste time (Awang & Sinnadurai, 2011; Maree et al., 2011, p. 11).

***Field 4: Problem-solving behaviour in Mathematics (PSB)***

Eighteen questions form this field. These questions focus on cognitive and metacognitive learning strategies; thinking about thinking during the problem-solving process in Mathematics. These learning strategies include self-regulation, self-evaluation, decision-making, self-monitoring, and planning (Van de Walle et al., 2015). Useful problem-solving strategies include observing patterns and relations in Mathematics; modelling, estimating and approximating answers, changing ineffective strategies, and carrying out Polya's four problem-solving steps (See § 2.5.2). The use of strategies helps learners to generalise in Mathematics. Learning strategies thrive in a problem-solving context where learners work cooperatively in solving problems, and where social interaction realises efficiently. These should enable learners to apply Mathematics in real life and prepare them for the challenges they face as adults

(Maree et al*.,* 2011, pp. 11-12). Learners' total study orientation in Mathematics significantly influences their problem-solving abilities and their ultimate performance in Mathematics (Maree et al*.,* 2011, p. 4).

***Field 5: Study milieu in Mathematics (SM)***

Thirteen questions make up this specific field. Study milieu includes the physical, experienced, and social milieu of learners. Learners come from various backgrounds and different circumstances. Non-stimulating environments often cause learners to be behind their peers, to experience problems, have limited experiences, and become slower learners (Singh, 2016). Non-understanding of the specific language of Mathematics and milieu disadvantages often result in Mathematics anxiety, inhibit Mathematics performance, and lower learners' self-confidence (Maree et al*.,* 2011, p. 12).

***Field 6: Information processing (IP)***

Sixteen questions are designed to measure the information processing abilities of learners. This field focuses on specific learning and learning in general, critical thinking and understanding strategies, e.g. use of tables, diagrams, and sketches, and reading and summarising strategies. This field indicates learners' real understanding of Mathematics. Inadequate conceptualisation in Mathematics is often noticeable by incorrect calculations, incorrect assumptions, incorrect allocation of qualities, and incorrect allocations of values to unknowns. Learners find it difficult to distinguish between the 'given' and the question in mathematical tasks. Transfer of learning does not happen and made solving problems difficult or impossible (Maree et al., 2011, pp. 12-13).

An in-depth discussion of these six aspects constituting study orientation in Mathematics follows in the subsequent six sections.

### 3.4.2 Study attitude in Mathematics

Attitude lies at the heart of human identity. Daily people like, dislike, love, hate, agree, disagree, favour, and oppose. These are all judgmental responses to something. Therefore, attitude is a summative evaluation of an object of thought (Mohamed & Waheed, 2011). Many learners have a negative study orientation towards Mathematics. Learners without a positive attitude towards learning, who do not understand the importance of hard work, and do not realise that each mathematical concept is a building block for those which follow, will be unable to perform well in Mathematics. Improving a learner's study orientation from negative to more positive, ought to improve Mathematics achievement. A learner's self-confidence in learning

Mathematics (which overlaps with self-efficacy), self-concept, and expectancy, are the most critical requirements for achievement in Mathematics (Erasmus, 2013b; Maree et al., 2011).

A learner's attitude towards Mathematics plays a significant role in Mathematics teaching and learning. The assessment methods and teaching method not only affect attitude towards Mathematics but also learners' achievement in Mathematics (Arhin, 2015). Attitude forms a central part of a person's identity. Attitude guides an individual's behaviour, can be positive or negative, develops with time and can change over time. Three aspects or components influence attitudes: these components are cognitive, affective and behavioural information. Cognitive factors include aspects such as thoughts, beliefs, and attributes. Affective factors include feelings and emotions. Behavioural factors include the experience the person has had as well as past events (Mohamed & Waheed, 2011).

Learners' attitude towards Mathematics plays an important role in the learning of Mathematics and is one of the important factors influencing their achievement (Maree et al., 2011). Several factors influence learners' attitude towards Mathematics. Firstly, factors associated with the learners' themselves. These factors include learners' Mathematics marks, anxiety towards Mathematics, their self-concept, experiences at school, self-efficacy and intrinsic motivation (OECD, 2013a). Secondly, factors from the society and home environment also influence learners' attitude towards Mathematics. These include the expectations of parents, their educational background, and occupation (Singh, 2016). Thirdly, the school, teacher, and teaching approaches are also factors which can influence learners' attitudes. This includes the teaching materials used by the teacher, classroom management, teacher's personality and content knowledge, and topics related to real-life examples or not (Samuelsson, 2010). More aspects are teaching methods, teachers' attitude towards Mathematics, teachers' beliefs about the nature of Mathematics, and the opinions of other learners about the subject. The society also tends to label Mathematics as a problematic and abstract subject, only accessible to some people and the clever ones (Mohamed & Waheed, 2011, p. 278).

Study attitude in Mathematics refers to a learner's objective as well as subjective attitudes and feelings towards Mathematics which are seen consistently and affect learner's expectation, motivation, and interest in the subject. A learner's mathematical worldview about the self, the nature of Mathematics, and the nature of learning Mathematics are included in the construct. Learners' study attitude is believed to be the driving force behind their study attitude to Mathematics. Various factors, for example, the enjoyment of the subject, the usefulness thereof, the challenge it offers, and self-confidence are included in attitudes (Maree et al., 2011; Steyn & Maree, 2003).

Middle school learners in the United States, trained in problem-solving skills recommended by the National Council of Teachers of Mathematics (NCTM), had more positive attitudes towards Mathematics and persevered more in finding solutions than the learners in traditional classrooms (NCTM, 1980, 2010). Furthermore, performance assessment-driven teaching and learning used with senior secondary school learners in Ghana had encouraging results on these learners' attitudes towards Mathematics especially on understanding in solving mathematical problems, learners' motivation, and independent thinking. Positive class experiences which portray positive values associated with Mathematics and its relevance to the society are likely to increase learners' positive attitudes towards Mathematics. Performance assessment-driven teaching showed to improve learners' achievement in Mathematics too because it encouraged them to own the process of solving the given problem (Arhin, 2015).

### 3.4.3 Study habits in Mathematics

Study habits are unique to everyone. Some learners prefer to read aloud, others to read silently or in a group. Some listen to music while studying while others prefer the study surroundings to be quiet. Many learners are unsuccessful in their schoolwork because they do not possess adequate study skills and study habits. The home plays a vital role in establishing effective study habits in the learners (Awang & Sinnadurai, 2011). Singh (2016) maintains that there is a significant relationship between study habits, environment, their combined effect, and academic performance in Mathematics.

Study habits refer to the displaying of acquired, consistent and efficient study methods and habits. These include aspects such as planning one's time; preparation; working through previous assessments; completing familiar problems but also strange problems, and a willingness to gain insight into specific aspects of Mathematics as well as to study the content and practise it in a focused way (Maree et al., 2011, p. 11; Steyn & Maree, 2003).

Study habits serve as the vehicle for learning and are the pattern of behaviour employed by learners in their studies. It is the degree to which learners engage themselves in regular studying. Study habits involve regular study time and routines in an environment which is conducive to learning. Good study habits go hand in hand with a positive attitude toward learning in general (Singh, 2016).

Inadequate study habits and study skills can cause learners to be unsuccessful in their Mathematics assessments. High-achieving learners are not born but developed by the regular and deliberate practice of good study habits. Therefore, to improve learners' academic achievement, it is crucial to improving their study habits. Teachers and parents are mutually responsible for the development of sound study habits in learners (Singh, 2016).

### 3.4.4 Study milieu in Mathematics

The study milieu includes factors relating to the social, physical and experienced environment of learners. Learners come from different social backgrounds and environments. Learners from non-stimulating environments are often behind their peers, have problems and are slower due to limited experiences (Singh, 2016). These environments, as well as a non-understanding of the language of Mathematics, tends to lead to Mathematics anxiety and a lack of self-confidence which could inhibit Mathematics performance (Steyn & Maree, 2003, p. 51).

### 3.4.5 Mathematics anxiety

Despite the availability of digital resources, the development of mathematical skills remains very important in everyday life but severely hampered by feelings of incompetence and Mathematics anxiety. Mathematics anxiety was one of the first affective characteristics which were empirically investigated in the Mathematics learning domain (Hannula, 2014).

Richardson and Suinn (1972) and Ashcraft (2002, p. 181) describe Mathematics anxiety as feelings of anxiety and tension which hamper working with numbers and solving mathematical problems in a variety of everyday life and academic situations. Mathematics anxiety involves cognitive as well as affective factors. The Mathematics Anxiety Rating Scale (MARS) measures Mathematics anxiety in adults and is popular among educators. The Mathematics Anxiety Scale for Children (MASC) is based on the MARS and employed to measure Mathematics anxiety in children (Karimi & Venkatesan, 2009).

Mathematics anxiety is an essential factor which hinders a learner's problem-solving success. High levels of anxiety are related to less efficient mathematical problem-solving (Guven & Cabakcor, 2013). Mathematics anxiety interferes with thinking processes by compromising ongoing activity in the working memory. Memory and anxiety affect Mathematics achievement directly. Anxiety is a predictor (indicator) of the relationship between Mathematics and memory for most measures of Mathematics achievement.

Mathematics anxiety is associated with adverse feelings towards Mathematics and unfavourable outcomes on Mathematics performance and confidence to learn. Anxiety has a detrimental effect on the working memory to such an extent that it cannot be used optimally in performing Mathematics related tasks. Anxiety may also cause low performance in Mathematics because learners tend to avoid doing Mathematics or rush to get the work done (Jansen et al., 2013, p. 190; Mehar & Kaur, 2015). However, Ma and Xu (2004) have evidence that the opposite is true: Low Mathematics performance causes Mathematics anxiety later. Most studies support both ways of thinking, and therefore a reciprocal model of Mathematics performance and maths anxiety seems to be more acceptable. An unfortunate consequence of the avoidance tendency

is that highly Mathematics-anxious learners are likely to have lower levels of mathematical competence and Mathematics achievement. They have exposure to less Mathematics at school, learn less of what they are expected to, and the result is a lower achievement in achievement as measured by standardised tests (Ashcraft, 2002).

Mathematics anxiety refers to a learner's adverse affective reaction in situations where numbers, Mathematics, and Mathematics calculations are involved. It is a feeling of anxiety and tension or stress that prevents the learner from working with numbers and solving mathematical problems in a relaxed and confident way. Such anxiety manifests typically as aimless, repetitive behaviour, for example, biting nails, excessive sweating, the scrapping of correct answers, and playing with objects (Maree et al., 2011). Being too afraid to ask questions or discuss problems with the teacher, inhibits a learner's cognitive functioning and the learner will not take any risks in class (Hembree, 1990).

Learners who are incredibly maths-anxious tend to avoid Mathematics, which negatively impacts their mathematical competence and excludes essential future careers (Ashcraft, 2002). Ashcraft and Moore (2009) mention that Mathematics anxiety does not relate to intelligence. It does, however, relate strongly to test anxiety, moderately to state anxiety, general anxiety, and trait anxiety. Many researchers view this meaning that test anxiety is a strong indication of Mathematics anxiety and that Mathematics anxiety is separate from another anxiety construct, although they are related.

The causes of Mathematics anxiety are still unknown, but specific teaching styles such as the traditional approach could contribute to this phenomenon. We need further research to determine its origins and effect of brain activity and to examine both the cognitive and emotional constituents thereof. There is a substantial amount of literature on the educational and personal consequences of Mathematics anxiety (Hembree, 1990). Avoidance of doing Mathematics is the most prominent tendency. Mathematics-anxious people take fewer Mathematics courses than people with low Mathematics anxiety and tend to have lower achievement. Highly Mathematics-anxious learners also tend to show negative attitudes toward Mathematics and have negative self-concepts. The opposite of Mathematics anxiety is Mathematics confidence which is an overall feeling of 'comfort' toward Mathematics (Steyn & Maree, 2003).

Self-efficacy in Mathematics tends to increase where learners' Mathematics anxiety levels are lower as evident in the OECD participating countries. For example, in Portugal and Iceland, significant decreases in Mathematics anxiety went along with increases in learners' Mathematics self-efficacy. Furthermore, the relationship between learners' mathematics self-efficacy and Mathematics achievement was firm in 2003 and stayed high in 2012 across 23 OECD countries (OECD, 2013a).

Daneshamooz and Alamolhodaei (2012, p. 270) report a relationship between academic hardiness, Mathematics anxiety, and Mathematics performance in secondary school learners regarding a cooperative learning approach. Academic hardiness is a characteristic that may distinguish between learners who avoid challenging tasks and those who are willing to partake in these challenges. The study aimed to show to what extent a learning method could assist learners with high Mathematics anxiety. The results showed the following:

- Learners with high and low levels of Mathematics anxiety performed better in Mathematics when exposed to cooperative learning.
- Mathematics anxiety has a significant negative correlation with mathematics achievement and academic hardiness.
- Gender differences in Mathematics anxiety are significant, but no significant gender differences were found in Mathematics performance and academic hardiness.
- Learners with high and low Mathematics anxiety levels who worked together, performed better in Mathematics (Daneshamooz & Alamolhodaei, 2012, pp. 274-275).

Maree et al. (2013, p. 208) confirm a negative correlation between Mathematics anxiety and Mathematics achievement, i.e. lower levels of Mathematics anxiety results in better achievement in the subject. In this study, the relative absence of Mathematics anxiety emerges as a predictor of achievement in Mathematics. Their findings also support those of other researchers, who have found that anxiety has a negative impact on Mathematics achievement (Ashcraft & Moore, 2009; Buckley, 2013; Çiftçi, 2015; Jensen, Dunekacke, Eid, & Blomeke, 2015; Karimi & Venkatesan, 2009; Lai et al., 2015).

### 3.4.6 Problem-solving behaviour in Mathematics

Mathematics learners need to be competent in solving open-ended problems. These are problems that are unfamiliar to them and which they initially do not know how to solve (Van de Walle et al., 2015). To solve these type of problems, the problem-solver needs not only a substantial amount of subject content knowledge but also knowledge of concepts, conditional knowledge, procedural knowledge, problem-solving strategies, and metacognitive self-regulatory skills (NCTM, 1980, 2010). These are essential aspects of the problem-solving competence. Procedural knowledge is “knowing how” while conditional knowledge is “knowing when and why”. Procedural knowledge is knowledge about operators which change the problem state and the ability to recognise a suitable cognitive operation. Conditional knowledge deals with the circumstances of the usage of operators which is essential in cases where more than one solution method is possible. Planning is of utmost importance and is the process aimed at finding a useful way in which to perform specific operations. Planning is an aspect of general problem-solving competence and self-regulation. Polya devised the four steps in

problem-solving, namely: understand the problem, devise a plan, carry out the plan, and look back (See § 2.5.2) (Buchwald et al., 2015).

Problem-solving behaviour in Mathematics includes cognitive and metacognitive learning strategies (Steyn & Maree, 2003). These strategies include planning, self-monitoring, self-regulation, decision-making, and self-evaluation during mathematical problem-solving. Metacognition plays an essential role during the problem-solving process; it can be learned and is connected to learning. Van de Walle et al. (2014) describe metacognition in problem-solving as the "conscious monitoring (being aware of how and why you are doing something) and regulation (choosing to do something or deciding to make changes) of one's thought processes." When the problem-solving is successful, it is evidence of high achievement in Mathematics.

### 3.4.7 Information processing

Information processing entails the specific way in which learners deal with information and process the information. Information processing refers to aspects such as general and specific learning and summarising and reading strategies. Critical thinking and understanding strategies, for example, the optimal use of sketches, tables, and diagrams are also seen as ways of information processing. Information processing is an indicator of the extent to which learners understand Mathematics (Steyn & Maree, 2003).

Learners' total study orientation in Mathematics influences their problem-solving abilities and achievement in Mathematics. There is close interaction between different aspects of learners' study orientation (Maree et al., 2011).

## 3.5 The effect of study orientation on Mathematics achievement

Mathematics achievement and aspects of study orientation in Mathematics show a statistically significant correlation. Many studies focus on the role of affect and study orientation in Mathematics on learners' mathematical achievement and mastering of certain mathematical concepts. Affect influences achievement and decision-making (Ajisuksmo & Saputri, 2017). A more positive attitude leads to increased effort and motivation. Learners' attitudes toward Mathematics, their emotions; study habits; their experience of the teaching of Mathematics; classroom atmosphere, and their family life, all play an essential role in their Mathematics achievement (Erasmus, 2013b).

In a Malaysian study to determine the relationship between study orientation in Mathematics and Mathematics achievement, the researchers attempted to identify the SOM variable/field which is the best predictor of Mathematics achievement. Their findings reveal that the best

indicator of Mathematics achievement is the attitude of a learner. Study habits, study milieu, attitude, and problem-solving behaviour all have positive relationships with Mathematics achievement (Veloo, Ali, & Krishnasamy, 2014). On the other hand, Mathematics anxiety in learning Mathematics has a negative relationship with Mathematics achievement. These results emphasise the importance of a positive attitude towards Mathematics to combat feelings of anxiety and stress (Veloo et al., 2014). Learners without a positive attitude towards work, do not understand that every concept in Mathematics is essential and part of building blocks for new information. They will, therefore, be unable to perform well in the subject (Maree et al., 2011).

In most measures of Mathematics achievement, anxiety serves as a representative (indicator) of the relationship between memory and Mathematics. Changing a learner's study orientation in Mathematics from negative to more positive, ought to improve the learner's performance in Mathematics. A learner's self-confidence, which has interfaces with self-concept, expectancy, and self-efficacy, is the most critical prerequisite for achievement in Mathematics (Alves et al., 2016; Erasmus, 2013b, p. 14).

### 3.6 The role of affective factors on study orientation

During the past decades, researchers realised the essential and determining role of conative and affective factors in learning Mathematics, besides the cognitive factors involved. Conative factors include aspects such as motivation and volition, while affective factors involve self-confidence, availing beliefs and emotions (De Corte, 2015, p. 2). A discussion of conative factors follows in par. 3.7.

Many studies done over the past 25 years have indicated that learners' beliefs about Mathematics and Mathematics Education (teaching and learning) influence different aspects of their learning. These aspects include their motivation, learning strategies and approaches, and achievement. Schoenfeld (1985) was the first researcher who showed the existence of a set or system of beliefs which influences the problem-solving behaviour of learners. He explained it as follows: ''Belief systems are one's mathematical worldview, the perspective with which one approaches Mathematics and mathematical tasks. One's beliefs about Mathematics can determine how one chooses to approach a problem, which techniques will be used or avoided, how long and how hard one will work on it and so on. Beliefs establish the context within which resources, heuristics, and control function.'' (Schoenfeld, 1985, p. 45)

De Corte (2015) describes math-related beliefs as the personal ideas learners believe to be true about 1) Mathematics Education, 2) themselves, the learners of Mathematics and 3) the Mathematics classroom context. These personal ideas are explicitly or implicitly held and

determine, together with learners' pre-knowledge, their mathematical learning and problem-solving activities.

People's emotions form a crucial and integral part of their lives and day-to-day living and functioning. Subsequently, learners' self-perceived beliefs also play a substantial role in their academic motivation and achievement. Some self-perceived beliefs include Mathematics self-efficacy, Mathematics self-concept, Mathematics anxiety, and learner engagement (OECD, 2013a).

Mathematics self-efficacy is the degree to which learners believe in their abilities to efficiently deal with mathematical tasks and overcome obstacles. Self-efficacy addresses the question "Can I do it?" in contrast to self-concept which addresses the question "Am I good at it?" One's sense of self-efficacy is a determining factor in how one approaches challenges, goals, and tasks. It is a uniquely human attribute which affects motivation. Bandura (1977) initially suggested that self-efficacy affects people's choice of the type of activities they engage with, the amount of effort they put in and the degree of perseverance. Similarly, learners' motivation for their schoolwork relates to their academic self-efficacy. Self-efficacy beliefs relate positively to the choice of tasks, task values, intrinsic motivation, and persistence (Bong & Skaalvik, 2003).

Mathematics self-concept refers to learners' beliefs in their mathematical abilities. Mathematics anxiety involves feelings and thoughts about oneself about Mathematics. These include stress when doing Mathematics and feelings of hopelessness. Learner engagement in Mathematics refers to Mathematics activities in and out of school. Results from previous PISA International Assessments are evidence that different Mathematics self-beliefs are related, but conceptually distinct (OECD, 2013a).

Self-beliefs about Mathematics affect learning and achievement on various levels, namely cognitive, affective, motivational and decision-making. They influence how good learners motivate themselves and persevere despite challenges and difficulties. They further influence learners' decisions on educational and future careers (OECD, 2013a).

Meta-analysis studies reveal the negative implications of negative emotions and attitudes. Some of these are a sense of hopelessness, stress, avoiding Mathematics, and quitting during different phases of the solution process. These symptoms appear as early as primary school and peak in grades five and six (Tzohar-Rozen & Kramarski, 2014).

Kriegbaum et al. (2015) believe that there is enough evidence that motivational constructs are a predictor of achievement and school grades above prior achievement and intelligence. Learners' ability as well as other attributes such as motivation influence their grades, but intelligence predicts standardised achievement tests more strongly. Learners with high

academic self-efficacy are better motivated, attain higher achievement, and can more easily overcome academic obstacles (Jones & Ford, 2014).

## 3.7 The role of conative factors on study orientation

Conative factors such as motivation and volition and affective factors such as self-confidence, positive emotions, and availing beliefs, also play a key role in learners' study orientation in Mathematics. Motivation means being eager or keen to do something while volition is a decision or choice made by the will. Therefore, it is important to acknowledge the role of these factors on learners' study orientation in Mathematics and their subsequent achievement in the subject (Erasmus, 2013b; Maree et al., 2011; Molokoli, 2005).

The theoretical constructs of motivation and volition are essential conative factors. They are interrelated constructs, but distinct states of motivation. They are however conceptually separable: motivation is "*why to* strive for *certain* goals", and volition is "*how to* strive for *chosen* goals". Motivation is the willingness or general desire of a person to do something, while volition is the power to use one's *will* (Heckhausen, 2007).

Volition is a psychological term which refers to the process of making and acting on decisions. Volition refers to those thoughts and actions helping a person to attain a specific goal despite internal and external distractions. Therefore, it can be called the persistence to persevere (Molokoli, 2005). People with volition can control their environment and themselves in such a way that they can reach their goals by reducing the stumbling blocks in their way (Kim & Bennekin, 2013, p. 794). For example, a volitional learner decides to study alone at home before a test, not to be tempted to have fun with friends. The learner has a specific goal, a desire to pursue this goal, and acts accordingly to achieve the goal.

Kriegbaum et al. (2015) believe that there is enough evidence that motivational constructs are a predictor of achievement and school grades above prior achievement and intelligence. Learners' ability and other attributes such as motivation influence their grades, but intelligence more strongly predicts standardised achievement tests. Ability self-concepts relate more strongly to school grades and less strongly to standardised test achievement. Self-efficacy is a better indicator of standardised achievement than of school grades. Research also indicates that there is a definite relationship between self-efficacy and learner performance in all grades and subject disciplines (Nugent et al., 2015).

## 3.8 Enhancement of study orientation in Mathematics

As indicated in the previous sections, study orientation in Mathematics plays a pivotal role in the learning of Mathematics and subsequent achievement in the subject. Study orientation, as

employed in this study, entails the following facets: study attitude, study habits, Mathematics anxiety, study milieu, problem-solving behaviour, and information processing (§ 3.4.1). One of the aims of this study is to provide guidelines to enhance study orientation in Mathematics.

The formation of fundamental concepts in Mathematics is remarkably significant. Concept acquisition is a prerequisite for learning more advanced content in Mathematics. When conceptualisation is incomplete, the transfer of learning is inadequate and problem-solving in Mathematics is hindered (Bitter & Loney, 2015). The result is that learners do not readily understand the relationship between concepts and their importance to the solution of a given problem (Maree et al., 2011, p. 4). Learners will use formulas and theorems without considering their applicability to the specific situation or not. Content must link to learners' level of knowledge and thinking. When Mathematics is presented too abstractly or theoretically especially in the early stages, without learners' exposure to sufficient concrete material, it results in incomplete conceptualisation (Maree et al., 2011, p. 5; Siemon et al., 2013, p. 114).

Learners' study attitude towards Mathematics is another facet of study orientation. Aspects such as motivation, expectations about the subject, learners' views of the self, the nature of Mathematics, and the nature of the learning of Mathematics, influence learners' interest in the subject (Bong & Skaalvik, 2003). Learners' affective attitude affects their attitude towards Mathematics. Motivation and volition play an important role in study orientation (Molokoli, 2005). Learners' attitudes towards problem-solving have a potentially significant impact on their subsequent achievement in Mathematics (Mohamed & Waheed, 2011). These could include aspects such as problem-centred learning, the use of metacognitive learning strategies and co-operative learning (Samuelsson, 2008).

Learners' study milieu or the environment, i.e. the physical, social and experienced milieu, form an integral part of their study orientation. Learners come from different backgrounds and homes and differ in their interest and the prominence their parents give to achievement in Mathematics (Maree et al., 2011, pp. 5-6). Mathematics anxiety could have a negative impact on learners' interest in the subject. If Mathematics content does not make sense to the learners, they tend to become uncertain and fretful (Ashcraft, 2002; Lai et al., 2015; Ma & Xu, 2004).

Maree et al. (2011, p. 5) contend that learners' study habits in Mathematics are important in gaining understanding and insight and being successful during problem-solving activities. Effective and consistent study methods and practising concepts and procedures form an integral part of learners' study orientation in Mathematics. Study attitude towards Mathematics leads to specific study habits. Study habits are the second most crucial forecaster of Mathematics achievement (Awang & Sinnadurai, 2011; Siahi & Maiyo, 2015). Learners from

high and low performing schools in Mathematics indicate that study habits played a more prominent role in their Mathematics achievement than basic knowledge in Mathematics. High achievers have more adequate study habits than low achievers (Maree & Crafford, 2005, p. 208; Maree et al., 2013).

The way in which the learners process information in Mathematics is a notable contributor to their performance in the subject. Information processing entails critical thinking, general and specific understanding, learning, reading strategies and summarising strategies. These strategies can be employed for mathematical problem-solving and often indicate the degree to which learners understand the subject (Maree et al., 2011, p. 6).

Poor information processing skills result in mathematical errors that contribute to poor achievement in Mathematics. Information processing skills are activities such as learning and remembering, and are brought about by internal processes. Control over these processes is facilitated by learners' behaviour when completing problems and the contents of their memory (Maree et al., 2011). Learners with a poor working memory could struggle to follow instructions in class; to execute activities that need both storing and processing; to concentrate on where they are during the execution of activity; and to retain their attention and focus. The function of the working memory is to perform as a cognitive supply that learners may use to solve mathematical problems and to process information (Maree et al., 2013, p. 208).

Learners' study orientation seen holistically, significantly influences their problem-solving abilities and ultimate achievement in the subject. There is a close interaction between the different facets of learners' study orientation: changing one facet affects another (Maree et al., 2011, p. 6).

In conclusion, to enhance learners' study orientation in Mathematics, each aspect (study attitude, study habits, study milieu, information processing, and problem-solving behaviour) should be deliberately strengthened and their Mathematics anxiety levels reduced.

## 3.9 Summary of the chapter

This chapter presented the conceptual and theoretical framework for study orientation in Mathematics as viewed in this study. Study orientation in Mathematics was theorised regarding the Study Orientation Questionnaire in Mathematics (SOM) and the six fields encompassing study orientation in Mathematics. They are study attitude, study habits, study milieu, Mathematics anxiety, problem-solving behaviour, and information processing. However, information processing forms part of the grades 10 to 12 assessment and is not used in this study. Related aspects were: the role of affective and conative factors on study orientation, the enhancement of study orientation, and the role thereof in mathematical competence and

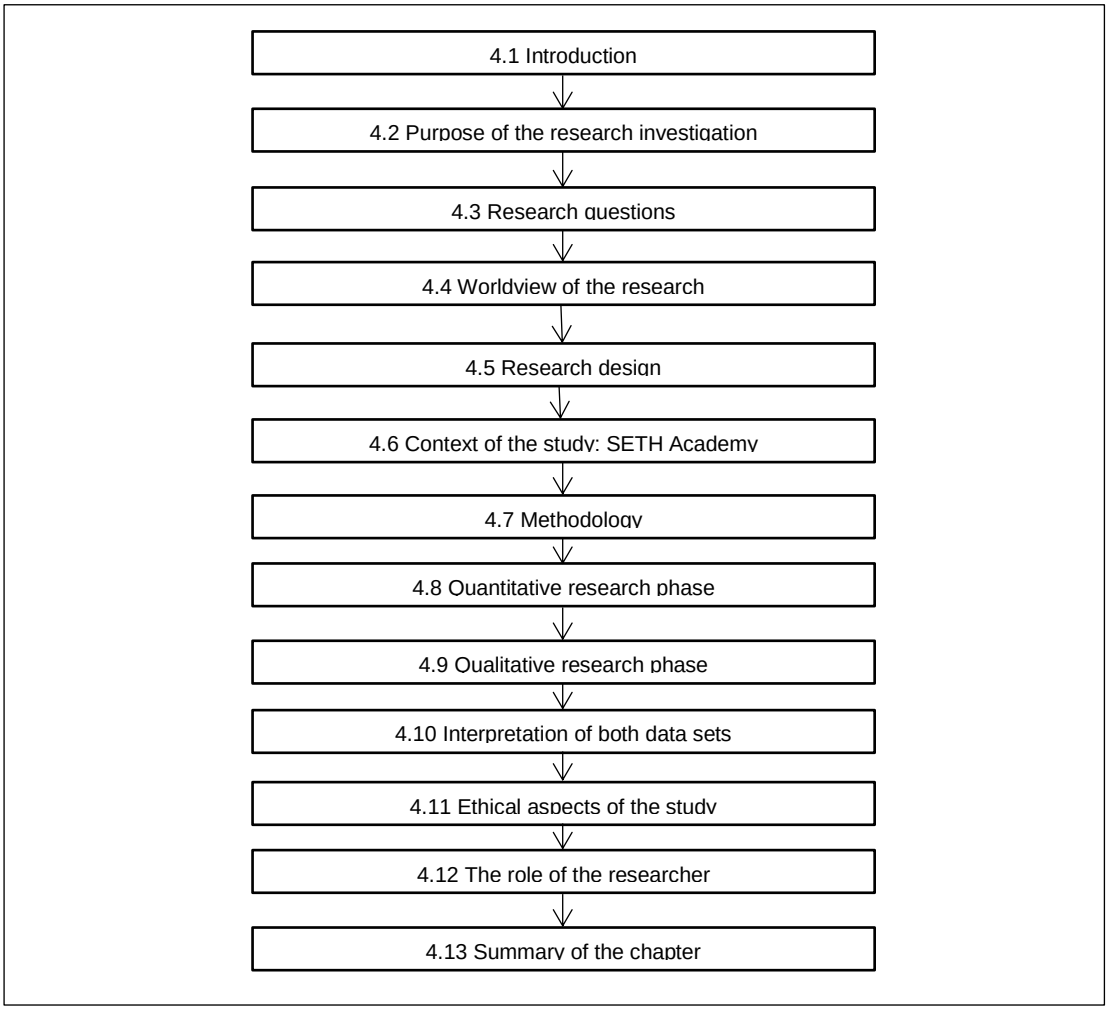
Mathematics achievement.  Chapter Four presents the research design and methodology for the study.

# CHAPTER 4 RESEARCH DESIGN AND METHODOLOGY

## 4.1 Introduction

Chapters 2 and 3 provided the conceptual and theoretical frameworks for the research question: *What guidelines can be developed to enhance the mathematical competence and study orientation of secondary school learners in a problem-solving learning context?* Chapter 4 focuses on the empirical investigation undertaken to determine answers to the following sub-questions: W*hat does mathematical competence entail?* and *what does study orientation in Mathematics entail*? Moreover, *how can the mathematical competence and study orientation in Mathematics of secondary school learners be enhanced through a problem-solving learning context?* This chapter describes the empirical investigation according to the following aspects: the purpose of the study, the research questions, worldview, an embedded mixed method research design, the quantitative research phase, the qualitative research phase, and ethical aspects. Figure 4-1 represents an overview of Chapter 4.

**Figure 4-1: An overview of Chapter 4**



## 4.2 Purpose of the research investigation

Research is a systematic inquiry process in a specific context with the following aims: to find answers to questions, to empower people to understand, predict, control or describe, or to change the investigated phenomena. Research occurs through the design of a research protocol which includes data generation, data analysis, and the interpretation of the gathered data (Fraenkel & Wallen, 2003).

The purpose of this empirical investigation is to quantitatively determine the nature of learners' mathematical competence (Sub-question 1) and their study orientation in Mathematics (Sub-question 2). Furthermore, learners' problem-solving abilities are determined qualitatively (Sub-question 3) to establish how these can enhance their mathematical competence and study orientation in a problem-solving learning context. Guidelines are developed by merging the results of the two data sets to answer the central research question.

## 4.3 Research questions

The primary research question in this study is: *What guidelines can be developed to enhance the mathematical competence and study orientation of secondary school learners in a problem-solving learning context?* The following sub-questions need an investigation to answer this research question:

1. What does mathematical competence entail?
2. What does study orientation in Mathematics entail?
3. How can the mathematical competence and the study orientation of secondary-school learners be enhanced through problem-solving?

## 4.4 Worldview of the research

A worldview is a researcher's philosophical orientation about the world and the nature of research. The worldview defines a researcher's view of the world or reality, how to deal with the nature of knowledge, and which methods to apply when acquiring knowledge (Botma et al., 2014, pp. 39-41). The significance of a worldview is that it gives meaning to the world as we see it (Creswell, 2014, pp. 5-6). Creswell further (2014, pp. 5-6) states that, although philosophical orientations remain hidden in research, they still influence the practice of research and need to be identified. Our worldview determines the decisions that we take in life and practice.

Social researchers hold specific views about the nature of the social world, and they approach their subject with that in mind. Burrell and Morgan (1979) describe the nature of these views as

ontological, epistemological, human, and methodological; this is also supported by Nieuwenhuis (2010b). Creswell and Plano Clark (2011, p. 417) mention that worldviews are different reality (ontology), how we obtain knowledge of what we know (epistemology), the process of research (methodology), the role values play in research (axiology), and the language of research (rhetoric). These views shape how the researcher sees the world and reacts to it.

Social scientists approach their subject(s) based on implicit or explicit assumptions about the nature of the social world and the way in which it may be investigated. There are assumptions of *ontological nature,* i.e. assumptions which involve the essence of the investigated phenomena. Social scientists can investigate reality in a variety of ways: external to the individual; as the product of the individual's consciousness from without; from an objective nature or as the product of one's mind. The second set of assumptions are of an *epistemological nature,* assumptions about the foundation of knowledge. These assumptions include ideas on how one should understand the world and communicate this as knowledge to fellow human beings. These include ideas regarding what forms of knowledge can be obtained and how a person can distinguish between what is regarded as valid and what as false (Burrell & Morgan, 1979, p. 1; Creswell & Plano Clark, 2011, p. 417).

The third set of assumptions are associated with, but conceptually separate from ontological and epistemological issues. They concern the *human nature,* specifically the relationship between human beings and their environment. All social science must be clear on this type of assumption since human life is the subject of enquiry. The three sets of assumptions discussed above have direct consequences of a *methodological nature.* Different ontologies, epistemologies and models of human nature will incline social scientists towards different methodologies (Burrell & Morgan, 1979, p. 2). The assumptions about the nature of social science lead to an objective approach to social science or a personal approach to social science as summarised (Burrell & Morgan, 1979, p. 3).

Berman and Smyth (2015) present the following model, presented in Table 4-1, to illustrate the alignment of ontology, epistemology, and methodology within a doctoral study.

**Table 4-1: Pedagogical model for the use of conceptual frameworks in doctoral study (Berman & Smyth, 2015, p. 130)**

| What is your conceptual framework? | | |
|---|---|---|
| **WHAT**<br>**ontology** | **HOW**<br>**methodology** | **WHY**<br>**epistemology** |
| Context for the research problem | Research theme(s) | New knowledge |
| Relationships | Explicit research questions | New theorising |
| Establishment of terminology and common language | Research design | Extent (limits) of generalising |
| Boundaries for conclusions and theorising | Methodology (data gathering, organising, analysing and interpreting) | Implications for practice |
| Key concepts | Validity (conceptual, practical) | |

Berman and Smyth (2015, p. 6) call these aspects the *what*, *how* and *why* of research and represent the alignment of ontology, methodology and epistemology. Ontology (the researched) refers to the reality of the context of the research problem. The context must be precise and restricted so that a stable foundation for shared meaning can be established. These ontological concerns link to the meaning of the research, or the epistemology (the reason for the research). When new knowledge follows from abstract thinking, epistemological outcomes develop which could have both practical and theoretical consequences. The conceptualisation of reality and knowledge, and abstract thinking, as well as the specific epistemology, direct the nature of the methodology (the how of the research).

Burrell and Morgan (1979) have done extensive research related to different approaches to social theory. They identified four paradigms for the analysis of social theory, namely interpretivism, functionalism, radical humanism and radical structuralism.

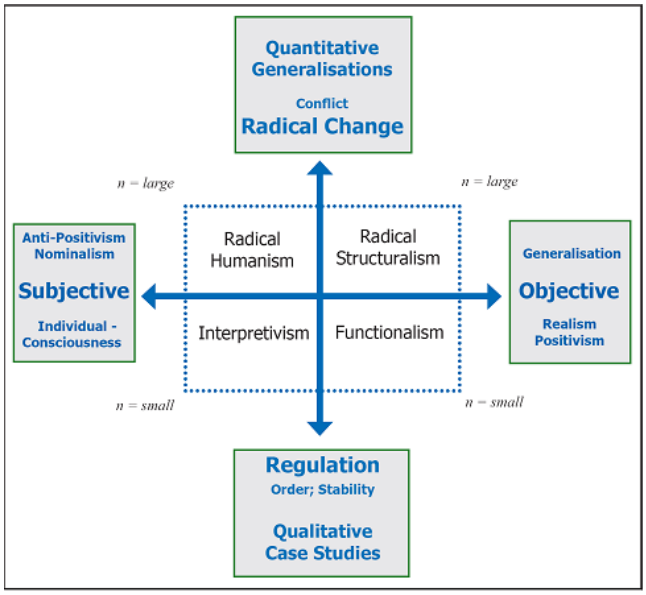



**Figure 4-2: Social research paradigms adapted from Burrell and Morgan (1979, p. 22).**

The horizontal axis of Figure 4-2 represents the *subjective* continuum (nominalism and anti-positivism) versus the *objective* continuum (realism and positivism). The vertical axis represents the regulation (order and stability) versus the radical change (conflict and transformation) continuum of research. The four paradigms describe different perspectives for analysing social phenomena. The *interpretive paradigm* tends to be nominalist, anti-positivist, voluntarist and ideographic. The *functionalist paradigm* tends to be realistic, positivistic, deterministic and nomothetic. The functionalist paradigm formed the basis of this study and discussed in detail in par. 4.4.1. The *radical humanist paradigm* has much in common with the interpretive paradigm, but its frame of reference is committed to a view of society which emphasises the importance of overthrowing or transcending the limitations of existing social arrangements. This paradigm tends to be nominalist, anti-positivist, voluntarist and ideographic. The *radical structuralist paradigm* is committed to emancipation, radical change, deprivation and contradiction. This paradigm tends to be realistic, positivist, determinist and nomothetic.

### 4.4.1 Functionalist (pragmatic) paradigm

This study is rooted in the functionalist paradigm. The functionalist paradigm represents a perspective firmly rooted in the sociology of regulation and approaches its subject matter from an objectivist point of view. It is characterised by a concern to provide explanations of the status quo, social order, social interaction, solidarity, consensus, actuality and need satisfaction. This paradigm addresses objective and realistic evaluations to maintain order and stability in organisational structures. Its evaluation is realistic, positivistic, deterministic, and nomothetic

(Burrell & Morgan, 1979). The functionalist paradigm generates regulative sociology in a well-developed form. It is a perspective which is highly pragmatic in orientation, concerned to understand society in a way which generates knowledge which can be used. It seeks to provide rational explanations of social affairs. It is often problem-orientated in approach; concerned to provide practical solutions to practical problems (Burrell & Morgan, 1979, pp. 25-28).

Other paradigms may group under the functionalist meta-paradigm: constructivism (how people construct meaning from their current knowledge), ethnomethodology (how people make sense of their world), and naturalism (the study of natural contexts). Because functionalism is primarily *pragmatic* (gains knowledge, puts knowledge to use, and provides solutions), evaluation components anchor in this meta-paradigm. There are different forms of the philosophy, but pragmatism as a worldview originates from situations, actions, and consequences rather than preceding conditions (Creswell, 2014, pp. 10-11). Ivankova et al. (2010, p. 265) consider pragmatism as the best philosophical foundation for justifying the combination of different methods in one study. The truth is what works best for understanding a research problem. Pragmatists believe that the study's research questions are more important than the techniques applied to answer them or the philosophical views that underpin each method. Furthermore, a fundamental argument of pragmatism is that qualitative and quantitative methods are compatible. The implication is that both approaches have enough similarities in their core values to allow them to be combined in one study (Ivankova et al., 2016).

Typical functionalist research components include case studies, programme evaluations, implementation evaluations, programme monitoring, process evaluations, needs assessments, impact assessments, outcome assessments, progress assessments, management evaluations and infrastructure (Burrell & Morgan, 1979). The facts mentioned above are reasons for choosing this paradigm (Mertens, 2012). This study aimed to assess learners' mathematical competence and study orientation in Mathematics to develop guidelines to enhance both these essential constructs in Mathematics education. As a researcher, I was interested in solutions to problems as well as in useful and workable applications. The emphasis was on the research problem, and I wanted to use different approaches to understand the research problem instead of focusing on methods (Creswell, 2014, p. 245; Creswell & Plano Clark, 2011, p. 415). Pragmatism opens the door to multiple methods, different assumptions, and various forms of data collection and data analysis (Creswell, 2014, p. 11; Feilzer, 2010, p. 7). As a result of choosing this paradigm, my research develops and constructs theory (Trafford & Leshem, 2012, p. 94).

## 4.5 Research design

A research design is a master plan which helps the researcher to proceed from underlying philosophical worldviews to the selection of participants, data collection strategies, and data analysis strategies. A researcher's philosophical stance and worldview inform the methodology used, including the research design and techniques used to gather, analyse and interpret the data (Nieuwenhuis, 2010c, p. 70). A mixed method research design is utilised in this study and discussed in the next sections.

### 4.5.1 Mixed method research

Mixed method research is an approach which involves the collection of both quantitative and qualitative data (Leech & Onwuegbuzie, 2009, p. 263). The two data sets are then merged, and distinct designs used that involve philosophical assumptions and theoretical frameworks (Creswell, 2014, p. 217; Ivankova et al., 2016, p. 313). The primary assumption of this mode of inquiry is that the combination of qualitative and qualitative approaches provides a complete understanding of the research problem than either approach on its own (Ivankova et al., 2010, p. 280; Terrell, 2012, p. 256).

The reasons for choosing this research design are threefold: Firstly, mixed method can draw on both qualitative and quantitative research and reduce the limitations of both approaches. Secondly, the mixed method allows for a more sophisticated approach to research that appeals to people on the forefront of new research procedures. Thirdly, it is a useful strategy to give a complete understanding of the research problem and questions (Creswell, 2014, pp. 224-225; Creswell & Plano Clark, 2011, pp. 190-194).

### 4.5.2 The purpose of conducting mixed method research

Mixed method research is a relatively new methodology that commenced during the late 1980s and early 1990s based on work from researchers in various fields of study (Creswell, 2014, pp. 10-11; Ivankova et al., 2010, pp. 264-265). The purpose of the study was to, from a pragmatic stance, develop guidelines to enhance the mathematical competence and study orientation of secondary school learners in a problem-solving learning context. An embedded mixed method research design seemed appropriate to achieve this purpose. A discussion of the embedded mixed method design follows in the next section.

### 4.5.3 Embedded experimental mixed method design

An embedded mixed method design is a design where the researcher generates and analyses both quantitative and qualitative data within a quantitative/qualitative design to enhance the

whole design in some way (Creswell & Plano Clark, 2011, p. 411; Ivankova et al., 2016, p. 320). The generation and analysis of the second data set could be before, during, and after the implementation of the data generation and analysis procedures associated traditionally with the more significant design. The premises of the design are that a single data set is insufficient, that different questions need answers, and that each type of question requires different data types (Creswell & Plano Clark, 2011, pp. 90-91).

This type of design is used when a researcher intends to answer a secondary research question which is different from but related to the primary research question (Ivankova et al., 2010, pp. 269-270). Secondary data play a supplemental role in the design and are based on the other data type (Creswell & Plano Clark, 2011, p. 90). The results of the second data type would be meaningless if not embedded within the other data set. This design is typical in fields of evaluation and program interventions (Creswell, 2014, pp. 15-16) as is the case in this study.

An embedded experimental mixed method design was used in this study. The design is sequential, i.e. the qualitative phase follows the quantitative phase and is unequal, i.e. the quantitative phase plays a more prominent role than the qualitative phase. The notation for this study is QUAN(qual) or QUAN[qual] (Creswell & Plano Clark, 2011, p. 109 & 126). This design is appropriate for the study due to the following reasons. The research question requires different data types. The intent is not to converge the quantitative and qualitative data sets, but to follow up on the quantitative data to interpret the data and to answer the research question: W*hat guidelines can be developed to enhance the mathematical competence and study orientation of secondary school learners in a problem-solving learning context?*

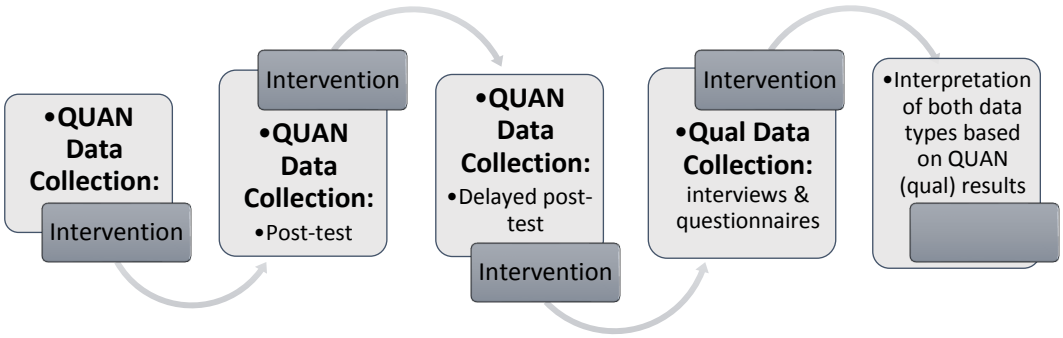



**Figure 4-3: A representation of the embedded experimental design used in this study**

In this study, the quantitative phase embeds the qualitative experimental phase as larger design to support the experimental design. The quantitative design is a quasi-experimental design (Refer to § 4.8). The qualitative design consists of task-based individual interviews, individual interviews with Mathematics teachers, and two open-ended questionnaires (See § 4.9). The results of both designs are analysed and interpreted to answer the main research question: *What guidelines can be developed to enhance the mathematical competence and study orientation of secondary school learners in a problem-solving learning context?* (Creswell & Plano Clark, 2011, pp. 123-127; Leedy & Ormrod, 2013, p. 260; Morse, 2010, p. 340).

## 4.6 The SETH Academy as problem-solving learning context

Teachers, university staff, Education Departments and other role players repeatedly received cautionary messages that they must prepare secondary school learners for jobs and career fields that may not even exist at present. These warnings have caused an increase in cross-curricular activities that promote cooperative learning, problem-based activities, self-directed learning, the acquisition of technological skills, and innovative solutions to problems (Berkeihiser & Ray, 2013, p. 21).

The Faculty of Engineering of the Potchefstroom Campus of the North-West University identified the need to prepare gifted secondary school learners for university entrance. Each consecutive year, fewer grade 12 learners achieve university exemption owing to not meeting the set requirements in Mathematics and Science. The result is a shortage of students in fields of study where Mathematics is a prerequisite (NWU, 2017) (Refer to § 1.2 and 1.3).

The SETH (Science, Engineering, Technology and Health) Academy was established in 2013 and is currently in its fifth year. The SETH Academy is an initiative in which the North-West Department of Basic Education, the North-West University and Industry collaborate to address the shortage of adequately prepared learners entering tertiary education for careers in short supply skills (NWU, 2017). The SETH Academy is a university-secondary school community programme like the STEM (Science, Technology, Engineering and Mathematics) interventions that take place worldwide (NWU, 2015, 2016, 2017). The stakeholders strive to expose learners to a variety of school-based activities, visits to the industry, and interaction with university lecturers from various Faculties. The SETH Academy focuses on all gifted secondary learners, and the intention is to prepare them for professional careers in fields as diverse as Engineering, Medicine, Finance and Economics, and Mathematics and Science education. These scant skills careers need high-quality Mathematics and Science Education (Hattingh & Hattingh, 2014a, 2014b; NWU, 2015).

The standard school curriculum happens in the mornings at the project secondary school in Potchefstroom. A monthly Monday afternoon (from 14:15-17:00) programme offered to the SETH learners at the project school supplements the school programme. The purpose is to prepare and develop the Mathematics knowledge and skills of these gifted learners who are most likely to study at a university in a field where Mathematics and Science are prerequisites. The intent is to improve understanding in Mathematics through problem-solving, but the programme also includes exposure to diverse topics such as time management, first aid, teamwork, diversity, and computer skills. Mathematics interventions with problem-solving tasks form the learning context in these interventions and in this study (Hattingh, 2012; Hattingh & Hattingh, 2014a, 2014b; NWU, 2016).

The research site was the premises of the project school of this community project of the Faculty of Engineering of the North-West University. My role was that of an observer researcher. All the grade 8 and 9 learners in the SETH Academy [N = 109], and the grade 8 and 9 non-SETH learners [N = 186] participated in this longitudinal study over a time span of one year. The Faculty of Engineering selected the SETH learners during their grade 7 years. They used the following criteria in the selection process: at least 80% in Mathematics and Natural Science and a grade average of 80% or more. As part of the selection process, each grade 7 learner had to complete the Study Orientation Questionnaire in Mathematics (SOM), and the calculation and comprehension subtests of the DAT-S questionnaire.

Initially, from 2013 onwards, the SETH learners completed worksheets during the Mathematics sessions. The motive was to expose them to a variety of problem situations with varying degrees of difficulty. Much resistance from the learners was evident because they were given more difficult and non-understandable problems to solve after an extended school day. However, at the beginning of 2017, the approach to the Mathematics interventions in grade 8 and 9 changed to interactive, collaborative problem-solving sessions with the use of various types of technology. Refer to the analysis of the two SETH questionnaires in § 5.3.1.

## 4.7 Methodology

To achieve the research aim: *To develop guidelines to enhance secondary school learners' mathematical competence and study orientation in Mathematics in a problem-solving learning context*, the research is divided into four phases.

**Table 4-2: Phases of the embedded mixed method design**

| Phases | Activity | Experimental sample (SETH learners in grade 8 and 9) | Control sample (Non-SETH learners in grade 8 and 9) |
|---|---|---|---|
| **Phase 1**<br><br>**Quantitative** | Questionnaire on study orientation in Mathematics (SOM) | Learners complete the questionnaire | Learners complete the questionnaire |
| | Mathematics pre-test | Learners complete a pre-test on problem-solving | Learners complete a pre-test on problem-solving |
| **Phase 2**<br><br>**Quantitative & qualitative** | Questionnaire on study orientation in Mathematics (SOM)<br><br>Mathematics post-test<br><br>Open-ended questionnaire | Learners complete the questionnaire six months later<br><br>Learners complete the post-test focused on problem-solving six months later<br><br>Learners complete the questionnaire | Learners complete the questionnaire six months later<br><br>Learners complete the post-test focused on problem-solving six months later |
| **Phase 3**<br><br>**(follow up on phase 1 & 2)**<br><br>**Quantitative** | Questionnaire on study orientation in Mathematics (SOM)<br><br>Mathematics post-test | Learners complete the questionnaire in the first half of the next year<br><br>Learners complete the delayed post-test focused on problem-solving in the first half of the next year | Learners complete the questionnaire in the first half of the next year<br><br>Learners complete the delayed post-test focused on problem-solving in the first half of the next year |
| **Phase 4**<br><br>**Qualitative** | Task-based interviews on problem-solving abilities<br><br>Open-ended questionnaire | Selected learners<br><br>Learners complete the questionnaire | Selected learners |
| | Individual interviews | Four Mathematics teachers in the SETH Academy | |

***Phase 1***

All the grade 8 and 9 learners completed the Study Orientation in Mathematics questionnaire (SOM). The learners also completed a mathematical competence pre-test on problem-solving towards the middle of the year. The test was set according to the four cognitive levels of mathematical thinking required by the CAPS document (See § 2.5.5) and the three competency clusters of the PISA document (See § 2.7.4). Test questions were on each cognitive level.

***Phase 2***

The learners completed the Study Orientation in Mathematics questionnaire (SOM) again after six months towards the end of the year. The learners also completed the same mathematical competence post-test (as in Phase 1) on problem-solving six months later. The SETH learners completed an open-ended questionnaire with eight questions on their views, experience and feelings regarding the SETH Academy.

***Phase 3***

The learners completed the Study Orientation in Mathematics questionnaire (SOM) six months into the next year. The learners also completed the delayed post-test on problem-solving during the same time to generate additional data sets to compare these with the previous data sets to improve the quality of this research.

***Phase 4***

Phase 4 involved task-based interviews with purposefully selected high- and low-achieving SETH- and non-SETH learners in determining their problem-solving abilities. The SETH-learners completed another open-ended questionnaire on their experiences of the Mathematics sessions and activities of the SETH Academy. There were individual interviews with the four Mathematics teachers of grade 8 and 9 learners. Their views on the SETH learners' study orientation, mathematical competence, and problem-solving abilities and possible changes therein, were imperative to achieve one of the research objectives.

## 4.8 Quantitative research phase

Quantitative research is a systematic and objective process in which numerical data from a selected sample or population is used to generalise the findings to the population under investigation (Maree & Pietersen, 2010a, p. 145). Cramer and Howitt (2006, p. 133) describe quantitative research as research where data or relationships are summarised or described by using numbers. Some form of statistical analysis goes hand in hand with such data generation.

To be able to determine the learners' level of mathematical competence and nature of their study orientation in Mathematics, it was imperative to draw on a quantitative phase in this study to measure these aspects. The quantitative phase was a quasi-experimental design. A non-equivalent (pre-test and post-test) control group design was employed (Maree & Pietersen, 2016). The experimental group was the grade 8 and 9 SETH learners and the control group the other learners (non-SETH learners) in the same grades. Both these groups of learners wrote a mathematical competence test (Creswell, 2014, pp. 168, 172).

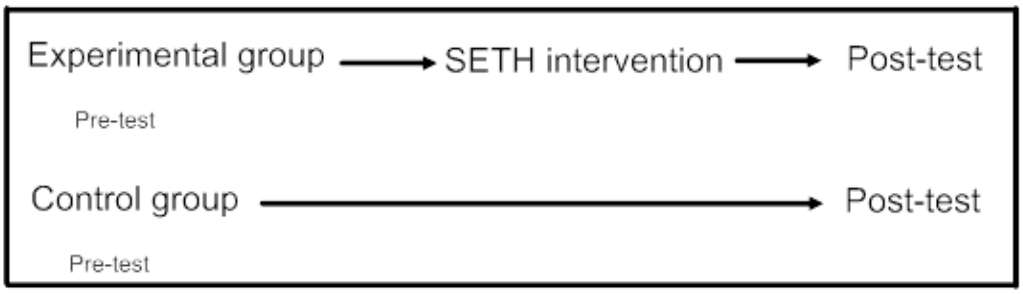



**Figure 4-4: Diagrammatic representation of a non-equivalent control-group design (Creswell, 2014, p. 172)**

The experimental and control groups completed the Study Orientation in Mathematics Questionnaire (SOM). This experimental design enabled me to determine the effect of the SETH Academy's intervention on the learners' mathematical competence and study orientation in Mathematics (Creswell, 2014; Maree & Pietersen, 2010a, p. 13; 2016). The dependent variables were the learners' mathematical competence and study orientation in Mathematics, while the intervention in the SETH Academy was the independent variable. Pre-test (baseline) measurements on the dependent variables enabled statistically adjustments for pre-test differences between the experimental and control groups. It is then possible to determine whether changes occur due to an intervention by observing the effect of the intervention over a period (Cramer & Howitt, 2006, pp. 133-134). The quantitative results informed the participants to select purposively for the qualitative phase and the types of questions asked to those participants during the task-based interviews.

### 4.8.1 Rationale and purpose of quantitative research

The purpose of the quantitative research was twofold. Firstly, to answer the first sub-question: *What does mathematical competence entail?* Secondly, to answer the second sub-question: *What does study orientation in Mathematics entail?*

### 4.8.2 Population and sample

Convenience sampling, a non-probability sampling method, is used in the quantitative phase. Convenience sampling is when the researcher uses participants who are conveniently and readily available and linked to the phenomenon under investigation (Cramer & Howitt, 2006, p. 38; Maree & Pietersen, 2010b, p. 177). This sampling method is appropriate to determine the participants' mathematical competence and study orientation in Mathematics. The learners of the project school are the population, but the participants are the grade 8 and 9 learners. The SETH learners in grades 8 and 9 form the experimental cohort and the non-SETH learners (also in grades 8 and 9), the control cohort (Refer to § 4.4).

### 4.8.3 Quantitative measurement instruments

Quantitative data were generated in two different ways and at three intervals during the study: a mathematical competence test and the SOM questionnaire. A discussion of these measuring instruments follows in the next two sections.

#### 4.8.3.1 The mathematical competence tests

Mathematical competence tests were set. These tests consisted of questions on each of the four cognitive levels (knowledge, routine procedures, complex procedures, and problem-solving) of the CAPS document (DBE, 2014a, p. 53) and the three competency clusters of the PISA Assessment Framework (See § 2.7.4). The competency clusters are reproduction, connections and reflection. (cf. § 2.7.4).

There were separate tests for grades 8 and 9 learners since the learners had to be assessed on their specific level and grade. The grade 8 and 9 Mathematics teachers at the school and two Mathematics lecturers moderated and approved the tests before implementation. A pilot study with six grades 8 learners and six grades 9 learners from another local secondary school, preceded the implementation of the tests. The Mathematics teachers from this school moderated the test prior the assessment. Some of the questions were changed or rephrased to make them more suitable for its purpose. All the participants wrote the tests at three intervals of six months: in May of the first year, six months later in November, and six months later in May of the next year. The SETH interventions and school programme continued as planned during this time. Refer to Addenda 7.1 and 7.2 for the respective tests.

#### 4.8.3.2 Study Orientation in Mathematics questionnaire (SOM)

The Study Orientation in Mathematics questionnaire is a standardised questionnaire for South African school learners (Maree et al., 2011). The participants completed the SOM questionnaire

a week before the mathematical competence test. They completed the questionnaire at three intervals of six months: in May of the first year, six months later in November, and six months later in May of the next year. All the grade 8 and 9 learners completed the questionnaire (See § 3.4 and Addendum 5.1).

### 4.8.4 Data analysis in the quantitative phase

The differences in abilities between the SETH cohorts and non-SETH cohorts were accounted for statistically for the baseline assessments, i.e. the pre-SOM and the pre-Mathematics test. The experimental and control cohorts are therefore regarded as equal and comparable in every way. This fact implied that the statistical differences proofed later, are caused by the "intervention" and not innate or otherwise differences in learners' abilities within the groups. A detailed discussion of the data analysis in the quantitative phase follows in the next two sections.

#### 4.8.4.1 Data analysis of the mathematical competence tests

A consultant from the NWU's Statistical Consultation Services executed the quantitative data analysis (cf. Addendum 3). The reliability of the questions in the mathematical competence test was determined using Cronbach's $\propto$ because they are self-constructed tests and not standardised tests (Field, 2005, pp. 666-668; Pietersen & Maree, 2010, pp. 218-222). The test had to be reliable so that if used at other times with different learners from the same population, the results should be the same. The tests had to be valid which shows the extent to which they measure what they are supposed to measure (Pietersen & Maree, 2010, pp. 215-218).

A factor analysis determined the construct validity of the questions in the mathematical pre-tests. The rationale of a factor analysis is to determine the degree to which some related variables can be grouped into a smaller number of factors that summarise the relationship between the variables (Cramer & Howitt, 2006, p. 63). The purpose of the factor analysis was to determine which questions belong together (answered similarly) and measure the same aspect or factor. The internal reliability of these instruments was determined with Cronbach's Alpha (Field, 2005, p. 731).

Each test had a memorandum with the correct solutions to every problem. The Mathematics tests were however not assessed for marks, but with a marking rubric (with scores ranging from zero to three) indicating the learner's progress towards a correct solution (Refer to § 5.3.3 for the marking rubric). Initially the intent was to determine learners' problem-solving abilities in terms of the three competency clusters according to the PISA Framework (See § 2.7.4) and the competency levels that range from one to six (§ 2.7.6). However, learners' levels of mathematical competence could no longer be determined in terms of the clusters and

competency levels. This resulted in comparing each question in terms of learners' performance, i.e. their experiences of the difficulty degree of the questions, and the knowledge level of the question.

#### 4.8.4.2 Data analysis of the SOM questionnaire

The SOM is a standardised questionnaire for South African school learners (cf. § 3.4). The reliability of the data in each of the five measured fields was firstly determined using Cronbach's Alpha. Thereafter a factor analysis determined the constructed validity of the data in each field (Field, 2005, pp. 666-668; Pietersen & Maree, 2016b). Refer to § 5.2.1 and § 5.2.2.

In this study, on advice of the Statistical Consultant, the SOM items (1-76) were statistically analysed on a scale of one to five. In the case of no response to an item, the value one was allocated. The results of the statistical analysis of the SOM data are presented in Tables 5-1 to 5-12.

The SOM questionnaire was standardised for the South African population (cf. § 3.4). Percentile ranks used as norm points for grade 8 and 9 learners are presented in Table 14 of the SOM Manual (cf. Addendum 5.4) (Maree et al., 2011, p. 50). A percentile rank expresses the position or rank of a learner in the norm group (population for which it was standardised) in terms of the percentage of learners who achieved lower scores than the learner did. Percentile ranks range from one to one hundred. The norm points indicated in this table refer to a raw score for the sample in the specific field which is then expressed as a percentile rank. For example, if the raw score for study attitude (Field 1) is 43, then the percentile rank is 80. This implies that 80% of the norm group obtained a lower score than this specific one. During the standardisation a scale of zero to four to determine the percentile ranks.

Therefore, in this study, a 0,8-factor adjustment had to be made on the results obtained for the three groups to enable percentile rank comparison between the groups and the population for which the SOM was standardised. The 'amended' mean values are presented in Tables 5-2 to 5-12 in Addendum 6.2.

The effect of the Mathematics interventions on the study orientation for the SETH (experimental) cohorts and for the non-SETH (control) cohorts had to be determined statistically. Dependent (paired) t-tests served this purpose. The t-test establishes whether the two means (before and after the intervention) of this group of learners differ significantly or not. It is the difference between the two means divided by the standard error of the difference in means. The larger the t-value, ignoring its sign, the greater the chance that the two means differ significantly from each other. The degrees of freedom for this test are the number of pairs of cases minus one (Cramer & Howitt, 2006, p. 167; Field, 2005, p. 728). The same procedure was followed for the

non-SETH (control) cohort (Cohen, Manion, & Morrison, 2007, p. 587; Pietersen & Maree, 2016b, p. 253). The results of the dependent t-tests done separately with each group shed light on the effect that the Mathematics intervention has on the experimental cohort (SETH) and the control cohort (non-SETH).

Furthermore, the extent of the differences in study orientation between the SETH (experimental) cohorts and the non-SETH (control) cohorts were determined statistically (Pietersen & Maree, 2016b, pp. 250-253). Independent t-tests yielded this information. The t-test establishes whether the means of the SETH (experimental) cohorts and the non-SETH (control) cohorts differ statistically significantly or not. The tests were done for the results in the pre-test, post-test, and the delayed post-test and for both these cohorts (Cramer & Howitt, 2006, p. 167; Field, 2005, p. 734).

## 4.9 Qualitative research phase

Qualitative research focuses on phenomena in real-world contexts and involves studying and expressing the complexity of those phenomena accurately in words, rather than in numbers (Leedy & Ormrod, 2013, p. 139). Qualitative research reveals the meaning or story behind numbers, provides an in-depth description and investigation of a phenomenon different to that which quantitative research provides. This includes the characteristics/properties and qualities of a phenomenon to explain and understand it better (Botma et al., 2014, p. 182). In qualitative research, coding categories are developed to describe the data in question (Cramer & Howitt, 2006, p. 132).

### 4.9.1 Rationale and purpose of the qualitative research

The purpose of the qualitative research was to answer the third secondary question: *How can the mathematical competence and the study orientation of secondary-school learners be enhanced through problem-solving?* A qualitative investigation was imperative in this study because the results of both the SOM questionnaire and the mathematical competence tests needed further investigation and a description of the learners' experiences, problem-solving abilities and Mathematics performance. The quantitative phase embedded the qualitative phase.

Learners were selected for individual task-based interviews based on the results of the mathematical competence tests in order to obtain their views on what they learn, how they learn that, and to which extent they can apply their knowledge and skills in problem-solving tasks (Cohen et al., 2007, pp. 361-365; Goldin, 2000, pp. 519-520). There were individual interviews with the four Mathematics teachers involved with these learners at the project school. The interviews were necessary to determine their views on changes they observed in the learners'

mathematical competence, study orientation in Mathematics, and Mathematics performance in general. The SETH learners completed two open-ended questionnaires. The questionnaires intended to determine learners' experiences, feelings, and challenges, regarding their involvement in the SETH Academy and specifically the Mathematics related activities.

### 4.9.2 Population and sample

Purposive sampling was employed to select grade 8 and 9 learners for the qualitative phase of the research. Purposive sampling is a non-probability sampling method where the researcher chooses the participants according to the possession of the characteristics needed to investigate the phenomenon. The sample is chosen for a specific purpose. Often 'knowledgeable' participants are used, i.e. those who have in-depth knowledge regarding particular aspects (Cohen et al., 2007, pp. 114-115; Creswell & Plano Clark, 2011, p. 415). This sampling method is appropriate to determine the problem-solving abilities of the chosen participants to find ways to develop guidelines to enhance the mathematical competence and study orientation of learners.

Learners were selected based on their results in the mathematical competence tests. Learners with a high level of mathematical competence formed two groups, one from the SETH learners and the other from the non-SETH learners. Learners with a low level of mathematical competence formed two groups, one from the SETH learners and one from the non-SETH learners. There were fourteen interviews with SETH learners and ten with non-SETH learners. Individual task-based interviews were conducted with each learner until the data were saturated.

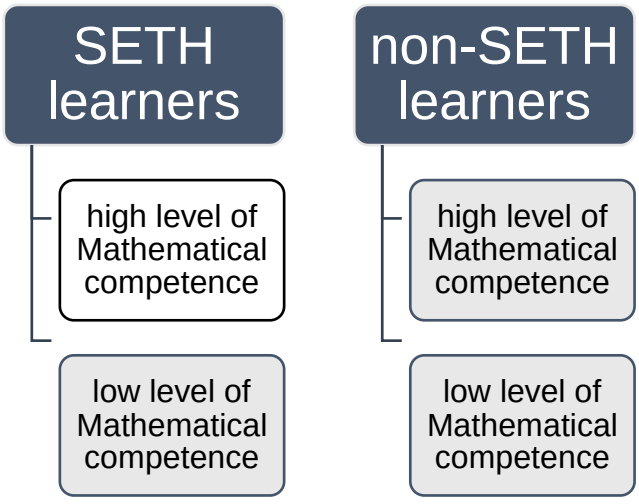



**Figure 4-5: Qualitative participant selection strategy**

The four grades 8 and 9 Mathematics teachers at the project school formed part of the qualitative phase. The reason was to determine their views on the effect of the SETH Academy

on the learners' mathematical competence and study orientation in Mathematics, and the development of the learners' mathematical knowledge and skills in general.

### 4.9.3 Data generation

Qualitative data were generated in the following ways:

- An open-ended questionnaire with eight questions completed by only the SETH learners at the end of the first year;
- Individual task-based interviews with 24 purposively selected grades 8 and 9 learners,
- Individual interviews with the four grades 8 and 9 Mathematics teachers; and
- A second open-ended questionnaire with nine questions six months later to determine SETH learners' views on the Mathematics sessions and their general experiences.

The questionnaire aimed to determine the feelings, experiences, challenges, and enjoyment of learners' involvement in the activities of the SETH Academy. Individual task-based interviews were conducted with the purposively selected learners (Goldin, 2000, p. 519). Task-based interviews are useful tools to assess the mathematical thinking of learners especially when mathematical concepts form part of real-life or daily contexts. Mathematical thinking involves three types of knowledge: mathematical knowledge, contextual knowledge and strategic knowledge. Strategic knowledge is the confidence, skills and disposition to determine what needs to be done to solve a problem. Contextual knowledge is being aware of, and knowledge of the impact of the context on the Mathematics used. Mathematical knowledge involves the concepts, skills and techniques required to solve problems in a real-life context (Hurst, 2008, p. 273).

These interviews enabled me to make observations of the reasoning of the learners when solving mathematical problems (Goldin, 2000, p. 520). The aim was to hear directly from the learners what they were doing, why they were doing that, and how they could have done it better or differently. Valuable information on learners' metacognitive awareness, metacognitive regulation and reflective abilities emerged.

### 4.9.4 Data analysis in the qualitative research

A detailed discussion of the analysis of the qualitative data follows in the next three sections.

#### 4.9.4.1 Analysis of the open-ended questionnaires

The responses to the two open-ended questionnaires were analysed and coded using ATLAS.ti™. Themes were identified and extensively discussed. An in-depth discussion of the analysis follows in Chapter 5.3.1 (cf. Addenda 9.1 and 9.2 for the respective questionnaires).

#### 4.9.4.2 Analysis of the task-based interviews

The task-based interviews with the 24 purposively selected learners were transcribed. After that, analysed and coded on ATLAS.ti™ for emergent themes and patterns (Cohen et al., 2007, pp. 368-372; Nieuwenhuis, 2010a, pp. 111-113). Refer to Addendum 10.1 for the interview schedule and Chapter 5.3.2 for the discussion of these results.

The data analysis and interpretation of the results are integrated with the literature review to answer the research questions. The results or findings of both the quantitative and qualitative data analysis are interpreted to answer the reason questions (cf. § 5.4) (Creswell, 2014, pp. 224-225).

#### 4.9.4.3 Analysis of the individual interviews with the Mathematics teachers

Four individual interviews were conducted with the grade 8 and 9 Mathematics teachers. The interviews were transcribed and coded on ATLAS.ti™. Common themes could be identified and are discussed in § 5.3.3. The interview schedule is in Addendum 11.1.

### 4.9.5 Validity and reliability of the qualitative design

Validity is the extent to which a measuring instrument measures what it intends to measure (Cramer & Howitt, 2006, p. 178). The accuracy of the findings was established by using the following procedures: Independent moderators verified the allocated codes and emergent themes; extensive time was spent at the school; thick description was used, and feedback from unbiased colleagues sought regarding the interpretation of the qualitative results

(Botma et al., 2014, p. 231).

Reliability proves that the researcher's approach is consistent across different projects and research. Reliability was established in the following ways: Accurately and comprehensively documented data; cross-checking of allocated codes; communication with the co-coders, and verification of transcripts for correctness (Botma et al., 2014, p. 231).

## 4.10 Interpretation of both data sets

In this embedded experimental mixed method design, the qualitative data supplemented the quantitative data. The quantitative data were generated and analysed first to answer the first two sub-questions. After that, the qualitative data were generated and analysed to provide an answer to the third sub-question (Creswell & Plano Clark, 2011, pp. 219-220). Since the design was sequential, the two data types were connected to answer the primary research question (Refer to § 4.3).

## 4.11 Ethical aspects of the study

The context of the research was the SETH Academy, a community project at the project school of the Faculty of Engineering of the North-West University (NWU, 2017). The SETH Academy had prior approval for this project by the North-West Department of Education. For my research, the necessary electronic ethics application form was completed and submitted to the North-West University's Ethics Committee. Permission for the research was granted. The ethical clearance number is NWU-HS-2015-0235 (cf. Addendum 1).

The North-West Department of Basic Education, Kenneth Kaunda District gave their permission first. After that the School Governing Body (SGB) and school principal of the project school granted permission. The participants were all the grade 8 and 9 learners of the school. Their parents signed informed consent, and the learners themselves informed assent. The four participating Mathematics teachers also signed informed consent (cf. Addendum 4).

At the onset of this research project, each learner received a code to ensure anonymity. SETH learners received the codes S1 and S2 onwards, and the non-SETH learners received the codes L1 and L2 onwards. The SETH learners of the grade 8 group of 2017 received 8S1 and 8S2, and the non-SETH learners 8L1 and 8L2 as codes. These codes were used throughout the empirical investigation.

Other ethical principles applied throughout the research were: The participants were protected from any harm. They had the right to withdraw from the study at any time, and the research data were treated confidentially (Cohen et al*.,* 2007; Leedy & Ormrod, 2013, p. 263; Trafford & Leshem, 2012, p. 100). Furthermore, the learners' participation in the research did not jeopardise their school and SETH activities in any way (Botma et al*.*, 2014, p. 56; Creswell, 2014, pp. 92-95).

## 4.12 The role of the researcher

In this embedded mixed method study, both quantitative and qualitative data, based on the sub-questions were generated and analysed. The quantitative data embedded the qualitative data. The quantitative data received priority regarding the research emphasis with four phases in this study to generate data. The theoretical lenses of mathematical competence (Chapter 2) and study orientation (Chapter 3) embedded the research methodology. A pragmatic worldview directed the study.

## 4.13 Summary of the chapter

This chapter presented the research design and methodology for this study. The research questions formed the foundation of the chosen method. My stance as a pragmatist was described and the suitability of selecting a mixed method study expressed. The methodology of an embedded experimental mixed method design and the suitability thereof in this study were discussed. For both the quantitative and qualitative phases, I justified the rationale behind the participation selection, data generation methods and the process of data analysis. I explored my role as researcher and verified the validity and reliability of the empirical investigation. Chapter 5 presents the results, analysis and interpretation of the generated data sets.

# CHAPTER 5 RESULTS, DATA ANALYSIS AND INTERPRETATION

## 5.1 Introduction

Chapter 5 provides the results of the data generated in the empirical investigation. This is followed by the analysis and interpretation of the data. Quantitative data were generated to answer the following sub-questions: *What does mathematical competence entail* and *What does study orientation in Mathematics entail? Q*uantitative data were gathered from administering the SOM questionnaire and the mathematical competence tests. Furthermore, qualitative data were collected to answer the third sub-question: *How can the mathematical competence as well as the study orientation of secondary school learners be enhanced through problem-solving?* Qualitative data were gathered from the two open-ended SETH questionnaires, task-based interviews were conducted with purposively selected learners, and individual interviews with the four Mathematics teachers in grade 8 and grade 9. Figure 5-1 represents an overview of Chapter 5.

## 5.2 Quantitative data analysis and interpretation

Quantitative data were obtained for the experimental cohort (SETH learners in grade 8 and 9) and the control cohort (non-SETH learners in grade 8 and 9). The Study Orientation in Mathematics Questionnaire (SOM) and the mathematical competence test were utilised to obtain the quantitative data. The differences in abilities between the SETH learners and non-SETH learners that occurred in the baseline assessments, were accounted for statistically in the post-SOM, delayed post-SOM and the post- and delayed post-Mathematics tests. The experimental and control cohorts are therefore regarded as equal and comparable in every way. This fact implied that the statistical differences proofed later are caused by the “intervention” and not innate or otherwise differences in learners’ abilities within the groups.

There were three groups involved in this study: grade 8 (2016), grade 9 (2016) and grade 8 (2017) as shown in Figure 5-2 (cf. Figure 4-4, Table 1-5 and Figure 5-3). Keep in mind that each group consisted of SETH learners (experimental cohort) as well as non-SETH learners (control cohort). The results of the SOM data are analysed and discussed in detail in the following section and the results of the mathematical competence tests in § 5.2.4- § 5.2.6.

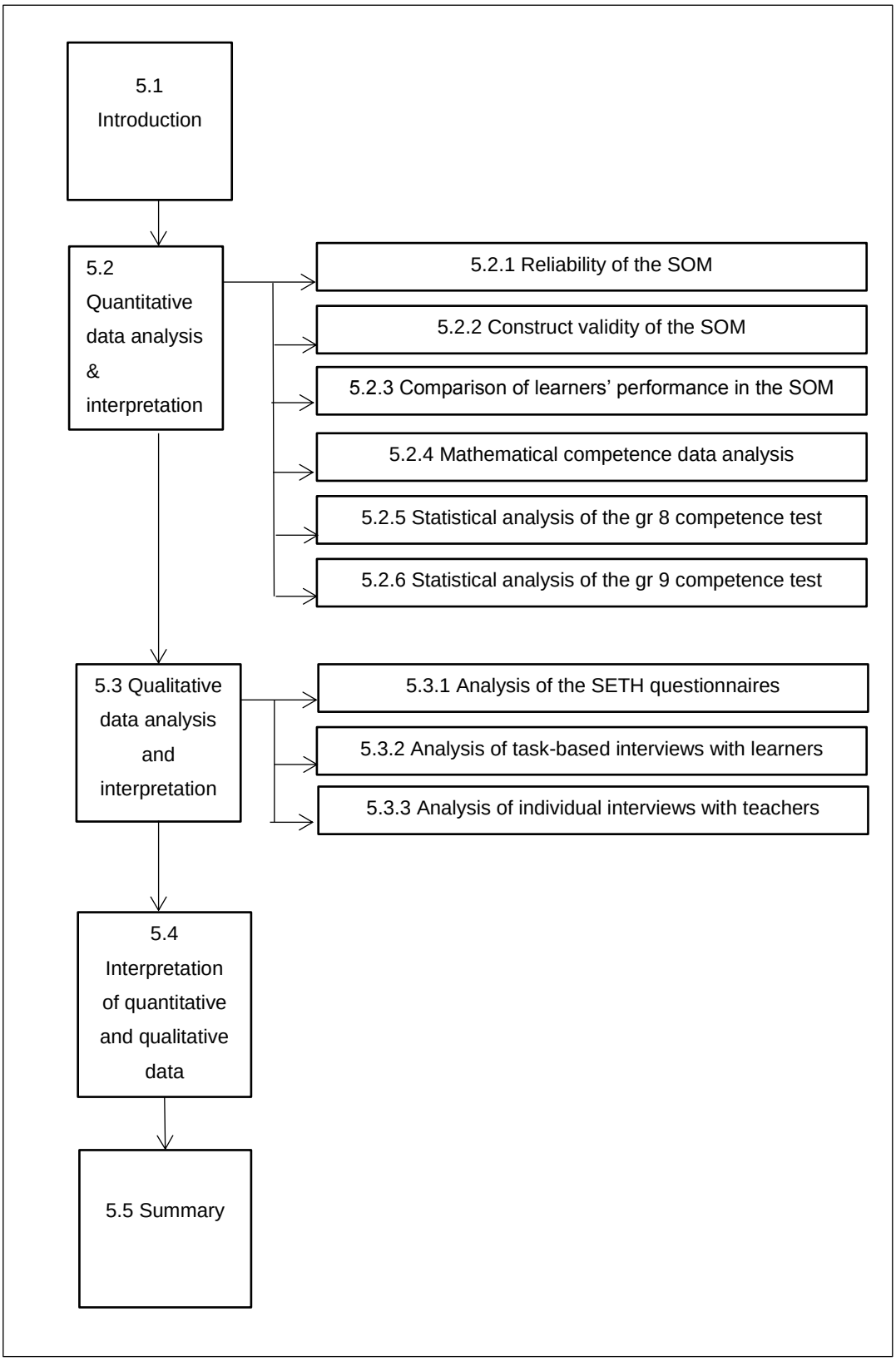



**Figure 5-1: An overview of Chapter 5**

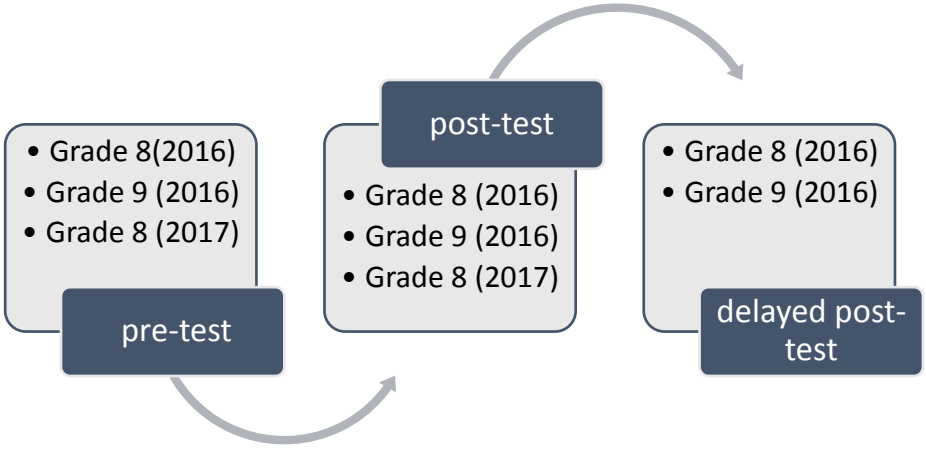



**Figure 5-2: A representation of the quantitative data generation process with the three groups**

### 5.2.1 Reliability of the SOM questionnaire

The SOM questionnaire measures learners' study orientation in Mathematics according to five fields (See § 3.4). The SOM questionnaire for grade 8 and 9 learners comprises of 76 questions. These questions form part of five fields, namely: study attitude, study habits, study milieu, Mathematics anxiety, and problem-solving behaviour. The sixth field, information processing, forms part of the grades 10 to 12 assessment and is not used in this study (cf. Addendum 5.1).

Learners completed the SOM questionnaire three times during the empirical investigation: during May (pre-SOM) and November (post-SOM) of the first year and again in May (delayed post-SOM) of the following year (Fig 5.2). It was imperative to determine whether the grouping of the five constructs/fields for this sample is like that of the South African population for which this questionnaire was standardised and furthermore, to determine whether these constructs are valid for this sample. Therefore, Cronbach's $\propto$ measured the reliability of the SOM for each field and each of the three groups. Table 5-1 below displays the reliability measured by the Cronbach's $\propto$ for each of the five SOM fields and the three groups.

**Table 5-1: Cronbach's ∝ for the three assessments of the SOM for the three groups**

| SOM field | Cronbach's ∝ | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Grade 8 (2016) | | | Grade 9 (2016) | | | Grade 8 (2017) | |
| | Pre-SOM | Post-SOM | Delayed SOM | Pre-SOM | Post-SOM | Delayed SOM | Pre-SOM | Post-SOM |
| **Study attitude** | 0,807 | 0,796 | 0,767 | 0,805 | 0,837 | 0,822 | 0,842 | 0,797 |
| **Mathematics anxiety** | 0,824 | 0,847 | 0,778 | 0,767 | 0,814 | 0,859 | 0,808 | 0,804 |
| **Study habits** | 0,863 | 0,873 | 0,859 | 0,851 | 0,861 | 0,868 | 0,876 | 0,860 |
| **Problem-solving behaviour** | 0,789 | 0,828 | 0,788 | 0,754 | 0,777 | 0,791 | 0,757 | 0,778 |
| **Study milieu** | 0,762 | 0,762 | 0,796 | 0,756 | 0,806 | 0,801 | 0,805 | 0,823 |

All the Cronbach's ∝ are higher than 0,7 and therefore it is assumed that the data are reliable to be utilised. From Table 5-1, it is evident that the SOM questionnaire is reliable for the groups used in the various fields and in all three phases of the research.

### 5.2.2 Construct validity of the SOM questionnaire

In the previous section, the Cronbach's ∝ for each of the five fields of the SOM questionnaire for each of the three samples in each of the three tests were tabulated (Refer to Table 5-1). All the values were higher than 0,7 and it is therefore accepted that the SOM questionnaire is reliable for the samples in this study.

A factor analysis determined the construct validity of each item (1-76) in the generated SOM data. The Kaiser-Meyer-Olkin (KMO) values were too low to use them as indicators of validity, owing to the relatively small sample of only 100 learners per group. A SEM analysis could not be employed either due to the same reason.

The pattern matrix for the grade 8 (2016) pre-test and the post-test for the same group, revealed 23 factors and not only the five factors (fields) of the SOM. The pattern matrix for the pre-test and subsequent post-test for grade 9 (2016) in turn, showed 21 factors. After that, an exploratory factor analysis 'forced' these 23 factors onto the five SOM fields. The result was that these 21 factors and 23 measured factors grouped correctly into the five SOM fields.

Upon further analysis of the results, it was evident that these data formed subfields within each field, i.e. some of the items supposed to measure study habits and study milieu grouped themselves under study attitude. Some of the items supposed to measure problem-solving

behaviour and study milieu grouped under Mathematics anxiety (Refer to Addendum 6 for the results of the statistical analysis).

Based on the results of the Cronbach's ∝ and the results of the factor analysis, the generated SOM data are reliable and valid to use and explore further. In the next section, comparisons are made between learners' performance in the SOM over time as well as between the SETH learners and the non-SETH learners. There is ample statistical evidence that the data are valid and reliable for further investigation.

### 5.2.3 Comparison of learners' performance in the SOM questionnaire

As mentioned earlier in this section, three groups formed part of this study (Fig 5-2). The intention was to determine the changes that occurred in study orientation between the following groups over time:

- SETH learners and non-SETH learners within each of the three groups at three intervals;
- SETH learners in each of the three groups at three intervals; and
- Non-SETH learners in each of the three groups at three intervals.

Fig. 5-3 illustrates the composition of the three groups.

**Figure 5-3: A representation of the composition of the three groups**

#### 5.2.3.1 Learners' performance in the independent samples

An independent t-test established the changes in study orientation between the SETH cohort and the non-SETH cohort. This happened for the pre-test of both cohorts, the post-test of both cohorts, and then for the pre-test and the delayed post-test of the two cohorts. This procedure was followed for grade 8 (2016) and grade 9 (2016). The grade 8 (2017) group completed only

a pre-test and post-test owing to time constraints. Therefore, the results of the pre-test were only compared with those of the post-test.

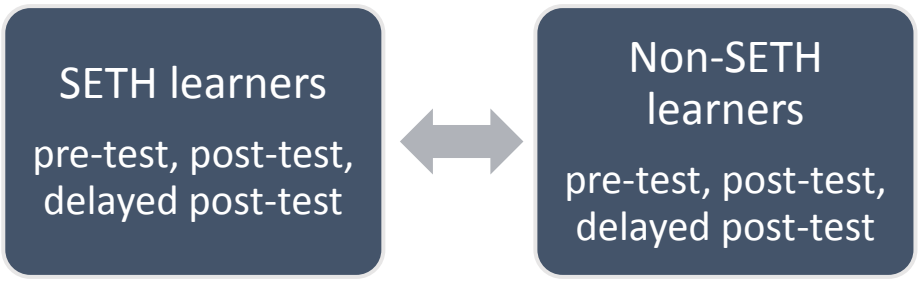



**Figure 5-4: A presentation of the cohorts in the independent t-test**

Table 5-2 to Table 5-7 below display the results of the independent t-tests.

**Table 5-2: Results of the independent t-tests for grade 8 (2016) in the pre-SOM**

| SOM field | Cohort | Mean | Standard deviation | Sig (2-tailed) | Effect size |
|---|---|---|---|---|---|
| **Study attitude** | SETH | 52.92 | 9,78 | 0,18 | 0,27 |
| | Non-SETH | 50.26 | 8,90 | | |
| **Mathematics anxiety** | SETH | 54.72 | 9,09 | 0,14 | 0,31 |
| | Non-SETH | 51.79 | 9,43 | | |
| **Study habits** | SETH | 62.67 | 11,68 | 0,16 | 0,28 |
| | Non-SETH | 59.36 | 10,77 | | |
| **Problem-solving behaviour** | SETH | 54.89 | 10,44 | 0,40 | 0,18 |
| | Non-SETH | 53.05 | 10,22 | | |
| **Study milieu** | SETH | 53.92 | 6,93 | 0,10 | 0,34 |
| | Non-SETH | 51.28 | 7,72 | | |

The SETH learners seemed to have a more positive **study attitude** (M = 52,92, SD = 9,78) than the non-SETH learners (M = 50,26, SD = 8,90). However, this difference was not statistically significant: *t* (95) = 1,37, $p = 0{,}18$ and presented a small effect size (*d* = 0,27).

The non-SETH learners seemed to experience less **Mathematics anxiety** (M = 51,79, SD = 9,43) than the SETH learners (M = 54,27, SD = 9,09). However, this difference was not statistically significant, *t (95*) = 1,50, $p = 0{,}14$ and presented a small-sized effect, *d* = 0,31.

The SETH learners seemed to display more effective **study habits** (M = 62,67, SD = 11,68) than those of the non-SETH learners (M = 59,36, SD = 10,77). However, this difference was not statistically significant *t* (95) = 1,42, $p = 0{,}16$ and presented a small-sized effect (*d* = 0,28).

The SETH learners seemed to possess a higher quality of **problem-solving behaviour**, (M = 54,89, SD = 10,44) than the non-SETH learners (M = 53,05, SD = 10,22). However, this difference was not statistically significant *t* (95) = 0,85, $p = 0{,}40$ and presented a small effect size, *d* = 0,18.

The SETH learners seemed to have a more favourable **study milieu** (social, physical and experienced milieu) (M = 53,92, SD = 6,93) than the non-SETH learners (M = 51,28, SD = 7,72). However, this difference was not statistically significant *t* (95) = 1,69, $p = 0{,}10$ and presented a small effect size (*d* = 0,34).

**Table 5-3: Results of the independent t-tests for grade 8 (2016) in the post-SOM**

| SOM field | Cohort | Mean | Standard deviation | Sig (2-tailed) | Effect size |
|---|---|---|---|---|---|
| **Study attitude** | SETH | 52,81 | 8,02 | 0,54 | 0,14 |
| | Non-SETH | 51,73 | 7,98 | | |
| **Mathematics anxiety** | SETH | 57,34 | 8,43 | 0,12 | 0,33 |
| | Non-SETH | 54,27 | 9,19 | | |
| **Study habits** | SETH | 61,22 | 11,40 | 0,81 | 0,05 |
| | Non-SETH | 60,64 | 10,92 | | |
| **Problem-solving behaviour** | SETH | 58,31 | 11,27 | 0,09 | 0,34 |
| | Non-SETH | 54,44 | 9,79 | | |
| **Study milieu** | SETH | 57,19 | 5,28 | 0,03 | 0,45 |
| | Non-SETH | 54,07 | 6,94 | | |

The SETH learners seemed to possess a more positive **study attitude** (M = 52,81, SD = 8,02) than the non-SETH learners (M = 51,73, SD = 7,98). However, this difference was not statistically significant, *t* (89) = 0,62, $p = 0{,}54$ and presented a small effect size, *d* = 0,14.

The **Mathematics anxiety** of the non-SETH learners (M = 54,27, SD = 9,19) seemed to be lower than that of the SETH learners (M = 57,34, SD = 8,43). This difference was however not statistically significant, *t* (89) = 1,57, $p = 0{,}12$ and presented a small effect size, *d* = 0,33.

The SETH learners (M = 61,22, SD = 11,40) seemed to reveal more effective **study habits** than the non-SETH learners (M = 60,64, SD = 10,92). However, this difference was statistically insignificant, *t* (89) = 0,24, *p* = 0,81 and this presented a small-sized effect, *d* = 0,05.

The **problem-solving behaviour** of the SETH learners (M= 58,31, SD = 11,27) seemed to be of a higher quality than those of the non-SETH learners (M = 54,44, SD = 9,79). However, this difference was statistically insignificant, *t* (89) = 1,71, *p* = 0,09 and presented a small-sized effect, *d* = 0,34.

The **study milieu** of the SETH learners seemed to be more conducive to learning (M = 57,19, SD = 5,28) than those of the non-SETH learners (M = 54,07, SD = 6,94) and differed statistically significantly, (*t* (89*)* = 2,22, *p* = 0,03). The effect size was *d* = 0,45 and represented a medium-sized effect. This effect size could possibly be practically significant.

**Table 5-4: Results of the independent t-tests for grade 9 (2016) in the pre-SOM**

| SOM field | Cohort | Mean | Standard deviation | Sig (2-tailed) | Effect size |
|---|---|---|---|---|---|
| **Study attitude** | SETH | 54,78 | 6,72 | 0,01 | 0,57 |
| | Non-SETH | 50,17 | 8,11 | | |
| **Mathematics anxiety** | SETH | 55,67 | 7,34 | 0,37 | 0,20 |
| | Non-SETH | 53,96 | 8,70 | | |
| **Study habits** | SETH | 65,89 | 8,88 | 0,00 | 0,77 |
| | Non-SETH | 58,04 | 10,14 | | |
| **Problem-solving behaviour** | SETH | 58,81 | 9,11 | 0,01 | 0,60 |
| | Non-SETH | 53,31 | 8,44 | | |
| **Study milieu** | SETH | 56,37 | 4,91 | 0,15 | 0,30 |
| | Non-SETH | 54,31 | 6,79 | | |

The **study attitude** of the SETH learners seemed to be more positive (M = 54,78, SD = 6,72) and differed significantly, (*t* (96*)* = 2,63, *p* = 0,01) from that of the non-SETH learners (M = 50,17, SD = 8,11). The effect size was *d* = 0,57, a medium-sized effect, and of possible practical significance.

The non-SETH learners (M = 53,96, SD = 8,70) seemed to experience lower levels of **Mathematics anxiety** than the SETH learners (M = 55,67, SD = 7,34). However, the means did not differ significantly: *t* (96) = 0,91, *p* = 0,37 and *d* = 0,20 which is a small effect size.

The **study habits** of the SETH learners (M = 65,89, SD = 8,88) seemed to be more effective and the means differed significantly (*t* (53,32) = 3,75, *p* = 0,00) from those of the non-SETH learners (M = 58,04, SD = 10,14). The effect size is *d* = 0,77, a large effect size. This difference is of practical significance but was accounted for statistically to enable further comparison between the two cohorts.

The **problem-solving behaviour** of the SETH learners seemed of a higher quality (M = 58,81, SD = 9,11) and differed significantly (*t* (96) = 2,82, *p* = 0,01) from those of the non-SETH learners (M = 53,31, SD = 8,44). The effect size of *d* = 0,60 is a medium-sized effect and a possible indicator of practical significance.

The **study milieu** of the SETH learners (M = 56,37, SD = 4,91) seemed to be more conducive to learning but the means did not differ significantly (*t* (96) = 1,44, *p* = 0,15) from that of the non-SETH learners (M = 54,31, SD = 6,79). The result was a small-sized effect of *d* = 0,30 and not practically significant.

**Table 5-5: Results of the independent t-tests for grade 9 (2016) in the post-SOM**

| SOM field | Cohort | Mean | Standard deviation | Sig (2-tailed) | Effect size |
|---|---|---|---|---|---|
| **Study attitude** | SETH | 55,74 | 7,59 | 0,00 | 0,71 |
| | Non-SETH | 49,77 | 8,45 | | |
| **Mathematics anxiety** | SETH | 59,48 | 5,45 | 0,22 | 0,26 |
| | Non-SETH | 57,33 | 8,40 | | |
| **Study habits** | SETH | 66,74 | 9,38 | 0,01 | 0,58 |
| | Non-SETH | 60,05 | 11,46 | | |
| **Problem-solving behaviour** | SETH | 60,81 | 8,29 | 0,00 | 0,69 |
| | Non-SETH | 54,73 | 8,82 | | |
| **Study milieu** | SETH | 58,44 | 4,65 | 0,10 | 0,35 |
| | Non-SETH | 56,02 | 7,03 | | |

The **study attitude** of the SETH learners (M = 55,74, SD = 7,59) seemed to be more positive and differed significantly (*t* (53,55) = 3,33, *p* = 0,00) from that of the non-SETH learners (M = 49,77, SD = 8,45). The result was a medium effect size of *d* = 0,71, which could be showing practical significance.

The non-SETH learners (M = 57,33, SD = 8,40) seemed to experience lower levels of **Mathematics anxiety** than the SETH learners (M = 59,48, SD = 5,45). However, this did not

differ significantly: $t$ (91) = 1,23, $p$ = 0,22 and $d$ = 0,26 which is a small-sized effect with no practical significance.

The **study habits** of the SETH learners (M = 66,74, SD = 9,38) seemed more favourable and differed statistically significantly ($t$ (91) = 2,69, $p$ = 0,01) from that of the non-SETH learners (M = 60,05, SD = 11,46). The effect size was 0,58 and a medium effect size, which indicates a difference that could be of practical significance.

The mean for the **problem-solving behaviour** of the SETH-learners (M = 60,81, SD = 8,29) differed significantly ($t$ (51,26) = 3,15, $p$ = 0,00) from that of the non-SETH learners (M = 54,73, SD = 8,82). There was a medium effect size of $d$ = 0,69, which indicates a possible practical significance.

The mean for the **study milieu** of the SETH learners (M = 58,44, SD = 4,65) did not differ statistically significantly ($t$ (91) = 1,65, $p$ = 0,10) from the non-SETH learners (M = 56,02, SD = 7,03). The effect size was 0,35, i.e. a small effect size and of no practical significance.

**Table 5-6: Results of the independent t-tests for grade 8 (2017) in the pre-SOM**

| SOM field | Cohort | Mean | Standard deviation | Sig (2-tailed) | Effect size |
|---|---|---|---|---|---|
| **Study attitude** | SETH | 56,17 | 9,46 | 0,17 | 0,26 |
| | Non-SETH | 53,74 | 7,73 | | |
| **Mathematics anxiety** | SETH | 53,66 | 10,03 | 0,72 | 0,07 |
| | Non-SETH | 54,36 | 8,85 | | |
| **Study habits** | SETH | 66,79 | 11,13 | 0,09 | 0,34 |
| | Non-SETH | 63,04 | 9,91 | | |
| **Problem-solving behaviour** | SETH | 61,12 | 9,03 | 0,01 | 0,53 |
| | Non-SETH | 55,96 | 9,72 | | |
| **Study milieu** | SETH | 54,44 | 8,09 | 0,50 | 0,13 |
| | Non-SETH | 53,40 | 6,93 | | |

The mean for the **study attitude** of the SETH learners (M = 56,17, SD = 9,46) did not differ statistically significantly from that of the non-SETH learners (M = 53,74, SD = 7,73): $t$ (92) = 1,37, $p$ = 0,17. The result was a small-sized effect of $d$ = 0,26 and not practically significant.

The mean for the **Mathematics anxiety** of the SETH learners (M = 53,66, SD = 10,03) did not differ significantly statistically (*t* (92) = -0,36, *p* = 0,72) from that of the non-SETH learners (M = 54,36, SD = 8,85). There was a small effect size of *d* = 0,07 with no practical significance.

The mean for the **study habits** of the SETH learners (M = 66,79, SD = 11,13) did not differ statistically significantly from that of the non-SETH learners (M = 63,04, SD = 9,91): *t* (92) = 1,72, *p* = 0,09. The result was a small effect size, *d* = 0,34 and not practically significant.

The mean for the **problem-solving behaviour** of the SETH learners (M = 61,12, SD = 9,03) showed a statistically significant difference to that of the non-SETH learners (M = 55,96, SD = 9,72). The results were: t (92) = 2,63, *p* = 0,01 and *d* = 0,53. This was a medium-sized effect and could be of practical significance.

The mean for the **study milieu** of the SETH learners (M = 54,44, SD = 8,09) did not differ statistically significantly from that of the non-SETH learners (M = 53,40, SD = 6,93). These results were: *t* (92) = 0,67, *p* = 0,50 and *d* = 0,13. However, the effect size was small.

**Table 5-7: Results of the independent t-tests for grade 8 (2017) in the post-SOM**

| SOM field | Cohort | Mean | Standard deviation | Sig (2-tailed) | Effect size |
|---|---|---|---|---|---|
| **Study attitude** | SETH | 53,27 | 8,62 | 0,18 | 0,29 |
| | Non-SETH | 50,42 | 9,83 | | |
| **Mathematics anxiety** | SETH | 55,86 | 9,35 | 0,56 | 0,13 |
| | Non-SETH | 54,67 | 8,80 | | |
| **Study habits** | SETH | 64,86 | 8,42 | 0,07 | 0,37 |
| | Non-SETH | 60,51 | 11,86 | | |
| **Problem-solving behaviour** | SETH | 59,95 | 7,46 | 0,02 | 0,48 |
| | Non-SETH | 54,86 | 10,58 | | |
| **Study milieu** | SETH | 54,35 | 9,17 | 0,76 | 0,06 |
| | Non-SETH | 53,77 | 7,63 | | |

The mean for the **study attitude** of the SETH learners (M = 53,27, SD = 8,62) did not differ statistically significantly from that of the non-SETH learners (M = 50,42, SD = 9,83): *t* (78) = 1,37, *p* = 0,18. The result was a small effect size of *d* = 0,29 with no practical significance.

The mean for the **Mathematics anxiety** of the SETH learners (M = 55,86, SD = 9,35) did not differ significantly statistically (*t* (78) = 0,59, *p* = 0,56) from that of the non-SETH learners (M = 54,67, SD = 8,80). There was a small effect size of *d* = 0,13.

The mean for the **study habits** of the SETH learners (M = 64,86, SD = 8,42) did not differ statistically significantly from that of the non-SETH learners (M = 60,51, SD = 11,86): *t* (78) = 1,86, *p* = 0,07. The result was a small effect size, *d* = 0,37.

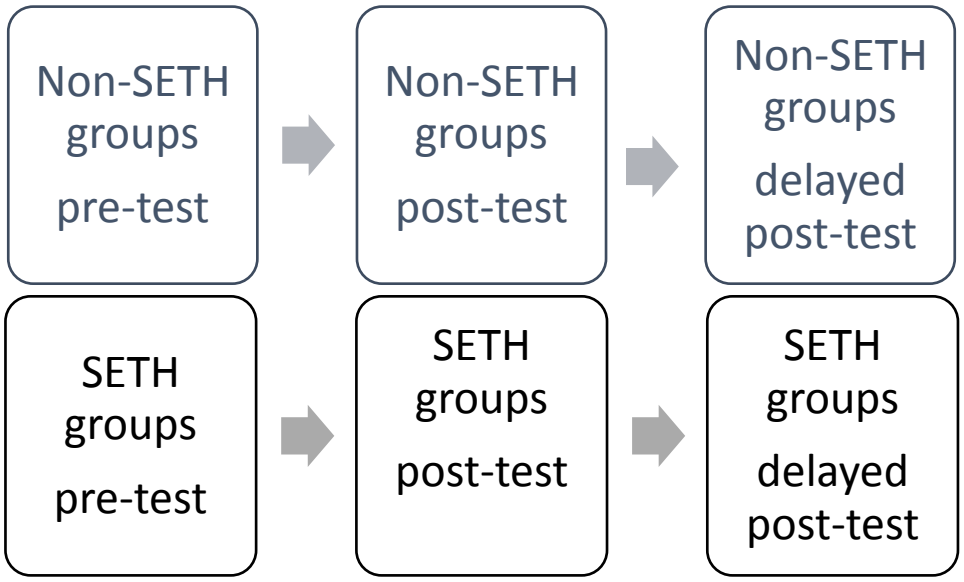
The mean for the **problem-solving behaviour** of the SETH learners (M = 59,95, SD = 7,46) differed statistically significantly from that of the non-SETH learners (M = 54,86, SD = 10,58). The results were: t (78) = 2,45, *p* = 0,02 and *d* = 0,48, a medium-sized effect, which could indicate possible practical significance.

The mean for the **study milieu** of the SETH learners (M = 54,35, SD = 9,17) did not differ statistically significantly from that of the non-SETH learners (M = 53,77, SD = 7,63). These results were: *t* (78) = 0,31, *p* = 0,76 and *d* = 0,06. The effect size was a small effect size and an indication of no practical significance.

#### 5.2.3.2 Learners' performance in the dependent samples

Paired t-tests established the changes in study orientation of the SETH cohort in each of the three tests and those of the non-SETH cohort in each of the three tests. There were paired

t-tests for the pre-test of both cohorts, the post-test of both cohorts, and then for the pre-test and the delayed post-test of the two cohorts. This procedure was followed for grade 8 (2016) and grade 9 (2016). The grade 8 (2017) group completed only a pre-test and post-test owing to



time constraints. Therefore, the results of the pre-test were compared with only those of the post-test.

**Figure 5-5: Visual representation of the cohorts in the paired t-tests**

The results of the paired t-tests are displayed in Table 5-8 to Table 5-12 and analysed after that.

**Table 5-8: Results of the paired t-test for grade 8 (2016)**

| SETH | SOM | Mean | Standard deviation | Sig (2-tailed) | Effect size |
|---|---|---|---|---|---|
| **Study attitude** | Pre<br>Post | 52,34<br>52,81 | 9,73<br>8,02 | 0,69 | 0,05 |
| **Mathematics anxiety** | Pre<br>Post | 54,44<br>57,34 | 9,06<br>8,43 | 0,02 | 0,32 |
| **Study habits** | Pre<br>Post | 61,94<br>61,22 | 11,86<br>11,40 | 0,65 | 0,06 |
| **Problem-solving behaviour** | Pre<br>Post | 54,75<br>58,31 | 10,20<br>11,27 | 0,01 | 0,32 |
| **Study milieu** | Pre<br>Post | 53,97<br>57,19 | 6,61<br>5,28 | 0,00 | 0,49 |
| **Non-SETH** | **SOM** | **Mean** | **Standard deviation** | **Sig (2-tailed)** | **Effect size** |
| **Study attitude** | Pre<br>Post | 50,05<br>51,73 | 8,98<br>7,98 | 0,11 | 0,19 |
| **Mathematics anxiety** | Pre<br>Post | 51,54<br>54,27 | 9,49<br>9,19 | 0,01 | 0,29 |
| **Study habits** | Pre<br>Post | 59,19<br>60,64 | 10,91<br>10,92 | 0,26 | 0,13 |
| **Problem-solving behaviour** | Pre<br>Post | 52,76<br>54,44 | 10,12<br>9,79 | 0,15 | 0,17 |
| **Study milieu** | Pre<br>Post | 51,17<br>54,07 | 7,81<br>6,94 | 0,00 | 0,37 |

**Analysis of the results for the SETH learners**

The mean for the **study attitude** of the learners in the pre-test (M = 52,34, SD = 9,73) did not differ statistically significantly from that in the post-test (M = 52,81, SD = 8,02). The results were: $t$ (31) = -0,41; $p$ = 0,69. The effect size was 0,05, i.e. a small effect.

The mean for **Mathematics anxiety** in the pre-test (M = 54,44, SD = 9,06) differed statistically significantly ($t$ (31) = -2,56, $p$ = 0,02) from that of the post-test (M = 57,34, SD = 8,43). However, there was a small effect size of $d$ = 0,32 and of no practical significance.

The mean for **study habits** in the pre-test (M = 61,94, SD = 11,86) did not differ statistically significantly from that of the post-test (M = 61,22, SD = 11,40): *t* (31) = 0,47, *p* = 0,65. The result was a small effect size, *d* = 0,06.

The mean for their **problem-solving behaviour** in the pre-test (M = 54,75, SD = 10,20) differed statistically significantly from that of the post-test (M = 58,31, SD = 11,27). The results were: t (31) = -2,97, *p* = 0,01 and *d* = 0,32. However, this was a small effect size and of no practical significance.

The mean for the **study milieu** in the pre-test (M = 53,97, SD = 6,61) differed statistically significantly from that in the post-test (M = 57,19, SD = 5,28). These results were: *t* (31) = -3,11, *p* = 0,00 and *d* = 0,49. The effect size was a medium-sized effect, which indicates a chance of possible practical significance.

**Analysis of the results for the non-SETH learners**

The mean for the **study attitude** of the learners in the pre-test (M = 50,05, SD = 8,98) did not differ statistically significantly from that in the post-test (M = 51,73, SD = 7,98). The results were: *t* (59) = 0,11; *p* = 0,11. The effect size was 0,19, i.e. a small-sized effect.

The mean for **Mathematics anxiety** in the pre-test (M = 51,54, SD = 9,49) differed significantly statistically (*t* (59) = 0,01, *p* = 0,01) from that of the post-test (M = 54,27, SD = 9,19). However, there was a small effect size of *d* = 0,29 which is of no practical significance.

The mean for their **study habits** in the pre-test (M = 59,19, SD = 10,91) did not differ statistically significantly from that of the post-test (M = 60,64, SD = 10,92): *t* (59) = 0,26, *p* = 0,26. The result was a small effect size, *d* = 0,13.

The mean for **problem-solving behaviour** in the pre-test (M = 52,76, SD = 10,12) did not differ statistically significantly from that of the post-test (M = 54,44, SD = 9,79). The results were: t (59) = 0,15, *p* = 0,15 and *d* = 0,17. This was a small effect size.

The means for **study milieu** in the pre-test (M = 51,17, SD = 7,81) differed statistically significantly from that in the post-test (M = 54,07, SD = 6,94). These results were: *t* (59) = 0,00, *p* = 0,00 and *d* = 0,37. The effect size was small and therefore of no practical significance.

**Table 5-9: Results of the paired t-test for grade 9 (2016)**

| SETH | SOM | Mean | Standard deviation | Sig (2-tailed) | Effect size |
|---|---|---|---|---|---|
| **Study attitude** | Pre<br>Post | 54,78<br>55,74 | 6,72<br>7,59 | 0,46 | 0,13 |
| **Mathematics anxiety** | Pre<br>Post | 55,67<br>59,48 | 7,34<br>5,45 | 0,00 | 0,52 |
| **Study habits** | Pre<br>Post | 65,89<br>66,74 | 8,88<br>9,38 | 0,63 | 0,09 |
| **Problem-solving behaviour** | Pre<br>Post | 58,81<br>60,81 | 9,11<br>8,29 | 0,32 | 0,22 |
| **Study milieu** | Pre<br>Post | 56,37<br>58,44 | 4,91<br>4,65 | 0,03 | 0,42 |
| **Non-SETH** | **SOM** | **Mean** | **Standard deviation** | **Sig (2-tailed)** | **Effect size** |
| **Study attitude** | Pre<br>Post | 50,18<br>49,77 | 7,94<br>8,45 | 0,60 | 0,05 |
| **Mathematics anxiety** | Pre<br>Post | 53,94<br>57,33 | 8,76<br>8,40 | 0,00 | 0,39 |
| **Study habits** | Pre<br>Post | 58,33<br>60,05 | 9,54<br>11,46 | 0,07 | 0,15 |
| **Problem-solving behaviour** | Pre<br>Post | 53,30<br>54,73 | 8,01<br>8,82 | 0,07 | 0,16 |
| **Study milieu** | Pre<br>Post | 54,30<br>56,02 | 6,88<br>7,03 | 0,02 | 0,24 |

**Analysis of the results for the SETH learners**

The mean for the **study attitude** of the learners in the pre-test (M = 54,78, SD = 6,72) did not differ statistically significantly from that in the post-test (M = 55,74, SD = 7,59). The results were: $t$ (26) = -0,75; $p$ = 0,46. The effect size was 0,13, i.e. a small-sized effect.

The mean for **Mathematics anxiety** in the pre-test (M = 55,67, SD = 7,34) differed significantly statistically ($t$ (26) = -3,70, $p$ = 0,00) from that of the post-test (M = 59,48, SD = 5,45). There was a medium effect size of $d$ = 0,52, which could point to practical significance.

The mean for their **study habits** in the pre-test (M = 65,89, SD = 8,88) did not differ statistically significantly from that of the post-test (M = 66,74, SD = 9,38): $t$ (26) = -0,49, $p$ = 0,63. The result was a small effect size, $d$ = 0,09.

The mean for the **problem-solving behaviour** in the pre-test (M = 58,81, SD = 9,11) did not differ statistically significantly from that of the post-test (M = 60,81, SD = 8,29). The results were: t (26) = -1,02, $p$ = 0,32 and $d$ = 0,22. This was a small-sized effect.

The mean for the **study milieu** in the pre-test (M = 56,37, SD = 4,91) differed statistically significantly from that in the post-test (M = 58,44, SD = 4,65). These results were: *t* (26) = -2,27, *p* = 0,03 and *d* = 0,42. The effect size was medium, which could possibly be practically significant.

**Analysis of the results for the non-SETH learners**

The mean for the **study attitude** of the learners in the pre-test (M = 50,18, SD = 7,94) did not differ statistically significantly from that in the post-test (M = 49,77, SD = 8,45). The results were: *t* (65) = 0,53; *p* = 0,60. The effect size was 0,05, i.e. small sized.

The mean for their **Mathematics anxiety** in the pre-test (M = 53,94, SD = 8,76) differed significantly statistically (*t* (65) = -3,70, *p* = 0,00) from that of the post-test (M = 57,33, SD = 8,40). However, there was a small effect size of *d* = 0,39 and of no practical significance.

The mean for their **study habits** in the pre-test (M = 58,33, SD = 9,54) did not differ statistically significantly from that of the post-test (M = 60,05, SD = 11,46): *t* (65) = -1,88, *p* = 0,07. The result was a small effect size, *d* = 0,15.

The mean for their **problem-solving behaviour** in the pre-test (M = 53,30, SD = 8,01) did not differ statistically significantly from that of the post-test (M = 54,73, SD = 8,82). The results were: t (65) = -1,88, *p* = 0,07 and *d* = 0,16. This was a small-sized effect.

The mean for **study milieu** in the pre-test (M = 54,30, SD = 6,88) differed statistically significantly from that in the post-test (M = 56,02, SD = 7,03. These results were: *t* (65) = -2,45, *p* = 0,02 and *d* = 0,24. However, this was a small effect size and not regarded as practically significant.

**Table 5-10: Results of the paired t-test for grade 8 (2017)**

| SETH | SOM | Mean | Standard deviation | Sig (2-tailed) | Effect size |
|---|---|---|---|---|---|
| **Study attitude** | Pre<br>Post | 56,81<br>53,27 | 7,84<br>8,62 | 0,01 | 0,41 |
| **Mathematics anxiety** | Pre<br>Post | 54,46<br>55,86 | 9,34<br>9,35 | 0,25 | 0,15 |
| **Study habits** | Pre<br>Post | 67,97<br>64,86 | 7,95<br>8,42 | 0,01 | 0,37 |
| **Problem-solving behaviour** | Pre<br>Post | 61,62<br>59,95 | 8,07<br>7,46 | 0,10 | 0,21 |
| **Study milieu** | Pre<br>Post | 55,41<br>54,35 | 6,49<br>9,17 | 0,30 | 0,11 |
| **Non-SETH** | **SOM** | **Mean** | **Standard deviation** | **Sig (2-tailed)** | **Effect size** |
| **Study attitude** | Pre<br>Post | 53,70<br>50,42 | 7,51<br>9,83 | 0,03 | 0,33 |
| **Mathematics anxiety** | Pre<br>Post | 53,98<br>54,67 | 9,03<br>8,80 | 0,49 | 0,08 |
| **Study habits** | Pre<br>Post | 62,93<br>60,51 | 10,40<br>11,86 | 0,10 | 0,20 |
| **Problem-solving behaviour** | Pre<br>Post | 55,58<br>54,86 | 9,57<br>10,58 | 0,59 | 0,07 |
| **Study milieu** | Pre<br>Post | 52,79<br>53,77 | 7,31<br>7,63 | 0,22 | 0,13 |

**Analysis of the results for the SETH learners**

The mean for the **study attitude** of the learners in the pre-test (M = 56,81; SD = 7,84) differed statistically significantly from that in the post-test (M = 53,27; SD = 8,62). The results were: $t$ (36) = 3,02; $p$ = 0,01. However, the effect size was 0,41, i.e. small, and therefore not practically significant.

The mean for the **Mathematics anxiety** of the learners in the pre-test (M = 54,46; SD = 9,34) did not differ statistically significantly from that in the post-test (M = 55,86; SD = 9,35). The results were: $t$ (36) = -1,16, $p$ = 0,25 and presented a small effect size, $d$ = 0,15.

The mean for the **study habits** of the learners in the pre-test (M = 67,97; SD = 7,95) differed statistically significantly from that in the post-test (M = 64,86; SD = 8,42): $t$ (36) = 2,78; $p$ = 0,01. However, the effect size of 0,37 was small.

The mean for the **problem-solving behaviour** of the learners in the pre-test (M = 61,62; SD = 8,07) did not differ statistically significantly from that in the post-test (M = 59,95; SD = 7,46). The results were: *t* (36) = 1,68; *p* = 0,10 and *d* = 0,21. This was a small-sized effect.

The mean score for the **study milieu** of learners in the pre-test (M = 55,41; SD = 6,49) did not differ statistically significantly from that in the post-test (M = 54,35; SD = 9,17). The results were: *t* (36) = 1,05; *p* = 0,30. The effect size was 0,11, i.e. a small effect.

**Analysis of the results for the non-SETH learners**

The mean for the **study attitude** of the learners in the pre-test (M = 53,70; SD = 7,51) differed statistically significantly from that in the post-test (M = 50,42; SD = 9,83). The results were: *t* (42) = 2,32, *p* = 0,03 and presented a small-sized effect, *d* = 0,33, which is not practically significant.

The mean score for the **Mathematics anxiety** of learners in the pre-test (M = 53,98; SD = 9,03) did not differ statistically significantly from that in the post-test (M = 54,67; SD = 8,80). The results were: *t* (42) = -0,70; *p* = 0,49. The effect size was 0,08, i.e. a small effect.

The mean for the **study habits** of the learners in the pre-test (M = 62,93; SD = 10,40) did not differ statistically significantly from that in the post-test (M = 60,51; SD = 11,86). The results were: *t* (42) = 1,69, *p* = 0,10 and presented a small effect size, *d* = 0,20.

The mean score for the **problem-solving behaviour** in the pre-test (M = 55,58, SD = 9,57) did not differ statistically significantly from that of the post-test (M = 54,86, SD = 10,58). The results were: t (42) = 0,55, *p* = 0,59 and *d* = 0,07. This was a small effect size.

The mean score for the **study milieu** of learners in the pre-test (M = 52,79; SD = 7,31) did not differ statistically significantly from that in the post-test (M = 53,77; SD = 7,63). The results were: *t* (42) = -1,24; *p* = 0,22. The effect size was 0,13, i.e. a small effect size.

**Table 5-11: Results of the paired t-test for the grade 8 (2016) pre-and delayed-post SOM**

| SETH | SOM | Mean | Standard deviation | Sig (2-tailed) | Effect size |
|---|---|---|---|---|---|
| **Study attitude** | Pre<br>Post (D) | 52,71<br>53.54 | 9,93<br>8,50 | 0,54 | 0,08 |
| **Mathematics anxiety** | Pre<br>Post (D) | 55,04<br>55,75 | 8,37<br>8,20 | 0,61 | 0,09 |
| **Study habits** | Pre<br>Post (D) | 62,79<br>61,93 | 11,58<br>12,17 | 0,57 | 0,07 |
| **Problem-solving behaviour** | Pre<br>Post (D) | 55,00<br>57,07 | 10,62<br>10,94 | 0,21 | 0,19 |
| **Study milieu** | Pre<br>Post (D) | 54,57<br>57,61 | 5,92<br>5,45 | 0,01 | 0,51 |
| **Non-SETH** | **SOM** | **Mean** | **Standard deviation** | **Sig (2-tailed)** | **Effect size** |
| **Study attitude** | Pre<br>Post (D) | 50,25<br>52,79 | 8,75<br>7,66 | 0,03 | 0,29 |
| **Mathematics anxiety** | Pre<br>Post (D) | 51,44<br>56,27 | 9,70<br>7,71 | 0,00 | 0,50 |
| **Study habits** | Pre<br>Post (D) | 58,65<br>62,06 | 10,50<br>10,81 | 0,01 | 0,31 |
| **Problem-solving behaviour** | Pre<br>Post (D) | 53,02<br>57,92 | 10,24<br>9,93 | 0,00 | 0,48 |
| **Study milieu** | Pre<br>Post (D) | 51,13<br>55,94 | 8,01<br>6,63 | 0,00 | 0,60 |

**Analysis of the results for the SETH learners**

The mean for the **study attitude** of the learners in the pre-test (M = 52,71; SD = 9,93) did not differ statistically significantly from that in the delayed post-test (M = 53,54; SD = 8,50). The results were: $t$ (27) = -0,63, $p$ = 0,54 and presented a small-sized effect, $d$ = 0,08.

The mean score for the **Mathematics anxiety** of learners in the pre-test (M = 55,04 SD = 8,37) did not differ statistically significantly from that in the delayed post-test (M = 55,75; SD = 8,20). The results were: $t$ (27) = -0,51; $p$ = 0,61. The effect size was 0,09, i.e. small.

The mean for the **study habits** of the learners in the pre-test (M = 62,79; SD = 11,58) did not differ statistically significantly from that in the delayed post-test (M = 61,93; SD = 12,17). The results were: $t$ (27) = 0,57, $p$ = 0,57 and presented a small-sized effect, $d$ = 0,07.

The mean score for the **problem-solving behaviour** of learners in the pre-test (M = 55,00; SD = 10,62) did not differ statistically significantly with that in the delayed post-test (M = 57,07; SD = 10,94). The results were: $t$ (27) = -1,28; $p$ = 0,21. The effect size was 0,19, i.e. a small effect.

The mean score for the **study milieu** of learners in the pre-test (M = 54,57; SD = 5,92) differed statistically significantly from that in the post-test (M = 57,61; SD = 5,45). The results were: $t$ (27) = -2,88; $p$ = 0,01. However, the effect size was 0,51, a medium effect which could indicate practical significance.

**Analysis of the results for the non-SETH learners**

The mean for the **study attitude** of the learners in the pre-test (M = 50,25; SD = 8,75) differed statistically significantly from that in the delayed post-test (M = 52,79; SD = 7,66. The results were: $t$ (51) = -2,18, $p$ = 0,03 and presented a small effect size, $d$ = 0,29.

The mean score for the **Mathematics anxiety** of the learners in the pre-test (M = 51,44; SD = 9,70) differed statistically significantly from that in the delayed post-test (M = 56,27; SD = 7,71). The results were: $t$ (51) = -4,47; $p$ = 0,00. The effect size was 0,50, i.e. a medium effect size, and could possibly be practically significant.

The mean for the **study habits** of the learners in the pre-test (M = 58,65; SD = 10,50) differed statistically significantly from those in the delayed post-test (M = 62,06; SD = 10,81). The results were: $t$ (51) = -2,69, $p$ = 0,01 and presented a small effect size, $d$ = 0,31. Therefore, this difference is not of practical significance.

The mean score for the **problem-solving behaviour** of the learners in the pre-test (M = 53,02; SD = 10,24) differed statistically significantly from that in the delayed post-test (M = 57,92; SD = 9,93). The results were: $t$ (51) = -3,85; $p$ = 0,00. The effect size was 0,48, i.e. a medium effect size, and could possibly be of practical significance.

The **study milieu** of the learners in the pre-test (M = 51,13; SD = 8,01) differed statistically significantly from that in the post-test (M = 55,94; SD = 6,63). The results were: $t$ (51) = -5,08; $p$ = 0,00. The effect size was 0,60 i.e. a medium effect, which indicates possible practical significance.

**Table 5-12: Results of the paired t-test for the grade 9 (2016) pre-and delayed post-SOM**

| SETH | SOM | Mean | Standard deviation | Sig (2-tailed) | Effect size |
|---|---|---|---|---|---|
| **Study attitude** | Pre<br>Post (D) | 54,78<br>54,67 | 6,72<br>7,90 | 0,94 | 0,01 |
| **Mathematics anxiety** | Pre<br>Post (D) | 55,67<br>60,19 | 7,34<br>6,11 | 0,00 | 0,62 |
| **Study habits** | Pre<br>Post (D) | 65,89<br>65,74 | 8,88<br>10,41 | 0,94 | 0,01 |
| **Problem-solving behaviour** | Pre<br>Post (D) | 58,81<br>59,96 | 9,11<br>9,34 | 0,60 | 0,12 |
| **Study milieu** | Pre<br>Post (D) | 56,37<br>56,44 | 4,91<br>5,90 | 0,96 | 0,01 |
| **Non-SETH** | **SOM** | **Mean** | **Standard deviation** | **Sig (2-tailed)** | **Effect size** |
| **Study attitude** | Pre<br>Post (D) | 50,43<br>49,02 | 7,15<br>7,62 | 0,17 | 0,19 |
| **Mathematics anxiety** | Pre<br>Post (D) | 54,47<br>56,66 | 8,18<br>8,40 | 0,02 | 0,26 |
| **Study habits** | Pre<br>Post (D) | 58,02<br>59,36 | 9,33<br>11,30 | 0,26 | 0,12 |
| **Problem-solving behaviour** | Pre<br>Post (D) | 53,07<br>51,86 | 7,88<br>8,78 | 0,27 | 0,14 |
| **Study milieu** | Pre<br>Post (D) | 54,33<br>53,66 | 6,98<br>7,48 | 0,39 | 0,09 |

**Analysis of the results for the SETH learners**

The mean for the **study attitude** of the learners in the pre-test (M = 54,78; SD = 6,72) did not differ statistically significantly from that in the delayed post-test (M = 54,67; SD = 7,90). The results were: $t$ (26) = 0,08, $p$ = 0,94 and presented a small effect size, $d$ = 0,01.

The mean for the **Mathematics anxiety** of the learners in the pre-test (M = 55,67; SD = 7,34) differed statistically significantly from that in the delayed post-test (M = 60,19; SD = 6,11). The results were: $t$ (26) = -3,90; $p$ = 0,00. The effect size was 0,62, i.e. a medium-sized effect and could indicate possible practical significance.

The mean for the **study habits** of the learners in the pre-test (M = 65,89; SD = 8,88) did not differ statistically significantly from those in the delayed post-test (M = 65,74; SD = 10,41). The results were: $t$ (26) = 0,07, $p$ = 0,94 and presented a small effect size, $d$ = 0,01.

The mean score for the **problem-solving behaviour** of the learners in the pre-test (M = 58,81; SD = 9,11) did not differ statistically significantly from that in the delayed post-test (M = 59,96; SD = 9,34). The results were: *t* (26) = -0,53; *p* = 0,60. The effect size was 0,12, i.e. a small effect.

The **study milieu** of the learners in the pre-test (M = 56,37; SD = 4,91) did not differ statistically significantly from that in the post-test (M = 56,44; SD = 5,90). The results were: *t* (26) = -0,05; *p* = 0,96. The effect size was 0,01, i.e. a medium-sized effect, which could be practically significant.

**Analysis of the results for the non-SETH learners**

The mean for the **study attitude** of the learners in the pre-test (M = 50,43; SD = 7,15) did not differ statistically significantly from that in the delayed post-test (M = 49,02; SD = 7,62). The results were: *t* (57) = 1,38, *p* = 0,17 and presented a small-sized effect, *d* = 0,19.

The mean score for the **Mathematics anxiety** of learners in the pre-test (M = 54,47; SD = 8,18) differed statistically significantly from that in the delayed post-test (M = 56,66; SD = 8,40). The results were: *t* (57) = -2,43; *p* = 0,02. The effect size was 0,26, i.e. a small effect size.

The mean for the **study habits** of the learners in the pre-test (M = 58,02; SD = 9,33) did not differ statistically significantly from those in the delayed post-test (M = 59,36; SD = 11,30). The results were: *t* (57) = -1,15, *p* = 0,26 and presented a small effect size, *d* = 0,12.

The mean score for the **problem-solving behaviour** of the learners in the pre-test (M = 53,07; SD = 7,88) did not differ statistically significantly from that in the delayed post-test (M = 51,86; SD = 8,78). The results were: *t* (57) = 1,12; *p* = 0,27. The effect size was 0,14, i.e. a small-sized effect.

The **study milieu** of learners in the pre-test (M = 54,33; SD = 6,98) did not differ statistically significantly from that in the post-test (M = 53,66; SD = 7,48). The results were: *t* (57) = 0,87; *p* = 0,39. The effect size was 0,09 which is small and of no practical significance.

**In conclusion:**

Information on the study orientation of the participants was needed to determine if their study orientation enhances in a problem-solving learning context and to what extent (cf. § 4.3). The following significant changes were observed for the three groups:

**Grade 8 (2016):**

The **SETH l**earners' Mathematics anxiety, study milieu and problem-solving behaviour changed significantly from the pre-SOM to the post-SOM. However, the only significant change between the pre-SOM and delayed post-SOM was in their study milieu. Study milieu refers to learners' social, physical and experienced milieu (Refer to § 3.4.4).

The **non-SETH** learners showed significant changes in their study milieu and Mathematics anxiety from the pre- to the post-SOM. Furthermore, each of the five fields study attitude, study milieu, Mathematics anxiety, problem-solving behaviour, and study habits showed significant changes from the pre- to the delayed post-SOM.

**Grade 8 (2017):**

From the pre- to the post-SOM, the **SETH** learners' study attitude and their study habits showed significant changes (cf. Table 5-10). However, the change in study attitude was a small effect size, and not practically significant. The change in study habits was also practically insignificant due to a small effect size. From the pre- to the post-SOM, the study attitude of the **non-SETH** learners changed significantly (See Table 5-10). In this case, it was a small effect size and not practically significant.

**Grade 9 (2016):**

The Mathematics anxiety and study milieu of the **SETH** learners showed significant differences (See Table 5-9). There is an indication of practical significance due to a medium effect size. Their study milieu improved with a medium-sized effect, an indication of possible practical significance. In the pre- and delayed post-SOM, the Mathematics anxiety of the SETH learners showed significant differences (cf. Table 5-12). Their Mathematics anxiety increased with a medium effect size which indicates possible practical significance.

The **non-SETH** learners' Mathematics anxiety and study milieu showed significant differences from the pre- to the post-SOM (cf. Table 5-9). Their Mathematics anxiety increased with a medium effect size which is an indicator of possible practical significance. Their study milieu improved, but with no practical significance due to a small sized effect. The non-SETH learners' Mathematics anxiety showed significant differences form the pre- to the delayed post-SOM (cf. Table 5-12). Their Mathematics anxiety increased but with a small effect size which indicates no practical significance.

Comparing the **amended mean values** for each SOM field (cf. Addendum 6.2) with the **percentile ranks** in Table 14 (cf. Addendum 5.4), the following conclusions can be made: In

each of the five fields, the SETH cohort tested better than 75% of the South African population for which the SOM was standardised. The non-SETH cohort tested better than 70% of the South African population in all five the SOM fields (cf. 4.8.4.2).

### 5.2.4 The mathematical competence pre- and post-test data analysis and interpretation

The grade 8 and 9 learners (SETH and non-SETH cohorts) wrote a mathematical competence test on three occasions during the study. The first test was the pre-test and the subsequent tests a post-test (second time) and a delayed post-test (third time). Refer to Addenda 7.1 and 7.2 for the respective tests. Initially, the test intended to determine each learner's level of mathematical competence regarding the requirements of the official school Mathematics curriculum (CAPS). Each of the questions is analysed in terms of the knowledge level, competency cluster and proficiency level (cf. Addenda 7.8 and 7.9) and the competency clusters as described by the PISA Assessment Framework. However, learners' levels of mathematical competence could no longer be determined regarding the three clusters. This resulted in comparing each question in terms of the level of cognitive challenge (difficulty).

For the assessment of the tests, a memorandum was compiled with the correct solution to each problem. Thereafter, all the Mathematics tests were assessed with the marking rubric in Table 5-13 below, with scores from zero to three allocated to each solution. The focus was on learners' problem-solving attempt of each problem and pointing to their progress towards the correct solution.

**Table 5-13: Problem-solving marking rubric for the mathematical competence tests**

| Score | Problem-solving attempt |
|---|---|
| 0 | • No attempt to solve the problem<br>• Nothing of substance to really assess (meaningless approach or solution) |
| 1 | • Some attempt to solve the problem<br>• Solution not reached<br>• Only correct answer was given |
| 2 | • Fair attempt to solve the problem<br>• Incorrect solution due to computational/procedural error(s) |
| 3 | • Clear indication of an innovative approach to solving the problem<br>• Correct solution reached |

Refer to Addenda 7.4 - 7.7 for a summary of the marks. Thereafter, Statistical Consultation Services analysed these results, and the succeeding sections will present them.

### 5.2.5 Statistical analysis of the grade 8 mathematical competence test

A comparable procedure to that of the SOM analysis was followed in the statistical analysis of the mathematical competence tests. The same three groups of participants wrote the

mathematical competence tests and completed the SOM questionnaire within a time frame of a year (Figure 5-2). The reliability of the questions in the test was determined, the construct validity of the questions established, and learners' performance in the tests were compared. The statistical analysis of the grade 9 mathematical competence test follows in § 5.2.6.

#### 5.2.5.1 Reliability of the grade 8 mathematical competence test

The Cronbach's ∝ established the reliability of the questions in the grade 8 test and the test. This was done for the questions in each of the three clusters, i.e. reproduction, connections and reflection, and the questions in the combined clusters. Table 5-14 below displays the reliability measured by the Cronbach's ∝ for the grouped questions in the grade 8 samples.

**Table 5-14: Cronbach's ∝ for the questions in the grade 8 mathematical competence test**

| | Grade 8 (2016) | | Grade 8 (2017) | |
|---|---|---|---|---|
| **Cluster** | **Number of questions** | **Cronbach's ∝** | **Number of questions** | **Cronbach's ∝** |
| **Reproduction** | 1 & 2 | **0,390** | 1 & 2 | **0,078** |
| **Reflection** | 3, 5 & 9 | **0,487** | 3, 5 & 9 | **0,303** |
| **Connections** | 4, 6, 7 & 8 | **0,397** | 4, 6, 7 & 8 | **0,593** |
| **All three clusters** | **All the questions** (1-9) | **0,637** | **All the questions** (1-9) | **0,707** |

The grouped questions in the respective clusters in the grade 8 test, had low Cronbach's ∝ values (< 0,6) for the two grades 8 groups of learners. These low values can be ascribed to the degree of difficulty experienced by the learners. The test results in terms of the learners' performance grouped the questions differently. However, when all the test questions were considered, the Cronbach's ∝ were larger than 0,6. The test is therefore regarded as reliable and the obtained data are considered reliable for further analysis and interpretation.

#### 5.2.5.2 Construct validity of the test questions in the grade 8 test

A factor analysis determined the construct validity of each question in the Mathematics pre-test data. Three factors surfaced in the grade 8 (2016) group and four factors in the grade 8 (2017) group. Table 5-15 below represents the results of the factor analysis in the mathematical competence test in the grade 8 groups.

**Table 5-15: Results of the factor analysis in the pre-test of the grade 8 groups**

| Grade 8 (2016) | | Grade 8 (2017) | |
|---|---|---|---|
| **Number of factors** | **Question numbers** | **Number of factors** | **Question numbers** |
| **Factor 1** | 3, 6 & 7 | **Factor 1** | 1, 6, 7, 8 & 9 |
| **Factor 2** | 1 & 7 | **Factor 2** | 2, 6 & 7 |
| **Factor 3** | 2, 4, 5 & 8 | **Factor 3** | 4, 5 & 6 |
| | | **Factor 4** | 3 & 4 |
| **KMO** | 0,652 | **KMO** | 0,708 |

The factors resulting from the factor analysis differ significantly from the initial combination of questions in the three clusters. The reason is that the specific factors formed due to learners' experience of the degree of difficulty of the questions (refer to Table 5-14 above). Interestingly, question 9 was not part of any of the three clusters in the grade 8 (2016) group. The assumption is that the grade 8 test has construct validity and that the generated data are valid to be analysed further. However, learners' levels of mathematical competence could no longer be determined regarding the three clusters. This resulted in comparing each question in terms of the level of cognitive challenge (difficulty).

#### 5.2.5.3 Comparison of learners' performance in the test

As mentioned earlier in section 5.2.3, three groups formed part of this study (Fig 5-2). The intention was to determine the changes that occurred in mathematical competence between the following groups over time:

- SETH learners and non-SETH learners within each of the three groups at three intervals;
- SETH learners in each of the three groups at three intervals; and
- Non-SETH learners in each of the three groups at three intervals.

Refer to Figure 5-2 and Figure 5-3 for the procedure and compositions of these three groups.

The mathematical competence tests were assessed and a mark between zero and three allocated for the correctness of the solution to each problem (§ 5.2.6 & Table 5-13). The test results were statistically analysed, and Tables 5-16 and 5-17 display the percentages of the learners on level three in each test (cf. Addendum 8 for these results).

**Table 5-16: The performance of the grade 8 (2016) learners in the Mathematics tests**

| Question number | Test | SETH | Non-SETH |
|---|---|---|---|
| **Question 1** | Pre-test | 63,6 | 60,9 |
| | Post-test | 93,9 | 62,5 |
| **Question 2** | Pre-test | 63,6 | 23,4 |
| | Post-test | 81,8 | 46,9 |
| **Question 3** | Pre-test | 42,4 | 18,8 |
| | Post-test | 75,8 | 10,9 |
| **Question 4** | Pre-test | 21,2 | 4,7 |
| | Post-test | 42,4 | 21,9 |
| **Question 5** | Pre-test | 15,2 | 4,7 |
| | Post-test | 48,5 | 14,1 |
| **Question 6** | Pre-test | 21,2 | 12,5 |
| | Post-test | 42,4 | 18,8 |
| **Question 7** | Pre-test | 9,1 | 9,4 |
| | Post-test | 15,2 | 7,8 |
| **Question 8** | Pre-test | 3,0 | 21,9 |
| | Post-test | 12,1 | 3,1 |
| **Question 9** | Pre-test | 12,1 | 12,5 |
| | Post-test | 60,6 | 35,9 |

The SETH learners performed better in the post-test than in the pre-test in all nine of the questions. The non-SETH learners performed better in the post-test than in the pre-test except in questions 3, 7 & 8. The SETH learners performed better in the pre- and post-test than the non-SETH learners except in questions 7, 8 & 9.

**Table 5-17: The performance of the grade 8 (2017) learners in the Mathematics tests**

| Question number | Test | SETH | Non-SETH |
|---|---|---|---|
| **Question 1** | Pre-test | 66,7 | 53,7 |
| | Post-test | 69,0 | 50,0 |
| **Question 2** | Pre-test | 7,1 | 5,6 |
| | Post-test | 45,2 | 29,6 |
| **Question 3** | Pre-test | 7,1 | 3,7 |
| | Post-test | 28,6 | 20,4 |
| **Question 4** | Pre-test | 7,1 | 5,6 |
| | Post-test | 16,7 | 3,7 |
| **Question 5** | Pre-test | 19,0 (1) | 1,9 |
| | Post-test | 2,4 | 1,9 |
| **Question 6** | Pre-test | 11,9 | 3,7 |
| | Post-test | 9,5 | 7,4 |
| **Question 7** | Pre-test | 9,5 | 11,1 |
| | Post-test | 21,4 | 11,1 |
| **Question 8** | Pre-test | 14,3 | 7,4 |
| | Post-test | 21,4 | 16,7 |
| **Question 9** | Pre-test | 11,9 | 7,4 |
| | Post-test | 16,7 | 14,8 |

The SETH learners performed better in the post-test than in the pre-test except in question five and six. The non-SETH learners performed better in the post-test than in the pre-test except in questions one and four. The SETH learners performed better in the pre-test and the post-test than the non-SETH learners except in question seven of the pre-test.

#### 5.2.5.4 Learners' performance in the independent samples

Independent t-tests established the changes in mathematical competence between the SETH cohort and the non-SETH cohort. The tests were done for the pre-test of both cohorts and the post-test of both cohorts. The results of the pre-test were compared with the post-test. Refer to § 5.2.3.1 and see Fig 5-2 and 5-3.

**Table 5-18: Results of the independent t-tests for grade 8 (2016) in the pre- and post-Mathematics test**

| Test | Cohort | Mean | Standard deviation | Sig (2-tailed) | Effect size |
|---|---|---|---|---|---|
| Pre-test | SETH | 12,67 | 4,82 | 0,00 | 0,86 |
| | Non-SETH | 8,50 | 3,76 | | |
| Post-test | SETH | 17,42 | 4,74 | 0,00 | 1,32 |
| | Non-SETH | 11,02 | 4,85 | | |

The SETH learners performed better in the **pre-test** (M = 12,67; SD = 4,82) than the non-SETH learners (M = 8,50; SD = 3,76). This difference was statistically significant, *t* (81) = 4,31, *p* = 0,00 and presented a large effect size (*d* = 0,86), an indication of practical significance. Hereafter, this difference was accounted for statistically to enable further comparisons between the two cohorts.

The SETH learners performed better in the **post-test** (M = 17,42; SD = 4,74) than the non-SETH learners (M = 11,02; SD = 4,85). This difference was statistically significant, *t* (90) = 6,13, $p = 0{,}00$ and presented a large-sized effect, which indicates practical significance (*d* = 1,32).

**Table 5-19: Results of the independent t-tests for grade 8 (2017) in the pre- and post-Mathematics test**

| Test | Cohort | Mean | Standard deviation | Sig (2-tailed) | Effect size |
|---|---|---|---|---|---|
| Pre-test | SETH | 7,50 | 3,97 | 0,00 | 0,80 |
| | Non-SETH | 4,29 | 4,00 | | |
| Post-test | SETH | 10,93 | 5,48 | 0,00 | 0,76 |
| | Non-SETH | 6,78 | 5,13 | | |

The SETH learners performed better in the **pre-test**, (M = 7,50; SD = 3,97) than the non-SETH learners (M = 4,29; SD = 4,00). This difference was statistically significant *t* (91) = 3,86, $p = 0{,}00$ and presented a large-sized effect, which is an indication of practical significance *(d* = 0,80). However, this difference was accounted for statistically to enable further comparisons between the two cohorts.

The SETH learners had a higher mean in the **post-test** (M = 10,93; SD = 5,48) than the non-SETH learners (M = 6,78; SD = 5,13). This difference was statistically significant *t* (90) = 3,73, $p = 0{,}00$ and presented a large effect size, *d* = 0,76. Once again, this effect size points to practical significance.

#### 5.2.5.5 Learners' performance in the dependent samples

Paired *t*-tests established the changes in the mathematical competence of the SETH cohort in each of the tests and those of the non-SETH cohort in each of the tests. These tests happened for the pre-test and the post-test.

**Table 5-20: Results of the dependent *t*-tests for grade 8 (2016) in the pre- and post-Mathematics test**

| Cohort | Test | Mean | Standard deviation | Sig (2-tailed) | Effect size |
|---|---|---|---|---|---|
| SETH | Pre-test | 12,67 | 4,82 | 0,000 | 0,95 |
| | Post-test | 17,48 | 5,07 | | |
| Non-SETH | Pre-test | 8,50 | 3,76 | 0,000 | 0,49 |
| | Post-test | 10,95 | 4,95 | | |

The SETH learners performed better in the **post-test**, (M = 17,48; SD = 5,07) than in the pre-test (M = 12,67; SD = 4,82). This difference was statistically significant, *t* (26) = -5,71, *p* = 0,00 and presented a large-sized effect, *d* = 0,95. In this case it shows practical significance.

The non-SETH learners had a higher mean in the **post-test** (M = 10,95; SD = 4,95) than in the pre-test (M = 8,50; SD = 3,76). This difference was statistically significant, *t* (55) = -4,52, $p = 0{,}00$, presented a medium-sized effect, *d* = 0,49 which is practically significant.

**Table 5-21: Results of the dependent t-tests for grade 8 (2017) in the pre- and post-Mathematics test**

| Cohort | Test | Mean | Standard deviation | Sig (2-tailed) | Effect size |
|---|---|---|---|---|---|
| SETH | Pre-test | 7,54 | 4,01 | 0,000 | 0,62 |
| | Post-test | 10,93 | 5,48 | | |
| Non-SETH | Pre-test | 3,94 | 3,74 | 0,000 | 0,52 |
| | Post-test | 6,67 | 5,25 | | |

The SETH learners performed better in the **post-test** (M = 10,93; SD = 5,48) than in the pre-test (M = 7,54; SD = 4,01). This difference was statistically significant, *t* (40) = -6,15, *p* = 0,00 with a medium-sized effect, *d* = 0,62. This could possibly be an indication of practical significance.

The non-SETH learners also performed better in the **post-test** (M = 6,67; SD = 5,25) than in the pre-test (M = 3,94; SD = 3,74). This difference was statistically significant, *t* (47) = -5,54, $p = 0{,}00$, presented a medium effect size, which could be pointing to practical significance (*d* = 0,52).

The subsequent section describes the analysis of the questions in the grade 8 mathematical competence test.

#### 5.2.5.6 Analysis of the questions in the grade 8 Mathematics test

Initially, questions were set at different knowledge levels, within a specific competency cluster, and required a specific level of mathematical proficiency for learners to be able to solve them correctly and successfully. Due to the results of the factor analysis, the questions are discussed further in terms of learners' performance (cognitive demand) and not in terms of the three competency clusters, and the level of mathematical proficiency as initially planned. The questions are therefore analysed and discussed according to the factors that emerged from the factor analysis (Section 5.2.6.3). Three factors emerged in the grade 8 (2016) pre-test, but four in the grade 8 (2017) pre-test. The factors in the grade 8 (2016) test are shown below. The factors in the grade 8 (2017) test follow afterwards.

**Factor 1: Questions 3, 6 & 7**

In the subsequent discussion of learners' solutions in each question, the percentages refer to the **post-test** of the grade 8 (2016) and grade 8 (2017) groups. Refer to Table 5-18 and Table 5-19. The grade 8 (2017) group had much lower percentages than the grade 8 (2016) group in

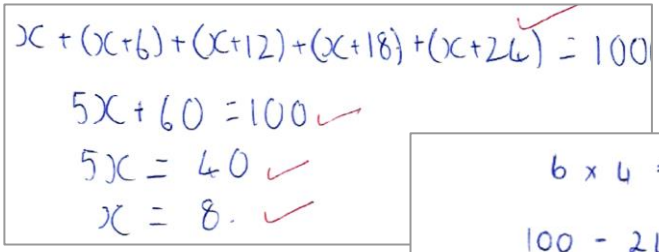
all nine the questions. Refer to Table 5-19. These percentages are for those learners who got the correct answer and were allocated a three on the problem-solving rubric.

**Question 3:**

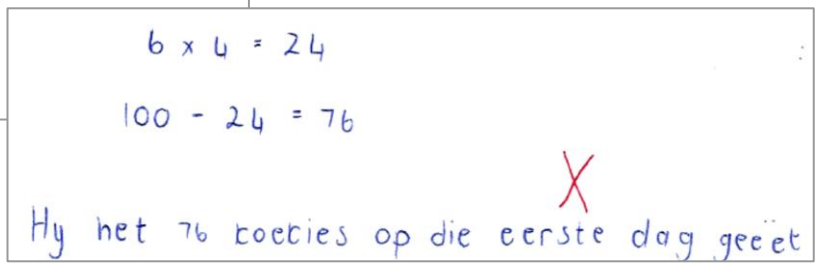
A boy eats 100 cookies in five days. Each day he eats 6 cookies more than the previous day. How many cookies did he eat on the first day?

| Cognitive level (CAPS) | Competency cluster & level |
|---|---|
| **Level 4: Problem-solving**<br><br>The learner must write a linear equation to model this situation and then solve the equation | **Reflection cluster – Level 5/6** |

**Learner 8S67**




**Learner 8L104**




Many learners were unable to model this situation with a linear equation as evident in the solution of learner 8L104 on the right. Those learners who could write down an equation were able to solve the problem correctly as shown in the solution of learner 8S67. A possible explanation could be that this question is a typical problem-solving question at the highest cognitive level (level 4) of the CAPS curriculum.

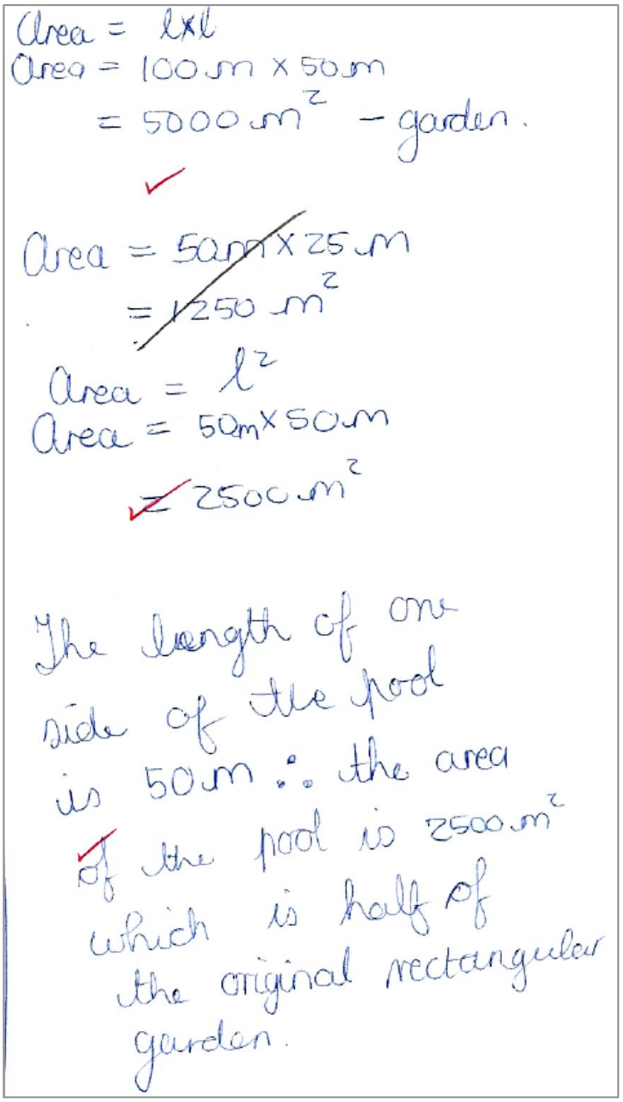
The percentages for the 2016 SETH learners were 75,8 and for the non-SETH learners 10,9. The percentages for the 2017 SETH learners were 28,6 and for the non-SETH learners 20,4. The 2017 SETH learners performed much worse in this question than their 2016 peers. This is interesting since these learners no longer complete worksheets during the Mathematics interventions (2016), but interactive problem-solving activities (2017). The expectation was that they should perform better than the 2016 learners.

**Question 6:**

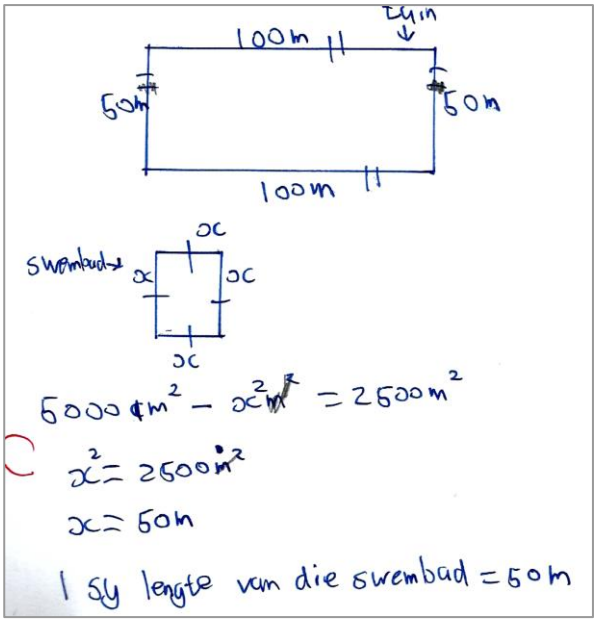
Mrs Scheepers plans to build a swimming pool in her garden. The garden is in the form of a rectangle with length 100 m and width 50 m. She wants to build a square pool. Calculate the length of one side of the pool if the remaining part of the garden (without the swimming pool) equals one half of the original rectangular garden.

| Cognitive level (CAPS) | Competency cluster & level |
|---|---|
| **Level 3: Complex procedure**<br><br>The learner must determine the area of the garden, determine one half of this area and find the length of one side of the square | **Connections cluster – Level 3/4** |

**Learner S23**




**Learner 8L101**



Question 6 is an example of a complex procedure according to the CAPS curriculum, i.e. on a cognitive level three. In the two examples above, the learners solved the problem correctly. Learner 8L101 used an algebraic equation to solve the problem while S23 chose the usual route. A common mistake in many learners' answers was that they did not realise that they needed to take the square root of 2 500 to determine the length of the side of the square. Interestingly, only a few learners realized that they could find the answer by folding the rectangle in two. This yields a 50 x 50 m square.

The SETH learners (2016) achieved 42,4% and the non-SETH learners (2016) 18,8% for this question. The 2017 SETH learners got 9,5% and the 2017 non-SETH learners only 7,4%. This also shows a lower performance than for the 2016 sample.

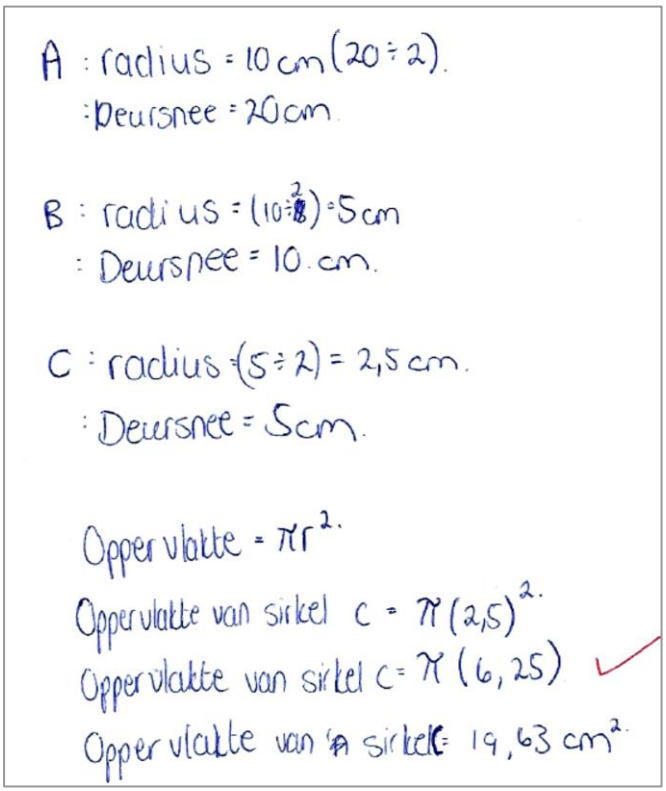
**Question 7:**

Given the following information regarding three circles:

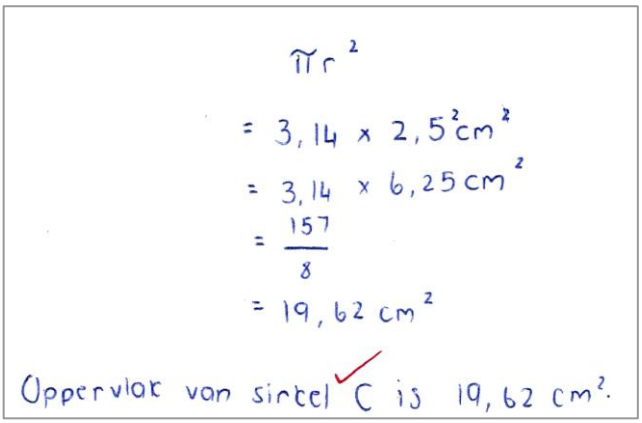
A is the largest circle; B is the middle-sized circle and C is the smallest circle. Circle A has a diameter of 20 cm. The smaller circles are drawn in such a way that the radius of circle A is the diameter of circle B, and the radius of circle B is the diameter of circle C. Calculate the area of circle C.

| Cognitive level (CAPS) | Competency cluster & level |
|---|---|
| **Level 3: Complex procedure**<br><br>The learner must know that the diameter is twice the radius, draw the three circles with the correct radius, and then determine the area of the smallest circle | **Connections cluster – Level 3/4** |

**Learner S17**




**Learner 8L104**




Question 3 is an example of a complex procedure on cognitive level three. Learners who failed to solve this problem were confused with the concepts, diameter and radius. Once they realised that the radius of circle C was 2,5 cm, they managed to determine the area correctly as evident in the solutions of both learner S17 and learner 8L104. For this question, the 2016 SETH learners scored 15,2 and the non-SETH learners 7,8%. However, the 2017 SETH learners got a higher 21,4% and the non-SETH learners a higher 11,1%. These marks show that learners found this problem challenging.

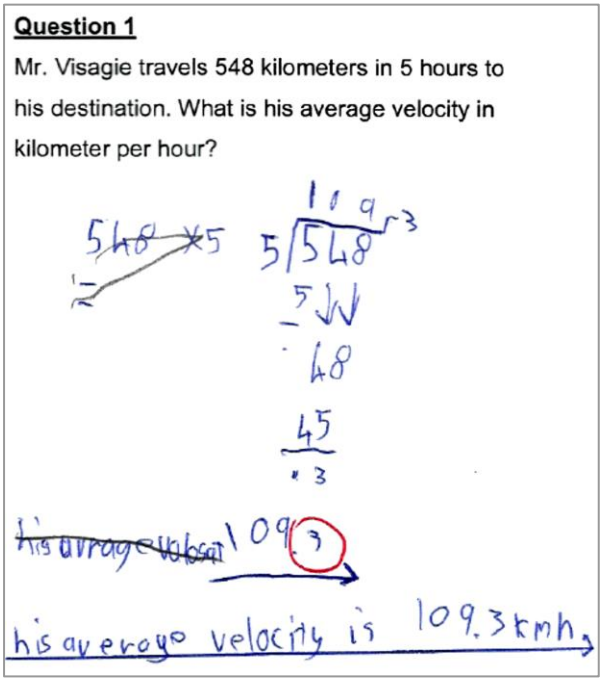
**Factor 2: Questions 1 & 7**

**Question 1:**

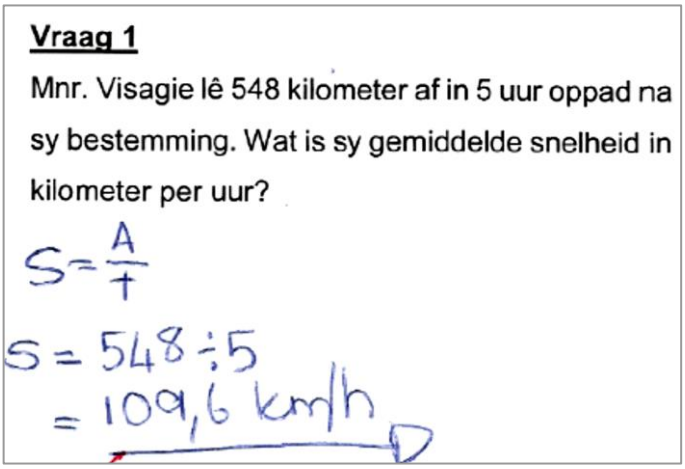
Mr Visagie travels 548 kilometres in 5 hours to his destination. What is his average velocity in kilometer per hour?

| Cognitive level (CAPS) | Competency cluster & - level |
|---|---|
| **Level 2: Routine procedure**<br><br>The learner must identify the correct formula, substitute the values in the formula, and determine the average velocity | **Reproduction cluster – Level 1/2** |

**Learner 8L86**




**Learner 8S41**




Question 7 was also part of factor one above and not shown again here.

Question 1 is an example of a routine procedure on level 2. Numerous learners knew that velocity equals distance divided by time and managed to solve question 1 accurately as shown in learner 8S41's solution. Those who did not have it correct mostly made an error in the decimal place as in the case of learner 8L86. The SETH learners (2016) scored 93,9% and the non-SETH (2016) learners 62,5%. The 2017 SETH learners achieved a lower 69% and the non-SETH learners of the same year a lower 50%. Therefore, this question was not of high cognitive demand to the learners.

**Factor 3: Questions 2, 4, 5 & 8**

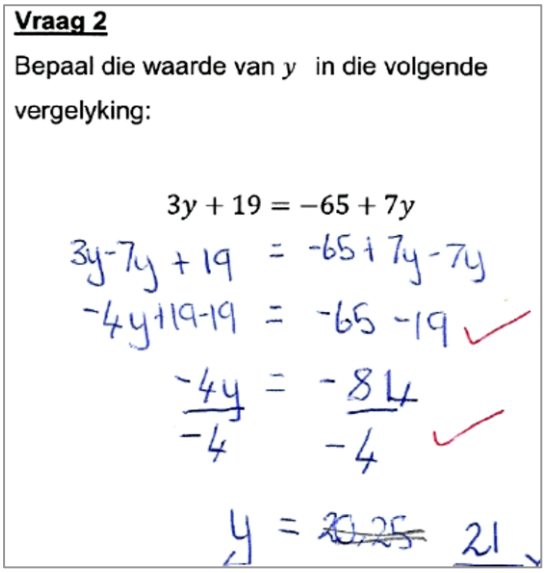
**Question 2:**

Determine the value of $y$ in the following expression:

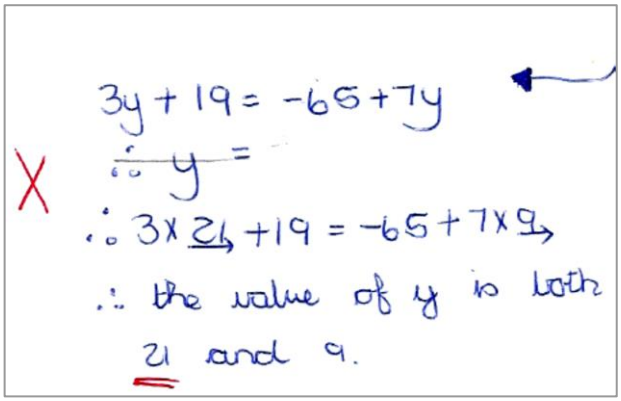
$$3y + 19 = -65 + 7y$$

| Cognitive level (CAPS) | Competency cluster & level |
|---|---|
| **Level 2: Routine procedure**<br><br>The learner must know the algorithm to solve this linear equation | **Reproduction cluster – Level 1/2** |

**Learner 8L92**




**Learner 8S79**



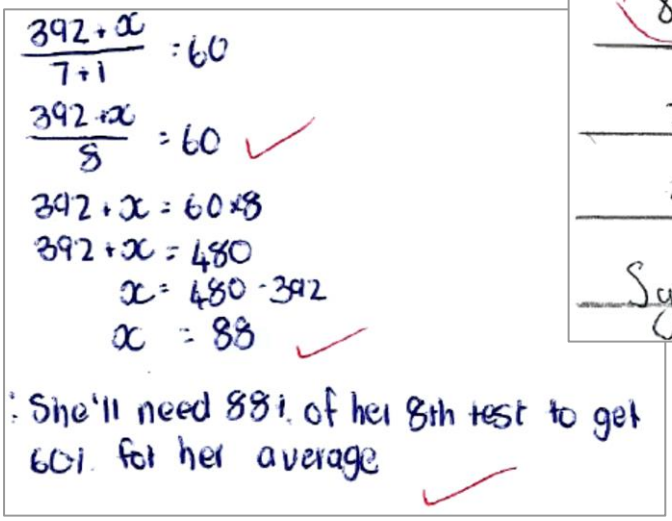

Even though solving a linear equation is a routine procedure (cognitive level 2) according to the CAPS curriculum, it was disappointing to see that, so many learners could not find the value of *y* correctly. Learner 8L92 got the correct value for *y*. Learner 8S79 was unsuccessful in what seems like a trial and error method. The 2016 SETH learners obtained 81,8% in this question with the non-SETH learners 46,9%. Their 2017 SETH peers got 45,2% and the non-SETH peers 29,6%. Both 2016 samples outperformed the 2017 sample in this question. In this excerpt, the non-SETH learner (8L92) had success and not the SETH learner (8S79).

**Question 4:**

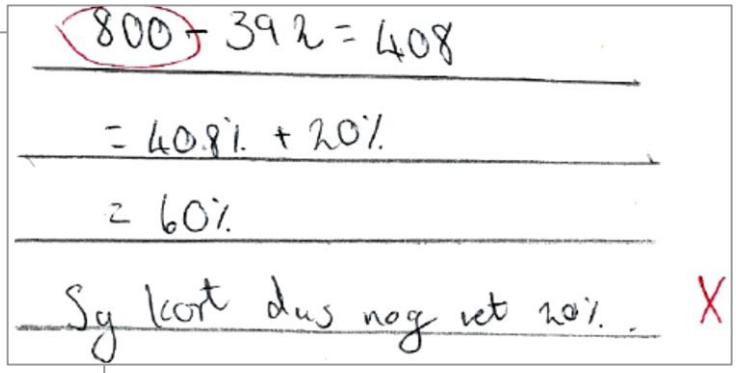
Theresa has an average of 56% for her first seven exam papers. What percentage should she get in her eighth paper to ensure she will have an average of 60% in her eight subjects?

| Cognitive level (CAPS) | Competency cluster & level |
|---|---|
| **Level 3: Complex procedure**<br><br>The learner must determine the total for eight papers and subtract the total for seven papers to determine the mark in paper eight | **Connections cluster – Level 3/4** |

**Learner 8S62**



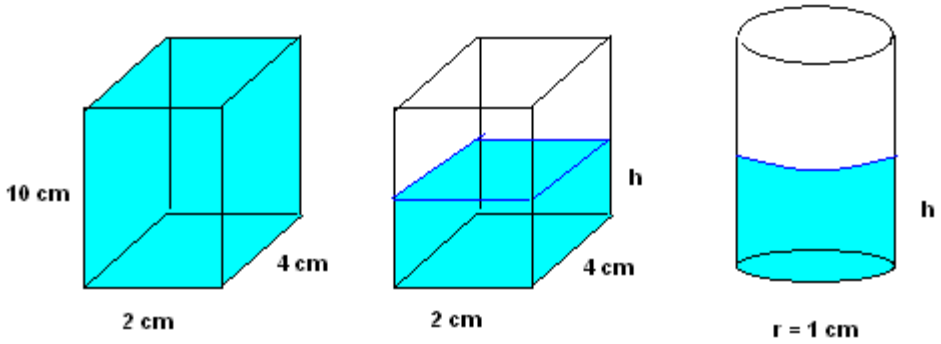

**Learner 8L114**




Question 3 represents a complex procedure, a typical level 3 problem. Learner 8L114 was unsuccessful in the attempt. Learner 8S62 solved the problem correctly by using an algebraic equation. It seemed that learners are more capable of finding a percentage in the known context. Once the problem is asked differently, as in this case, they get stuck. The SETH learners' percentage was 42,4 and that of the non-SETH learners 21,9 in 2016. However, in 2017 the SETH learners scored 16,7% and the non-SETH learners 3,7%. This was a much lower performance for both samples in comparison to the 2016 samples. Learners found this problem challenging as shown by their marks.

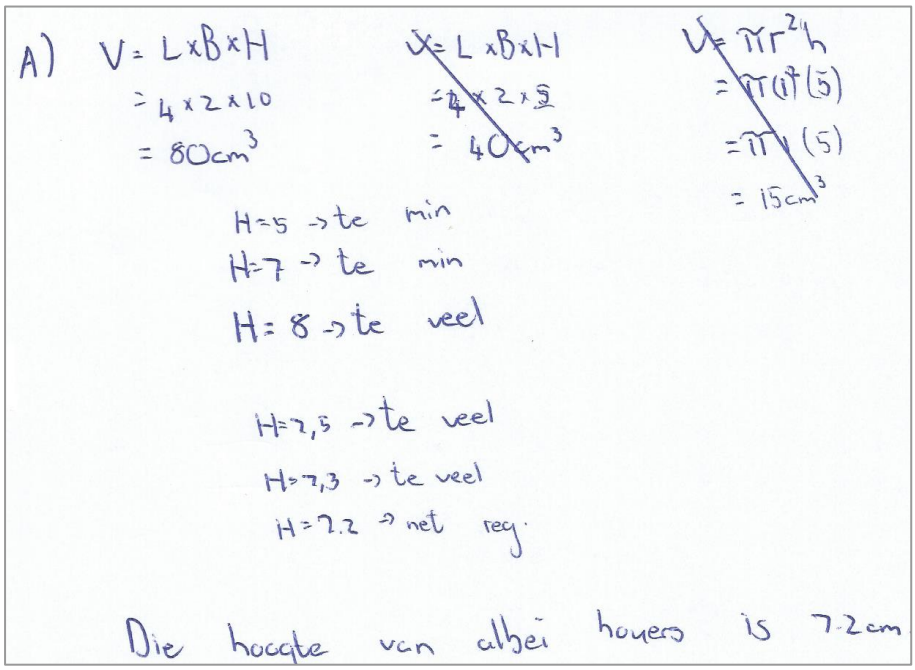
**Question 5:**

The cuboid on the left was initially filled with water. Water is then emptied from it into the cuboid on the right and the rectangular cylinder on the right in such a way that the height h in both containers (the right cylinder and the cuboid) are equal. Calculate the height h of the water in these two containers to the right. (Round your answer to the nearest tenth of a cm)

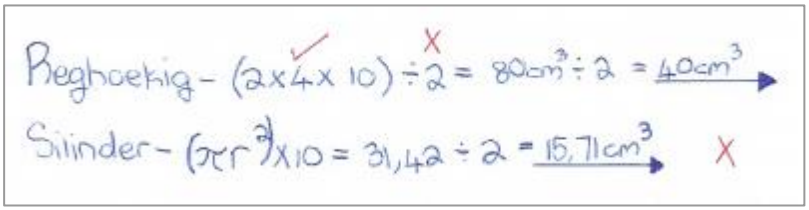



| Cognitive level (CAPS) | Competence cluster & level |
|---|---|
| **Level 4: Problem-solving**<br><br>The learner must determine the volume of all three shapes, then model the total volume of the last two shapes regarding the volume of the first shape, and then determine the height of the water in the two shapes by solving this linear equation | **Reflection cluster – Level 5/6** |

**Learner 8S61**




**Learner L30**




Question 4 is a level 4 problem-solving example, i.e. the highest cognitive level. Learner 8S61 solved the problem correctly by trial and error. On the other hand, learner L30 only knew that the volume of the cuboid is $l \times b \times h$ and could not progress correctly.

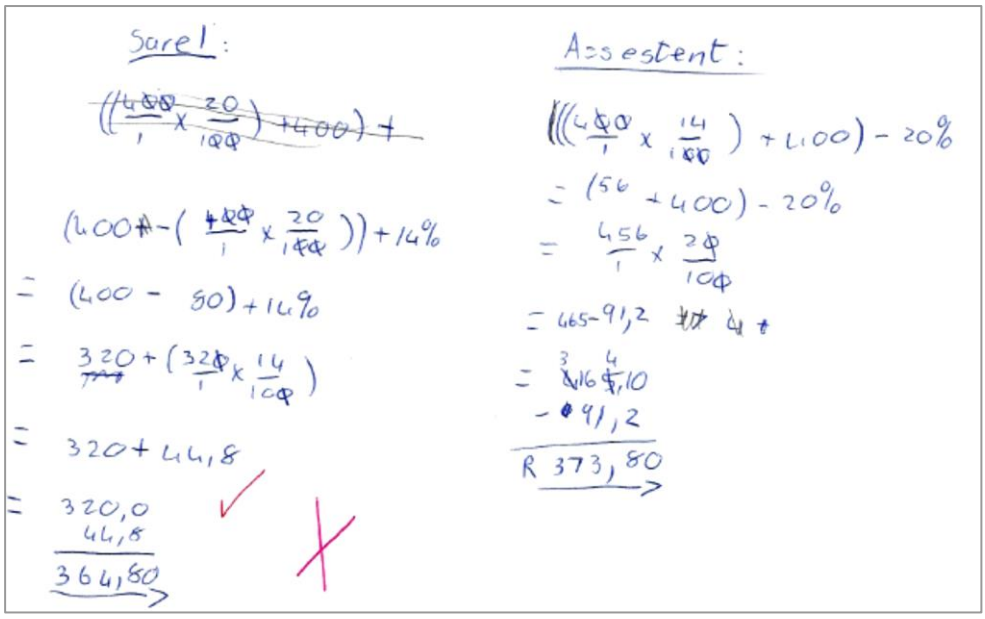
Fewer 2016 non-SETH learners managed to solve this problem correctly than the 2016 SETH learners (SETH 48,5% and non-SETH 14,1%). Matters were worse for the 2017 samples. The SETH learners achieved a very low 2,4% and the non-SETH learners only 1,9%. Learners' performance in this question indicates that they find problems on this level cognitively demanding.

**Question 8:**

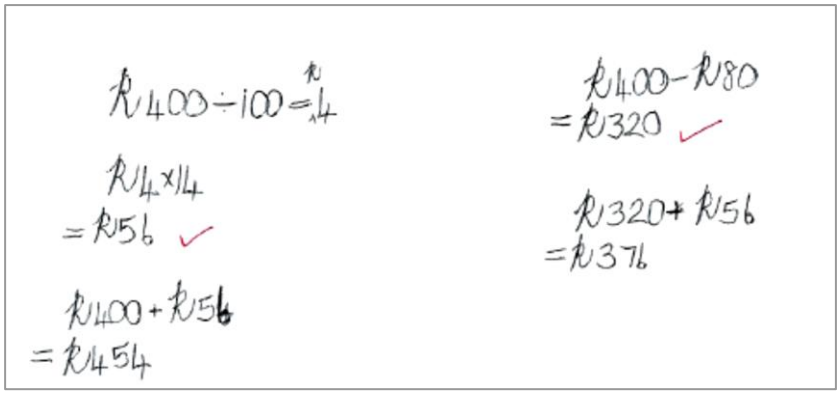
A gentleman considers buying himself a jacket. The original selling price of the jacket is R400, but there is a sale, and the jacket is sold at 20% discount. In South Africa, the sales tax is 14%. The shop assistant first adds the tax to the price and then subtracts the 20% discount. He is unhappy about this and insists that the assistant first subtract the 20% discount and then add the 14% tax. Does it make any difference to the price paid? Show all your calculations.

| Cognitive level (CAPS) | Competency cluster & level |
|---|---|
| **Level 3: Complex procedure**<br><br>The learner must be able to determine the price with sales tax, the discounted price and then the other way around. Learner must answer the question appropriately | **Connections cluster – Level 3/4** |

**Learner S11**




**Learner L4**



Question 8 is another example of a complex procedure and on cognitive level 3. Question 8 was very challenging to all the learners as seen by the SETH learners' deficient 12,1% and the non-SETH learners' lower 3,1% (2016). The 2017 sample performed better in this question than their 2016 peers. The SETH learners scored a higher 21,4% with the non-SETH learners a much higher 16,7%. Those who were successful in this question understood the 'language' in the problem, understood the concepts discount and sales tax and managed to apply them in this context. In the above exemplars, the non-SETH learner (L4) had a successful attempt, but the SETH learner (S11) not.

**Question 9:**

A rectangular piece of a field was booked for a pop concert. The area where the fans had to stand, was 100m by 50m. All the tickets were sold out, and the field filled with fans who were standing during the concert.

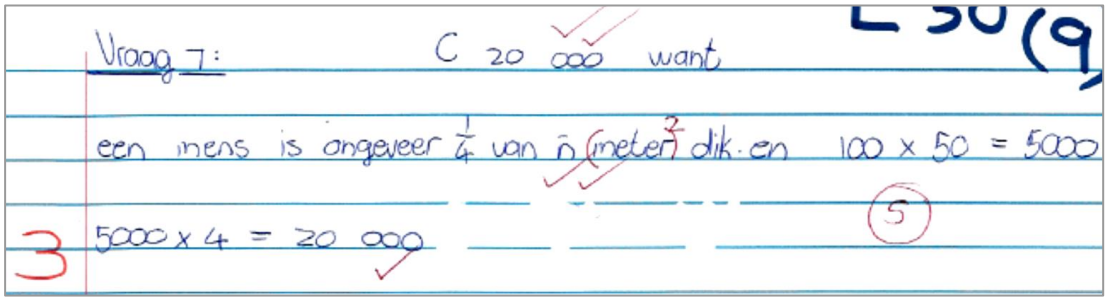
Choose the best estimation of the total number of people who attended the concert:

A. 2 000
B. 5 000
C. 20 000
D. 50 000
E. 100 000

Show your reasoning and all your calculations.

| Cognitive level (CAPS) | Competency cluster & level |
|---|---|
| **Level 4: Problem-solving**<br><br>The learner must estimate how many people can stand on one square meter, determine the area of the field and then determine the number of people on the field | **Reflection cluster – Level 5/6** |

**Learner L30**



Question 9 was not part of any of the three factors established in the grade 8 (2016) group and showed no significant correlation with any of the other questions. However, question 9 appeared as a factor in the grade 8 (2017) group. Question 9 is an example of a level 4 problem-solving question and known for its cognitive demand. Many of the learners calculated the area of the field, i.e. 5 000 $cm^2$ correctly. They made the wrong assumption on how many people can stand per square metre. Furthermore, they guessed what the answer should be without showing their reasoning. Learner L30 made the correct assumption that four people can stand per square metre. The SETH learners of 2016 got 60,6% and the non-SETH learners 35,9%. The 2017 SETH learners obtained a lower 16,7% and the non-SETH learners a lower 14,8% too.

**The effect of problem-solving learning on mathematical competence**

Information on the mathematical competence of the participants was needed to determine if their mathematical competence enhances in a problem-solving learning context and to what extent (cf. § 2.6 and § 4.3). The following significant changes were observed for the three groups:

**Grade 8 SETH learners of 2016**

Questions 7 and 8 had the lowest averages for these SETH learners. They can, therefore, be regarded as the most challenging problems from the nine problems in the test. Questions 4, 5 and 6 averaged between 42% and 49%, question 9 at 60,6% and the highest averages were in questions 1, 2, and 3 (between 76 and 94%). The grade 8 (2016) non-SETH learners had lower averages than the SETH learners in all the questions except in question 7.

The grade 8 (2016) SETH learners showed sustained or continuous improvement in their response to the cognitive challenge (degree of difficulty) of the questions throughout the investigation. Their mathematical competence improved from the pre- to the post-SOM. Similarly, the non-SETH learners also showed continuous improvement throughout the empirical investigation although their performances were lower than those of the SETH learners in both tests.

**Grade 8 SETH learners of 2017**

The performance of these learners in all nine questions was much lower than that of the 2016 group. They had averages lower than 10% in questions 7 and 8. In question 3 almost 11%, in questions 5 and 6, less than 20%, question 4 almost 22% and in questions 1, 2 and 9, between 36 and 63%. The 2017 non-SETH learners had lower percentages than the SETH learners in all the questions except in questions 3 and 8.

The grade 8 (2017) SETH learners showed continuous improvement in their mathematical competence throughout the investigation. Their mathematical competence improved from the pre-test to the post-test. Similarly, the non-SETH learners also showed improvement throughout the empirical investigation although their performance was lower than those of the SETH learners in both tests.

### 5.2.6 Statistical analysis of the grade 9 mathematical competence test

A comparable procedure to that in the grade 8 test analysis was followed in the statistical analysis of the grade 9 test. The same three groups wrote the Mathematics tests and completed the SOM questionnaire on three occasions within a year frame (Figure 5.2 and

§ 5.2.7). The reliability of the questions in the test and the test was determined, the construct validity of the questions established, and learners' performance in the test compared.

#### 5.2.6.1 Reliability of the grade 9 mathematical competence test

The Cronbach's ∝ of the questions in the pre-test established the reliability of the grade 9 test. This was done for the groups of questions and all the questions. Table 5-22 below displays the reliability measured by the Cronbach's ∝ for the grouped questions in the grade 9 sample.

**Table 5-22: Cronbach's ∝ for the questions in the grade 9 mathematical competence test**

| | **Grade 9 (2016)** | |
|---|---|---|
| **Cluster** | **Number of questions** | **Cronbach's ∝** |
| **Reproduction** | 1, 2 & 6 | 0,347 |
| **Connections** | 3, 4 & 5 | 0,679 |
| **Reflection** | 7 & 8 | 0,176 |
| **All three clusters** | All questions (1-8) | |
| | Pre-test | 0,677 |
| | Post-test | 0,670 |
| | Delayed post-test | 0,694 |

The grouped questions in the reproduction and reflection clusters in the grade 9 test had low Cronbach's ∝ values (< 0,6). However, the connections cluster had a Cronbach ∝ of 0,679. The low values can be because the learners' performance grouped the questions into these factors. However, in the case of all the questions, the Cronbach's ∝ were higher than 0,6. This

was the case in the pre-, post- and delayed post-test. The test is therefore reliable for further investigation. The data obtained are therefore considered reliable for further analysis and interpretation.

#### 5.2.6.2 Construct validity of the questions in the grade 9 test

A factor analysis was done in the grade 9 Mathematics pre-test data set to determine the construct validity of each question in the test. Table 5-23 below represents the results of the factor analysis on the mathematical competence test in the grade 9 test.

**Table 5-23: Results of the factor analysis in the grade 9 pre-test**

| Grade 9 (2016) | |
|---|---|
| **Number of factors** | **Question numbers** |
| **Factor 1** | 1, 2, 3, 4 & 5 |
| **Factor 2** | 5, 6 & 7 |
| **Factor 3** | 1 & 8 |
| **KMO** | 0,758 |

The factors resulting from the factor analysis differ from the initial combination of questions in the three clusters. The reason is that learners' performance in the questions compelled the questions into those specific factors. The factors relate to the degree of difficulty (cognitive demand) of the questions as experienced by the learners. The grade 9 test has construct validity and the generated data are valid to be analysed further. However, learners' levels of mathematical competence could no longer be determined using the clusters. This resulted in comparing each question in terms of learners' performance, i.e. the cognitive demand of the question.

#### 5.2.6.3 Comparison of learners' performance in the grade 9 test

As mentioned earlier in section 5.2.3, three groups formed part of this study (Fig 5-2). The intention was to determine the changes that occurred in mathematical competence between the following groups over time:

- SETH learners and non-SETH learners within each of the three groups at three intervals;
- SETH learners in each of the three groups at three intervals; and
- Non-SETH learners in each of the three groups at three intervals.

Refer to Figure 5-2 and Figure 5-3 for the procedure and compositions of these three groups.

The grade 9 mathematical competence tests were assessed and a mark between zero and three allocated for the correctness of the solution to each problem (§ 5.2.6 & Table 5-13). The test results were analysed statistically and the percentages of learners on level three displayed in the following tables:

**Table 5-24: The performance of the grade 9 (2016) learners in the Mathematics tests**

| Question number | Test | SETH | Non-SETH |
|---|---|---|---|
| **Question 1** | Pre-test | 78,6 | 63,5 |
| | Post-test | 92,9 | 62,2 |
| | Delayed post-test | 67,9 | 54,1 |
| **Question 2** | Pre-test | 78,6 | 54,1 |
| | Post-test | 71,4 | 70,3 |
| | Delayed post-test | 53,6 | 47,3 |
| **Question 3** | Pre-test | 57,1 | 35,1 |
| | Post-test | 82,1 | 56,8 |
| | Delayed post-test | 82,1 | 47,3 |
| **Question 4** | Pre-test | 14,3 | 6,8 |
| | Post-test | 35,7 | 24,3 |
| | Delayed post-test | 14,3 | 4,1 |
| **Question 5** | Pre-test | 39,3 | 23,0 |
| | Post-test | 60,7 | 31,1 |
| | Delayed post-test | 57,1 | 27,0 |
| **Question 6** | Pre-test | 42,9 | 35,1 |
| | Post-test | 42,9 | 41,9 |
| | Delayed post-test | 25,0 | 29,7 |
| **Question 7** | Pre-test | 14,3 | 1,4 |
| | Post-test | 10,7 | 5,4 |
| | Delayed post-test | 3,6 | 2,7 |
| **Question 8** | Pre-test | 7,1 | 8,1 |
| | Post-test | 35,7 | 24,3 |
| | Delayed post-test | 46,4 | 23,0 |

The SETH learners performed better in the post-test than in the pre-test except in questions two and seven. The SETH learners performed worse in the delayed post-test than in the pre-test in questions one, two, six and seven.

The non-SETH learners performed better in the post-test than in the pre-test except in question one. The non-SETH learners performed worse in the delayed post-test than in the pre-test in questions one, two, four and six.

The SETH learners performed better than the non-SETH learners in all the questions in all three tests except in question six of the delayed post-test and question eight of the pre-test.

#### 5.2.6.4 Learners' performance in the independent samples

Independent t-tests established the changes in mathematical competence between the SETH learners and non-SETH learners. The tests were done for the pre-test of both samples, the post-test of both samples, and then for the pre-test and the delayed post-test of the grade 9 (2016) sample. Table 5-25 displays these results.

**Table 5-25: Results of the independent t-tests for grade 9 (2016) in the pre-, post-and delayed post Mathematics test**

| Test | Cohort | Mean | Standard deviation | Sig (2-tailed) | Effect size |
|---|---|---|---|---|---|
| **Pre-test** | SETH | 13,52 | 3,45 | 0,00 | 0,74 |
| | Non-SETH | 9,99 | 4,74 | | |
| **Post-test** | SETH | 15,07 | 4,15 | 0,00 | 0,58 |
| | Non-SETH | 11,84 | 5,62 | | |
| **Delayed post-test** | SETH | 15,82 | 3,68 | 0,00 | 0,72 |
| | Non-SETH | 12,47 | 4,66 | | |

The SETH learners had a higher mean in the **pre-test** (M = 13,52; SD = 3,45) than the non-SETH learners (M = 9,99; SD = 4,74). This difference was statistically significant: *t* (65,45) = 4,03, $p = 0{,}00$ and presented a medium-sized effect, which could be practically significant (*d* = 0,74). This initial difference between the two cohorts was accounted for statistically to enable further investigation.

The SETH learners performed better in the **post-test** (M = 15,07; SD = 4,15) than the non-SETH learners (M = 11,84; SD = 5,62). This difference was statistically significant *t* (67,53) = 3,11, $p = 0{,}00$ and presented a medium-sized effect, *d* = 0,58. This could be a possible indicator of practical significance.

The SETH learners performed better in the **delayed post-test** (M = 15,82; SD = 3,68) than the non-SETH learners (M = 12,47; SD = 4,66). This difference was statistically significant *t* (90) = 3,37, $p = 0{,}00$, presented a medium-sized effect, *d* = 0,72 and could be of practical significance.

#### 5.2.6.5 Learner's performance in the dependent groups

Paired t-tests established the changes in the mathematical competence of the SETH cohort in each of the tests and those of the non-SETH cohort in each of the tests. The test was done for the pre- and post-test, and then for the pre- and delayed post-test of the grade 9 (2016) sample. Table 5-26 presents these results.

**Table 5-26: Results of the dependent t-tests for grade 9 (2016) in the pre-, post-and delayed post Mathematics test**

| Cohort | Test | Mean | Standard deviation | Sig (2-tailed) | Effect size |
|---|---|---|---|---|---|
| **SETH** | **Pre-test** | 13,52 | 3,45 | 0,02 | 0,35 |
| | **Post-test** | 15,00 | 4,22 | | |
| | **Pre- & delayed post-test** | 13,52 | 3,45 | 0,00 | 0,60 |
| | | 15,74 | 3,73 | | |
| **Non-SETH** | **Pre-test** | 9,73 | 4,56 | 0,00 | 0,43 |
| | **Post-test** | 12,08 | 5,48 | | |
| | **Pre- & delayed post-test** | 10,11 | 4,78 | 0,00 | 0,49 |
| | | 12,47 | 4,73 | | |

The SETH learners performed better in the **post-test**, (M = 15,00; SD = 4,22) than in the pre-test (M = 13,52; SD = 3,45). This difference was statistically significant, *t* (26) = -2,43, $p = 0{,}02$ and presented a small-sized effect, *d* = 0,35. However, this was of no practical significance.

The SETH learners performed better in the **delayed post-test**, (M = 15,74; SD = 3,73) than in the pre-test (M = 13,52; SD = 3,45). This difference was statistically significant, *t* (26) = -3,57, $p = 0{,}00$ and presented a medium-sized effect, *d* = 0,60.

The non-SETH learners had a higher mean in the **post-test** (M = 12,08; SD = 5,48) than in the pre-test (M = 9,73; SD = 4,56). This difference was statistically significant, *t* (65) = -4,27, $p = 0{,}00$ and presented a medium-sized effect, *d* = 0,43, which could be an indicator of practical significance.

The non-SETH learners performed better in the **delayed post-test** (M = 12,47; SD = 4,73) than in the pre-test (M = 10,11; SD = 4,78). This difference was statistically significant, *t* (61) = -4,64, $p = 0{,}00$, presented a medium-sized effect of *d* = 0,49 which could be practically significant.

The subsequent section describes the analysis of the questions in the grade 9 mathematical competence test.

#### 5.2.6.6 Analysis of the questions in the grade 9 mathematical competence test

Each of the questions was initially analysed regarding its knowledge level (CAPS curriculum), competency cluster and required proficiency level (cf. Addendum 7.9.). Due to the results of the statistical analysis, the questions are discussed further in terms of learners' performance and the knowledge level of the questions, and not in terms of the three competency clusters and the level of mathematical proficiency as initially planned. The questions are analysed and discussed according to the factors that emerged from the factor analysis (section 5.2.8.2). Three factors surfaced in the grade 9 test. The specific questions are discussed and analysed in the following sections.

**Factor 1: Questions one to five**

In the discussion of learners' solutions in each question, the percentages refer to the post-test. Refer to Table 5-24.

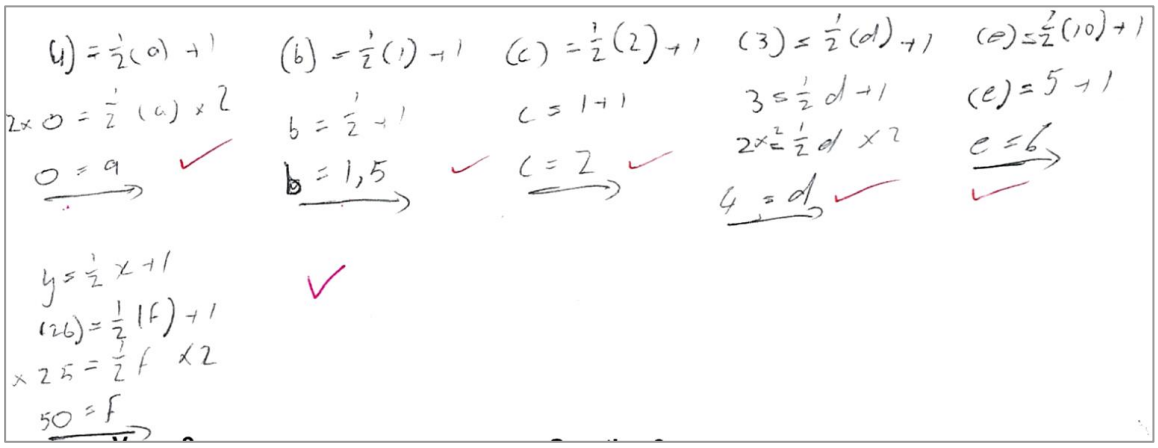
**Question 1:**

If the formula to solve for $y$ in the table below is given as $y = \frac{1}{2}x + 1$ , complete the given table.

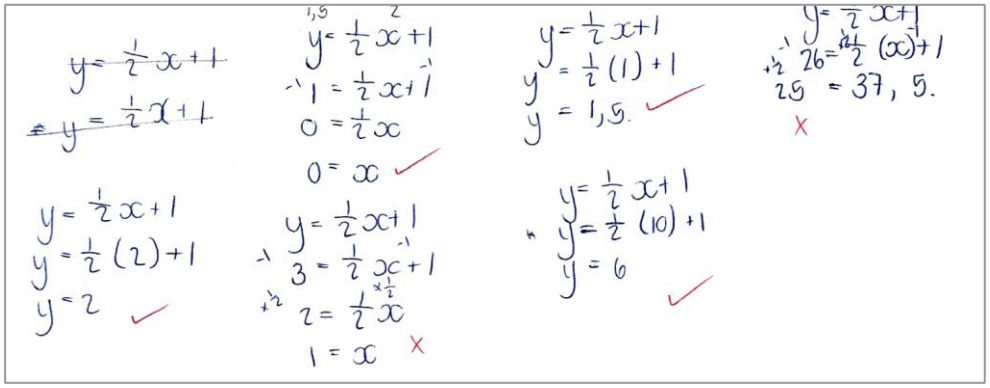
| $x$ | $a$ | 1 | 2 | $d$ | 10 | $f$ |
|---|---|---|---|---|---|---|
| $y$ | 1 | $b$ | $c$ | 3 | $e$ | 26 |

| Cognitive level (CAPS) | Competency cluster & proficiency level |
|---|---|
| **Level 2: Routine procedure**<br><br>The learner must determine the values for y when a value for x is given and the values for x when a value for y is given. Must know substitution and solving a linear equation | **Reproduction cluster – Level 1/2** |

**Learner S2**



**Learner L9**



Question 1 is an example of a routine procedure and on cognitive level 2. Learners had to find all six values to solve the problem correctly. Some learners made calculation errors as seen in learner L9's solution but learner S2 had a 100% correct solution. Therefore, due to their performance in this question, learners did not really experience this problem cognitively demanding.

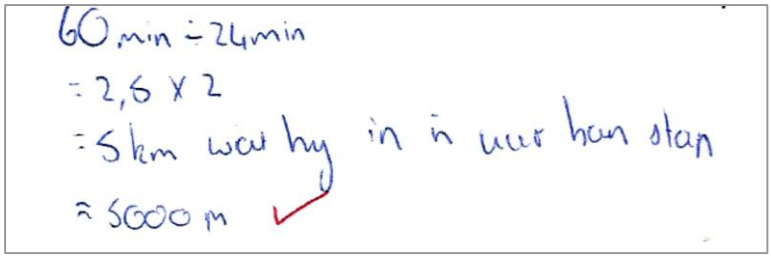
In the post-test, 92,9% of the SETH learners and 62,2% of the non-SETH learners had a correct solution for this question, i.e. a three on the problem-solving rubric. However, in the delayed post-test, these percentages drooped to respectively 67,9 and 54,1%.

**Question 2:**

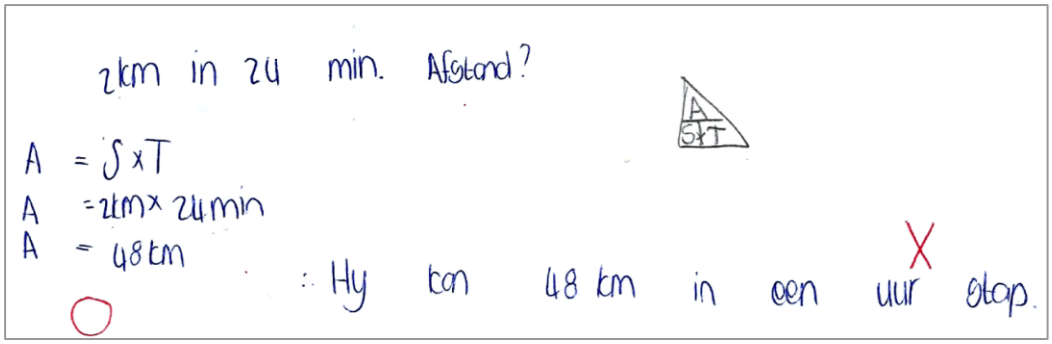
Brandon can walk 2 km in 24 minutes. How far will he be able to walk in one hour (in meters) at the same pace?

| Cognitive level (CAPS) | Competency cluster & level |
|---|---|
| **Level 2: Routine procedure**<br><br>The learner must convert km to m, determine the distance he can walk, and convert the answer to m/h | **Reproduction cluster – Level 1/2** |

**Learner L34**



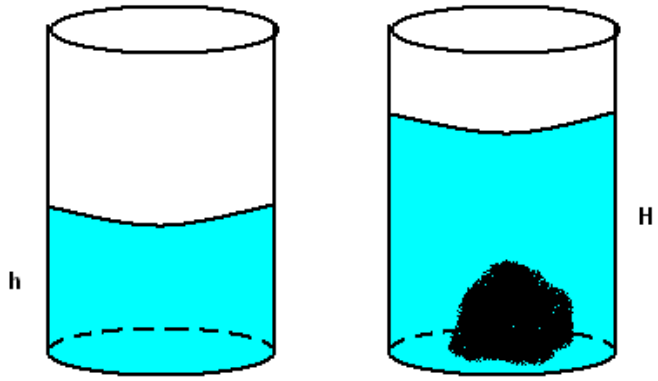

**Learner L9**




Question 2 is on level 2 and a routine procedure. Learner L34 obtained the correct distance. However, learner L9 failed in the attempt. This question was answered correctly by 71,4% SETH learners and 70,3% non-SETH learners in the post-test. Again, the percentages were lower in the delayed post-test (53,6 and 47,3). Common mistakes were conversion errors and neglect to write the answer in meters. This question did not have such a high cognitive demand regarding their performance in the question.

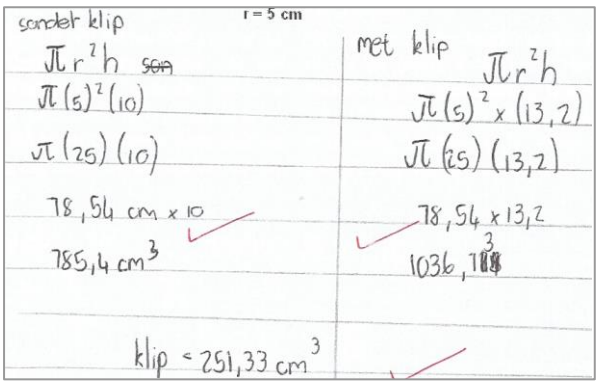
**Question 3:**

The height **h** of water in a cylindrical container with radius **r = 5 cm** is equal to **10 cm**. Peter must measure the volume of an irregularly shaped rock. He decides to place the rock inside the container filled with water. The height of the water inside the container rises to **H = 13,2 cm.** Calculate the volume of the rock in cubic centimeter.

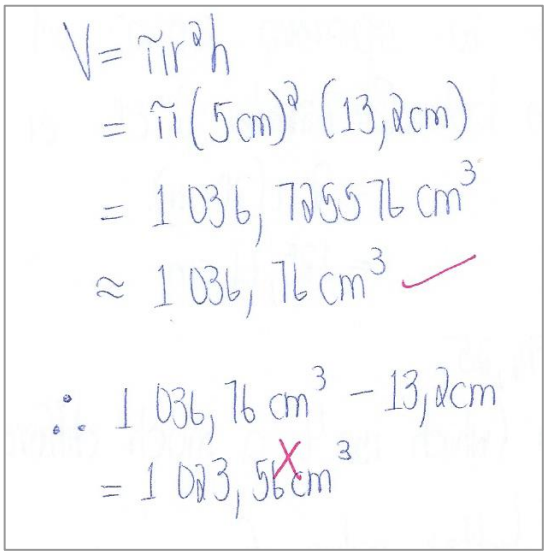



| Cognitive level (CAPS) | Competency cluster & level |
|---|---|
| **Level 3: Complex procedure**<br><br>The learner must model this situation regarding the volume of the cylinder without the rock and the volume with the rock. Determine the volume of the rock by subtracting the two volumes | **Connections cluster – Level 3/4** |

**Learner L34**




**Learner S11**




Question 3 is an example of a complex procedure, i.e. a level 3 problem and of higher cognitive demand. Learner L34 solved the problem accurately, but learner S11 did not determine the

volume of the cylinder without the rock. He, therefore, failed to determine the correct volume of the stone. Most learners solved the problem like learner L34. Some of the learners realised that the height increased by 3,2 cm and calculated the volume of the stone in one step. Other mistakes were: using the wrong formula for the volume of a cylinder, calculation errors, and not subtracting the volume of the water and stone from the volume of the water without the stone.

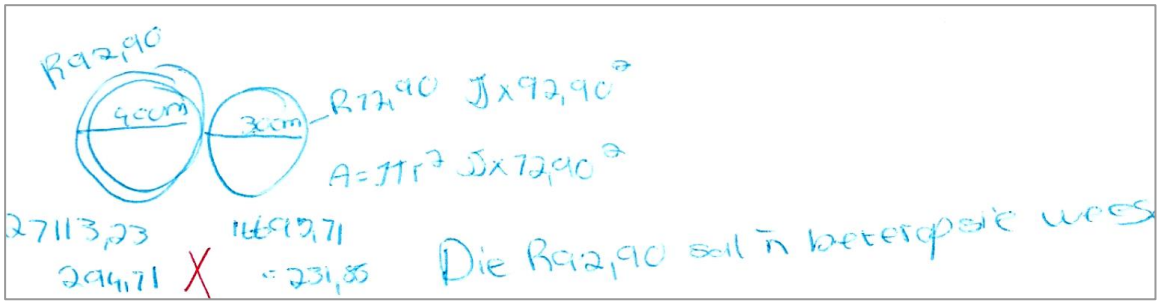
In the post-test, the average for this question was respectively 82,1% for SETH learners and 56,8% for the non-SETH learners. The SETH learners had a higher 82,1% in the delayed posttest but the non-SETH learners a lower 47,3%. Learners therefore did not experience this problem very challenging.

**Question 4:**

A pizza restaurant serves two round Hawaiian pizzas with the same thickness but different sizes (thus different areas). The smaller pizza has a diameter of 30cm and costs R 72,90. The larger pizza has a diameter of 40cm and costs R 92,90. Which of the two pizzas is better value for money? Show your reasoning. [Hint: R per area]

| Cognitive level (CAPS) | Competency cluster & level |
|---|---|
| **Level 3: Complex procedure**<br><br>The learner must determine the area of both pizzas, then determine the cost of each per square meter, and explain which one better value for money is | **Connections cluster – Level 3/4** |

**Learner S4**



**Learner S17**

S17.

**Vraag 4**

Panarotti's bedien twee ronde Hawaiian pizzas van dieselfde dikte in verskillende groottes (dus verskillende oppervlaktes). Die kleiner pizza het 'n deursnee van 30cm and kos R 72,90. Die groter pizza het 'n deursnee van 40cm en kos R 92,90. Watter een van die twee pizzas is beter waarde vir geld? Wys jou redenering.
[Wenk: R per oppervlakte]

**Question 4**

Panarotti's serve two round Hawaiian pizzas with the same thickness but different sizes (thus different areas). The smaller pizza has a diameter of 30cm and costs R 72,90. The larger pizza has a diameter of 40cm and costs R 92,90. Which of the two pizzas is better value for money? Show your reasoning. [Hint: R per area]

P1

$Opp = \pi r^2$

$= 3,14(15)^2$

$= 706,5.$

$706,5 \div 72,90.$

$= R9,69.$

Pizza 1 kos R9,69 per $cm^3$

Jy betaal R72,90 vir 706,5 oppervlakte

P2.

$Opp = \pi r^2$

$= 3,14(20)^2$

$= 1256$

$1256 \div 92,90.$

$= 13,52$

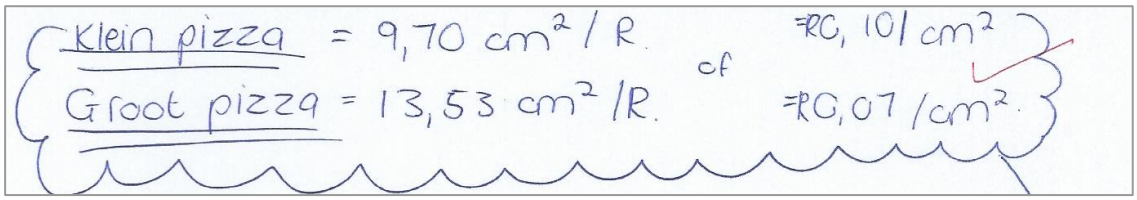
Pizza 2 kos R13,52 per $cm^3$

Jy betaal R92,90 vir 1256 oppervlakte.

R92,90 - R72,90 = R20

1256 - 706,5 = 549,5

Ek sal sê Pizza 2 sal beter waarde vir jou geld wees, want vir R20 meer kry jy 10cm pizza meer en ~~jou~~ die oppervlakte van die pizza styg met 549,5 $cm^2$ meer as Pizza 1 sin.



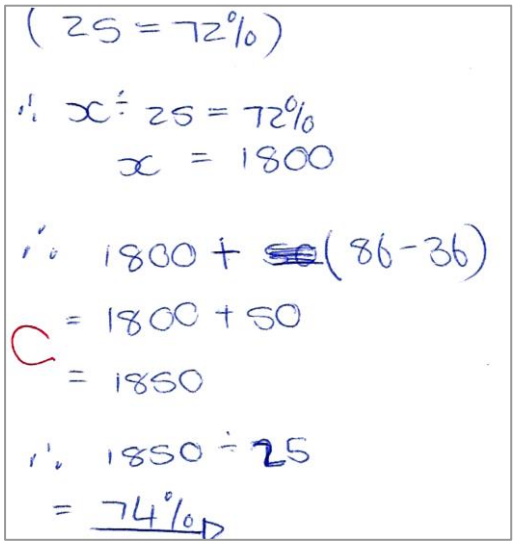

Question 4 is on level three and an example of a complex procedure. Learner S4 used the prices of the pizzas as radius and was unsuccessful. Learner S17 solved the problem correctly, but only realised in the end that the price should be in R/$cm^2$. Other mistakes were: using the diameter as the radius, determining the perimeter of the pizza despite the given hint, answering in the wrong unit. According to the percentages obtained for this question, i.e. 35,7% (SETH) and 24,3% (non-SETH), the learners found this problem challenging. The respective percentages in the delayed post-test were 14,3 (SETH learners) and 4,1 (non-SETH learners).

**Question 5:**

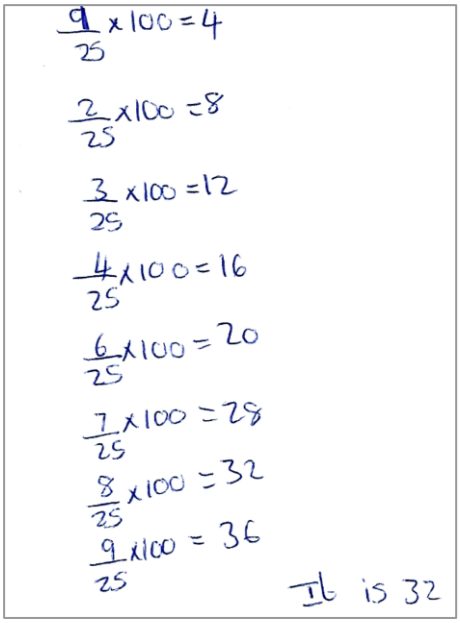
Mr Venter wrote down the test marks of his 25 learners in grade 9. He used these marks to calculate an average of 72%. Sandra's mark of 86% was incorrectly marked as 36%. What is the correct average of the test mark now?

| Cognitive level (CAPS) | Competency cluster & level |
|---|---|
| **Level 2: Complex procedure**<br><br>The learner must determine the total mark of the learners, subtract the wrong mark, add the correct mark and determine the new average | **Connections cluster – Level 3/4** |

**Learner L38**




**Learner L57**



Question 5 is another example of a complex procedure and on level 3. Learner L38 got the correct answer, but learner L57 did not. Learners seemed unfamiliar with a percentage problem in this form, although they can solve common percentage problems. The language in the problem could contribute to their misunderstanding. The SETH learners got 60,7% in the post-test in this question and the non-SETH learners 31,1%. In the delayed post-test, the SETH learners scored 57,1% and the non-SETH learners 27,0%. Their performance points to not such a high cognitive demand.

**Factor 2: Questions five, six and seven**

Question five formed part of factor one as well and is not shown again.

**Question 6:**

A sea lion must breathe even while it sleeps. Martin watched one for a whole hour. At the beginning of his observation, the sea lion dived to the bottom of the ocean and slept. After 8 minutes, it started to float slowly to the surface to breathe. After 3 minutes, it was back on the bottom of the ocean, and the process is repeated the whole time similarly.

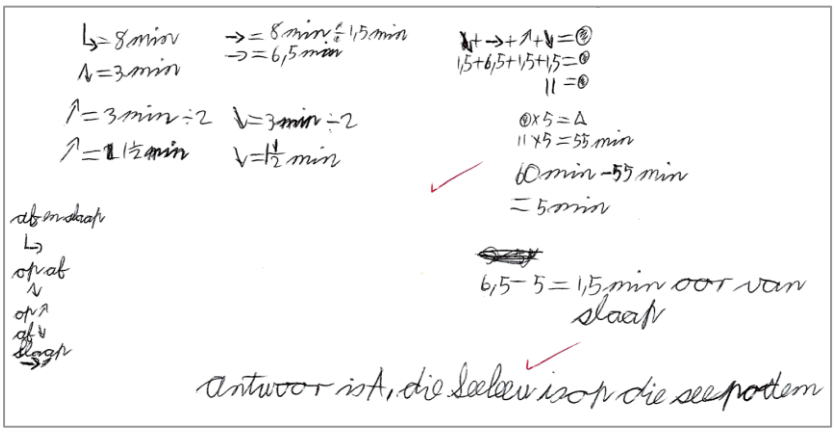
After an hour, the sea lion was:

A. On the bottom of the ocean
B. Busy taking a breath at the top
C. On its way, up
D. On its way, down

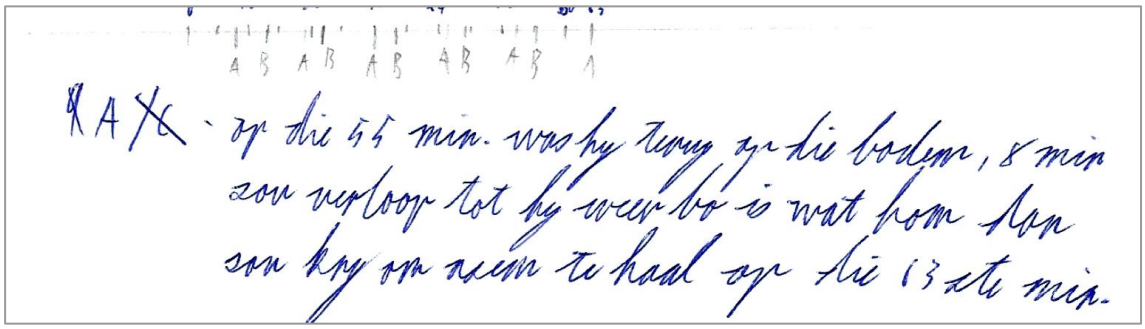
Report the correct answer (A-D) and show your reasoning.

| Cognitive level (CAPS)l | Competency cluster & level |
|---|---|
| **Level 2: Routine procedure**<br><br>The learner must in a logical way determine the position of the sea lion for the 8- and 3 min intervals during the 60 min of observation | **Reproduction cluster – Level 1/2** |

**Learner S22**



**Learner L17**



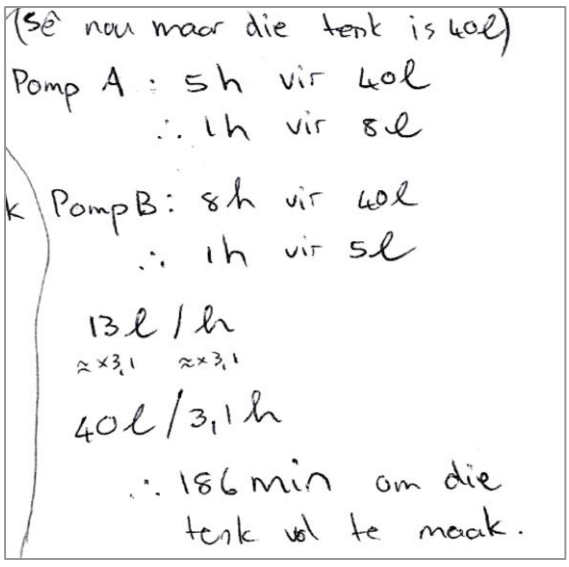

Question 6 is on level 2 and an example of a routine procedure. Learners S22 and L17 in the above exemplars, managed to reason logically to find the correct solution. Many learners guessed what the answer should be without showing any reasoning. Other learners did not attempt the question at all. The much lower scores in this question in the post-test shows that the learners found it challenging (SETH 42,9% and non-SETH 41,9%). Furthermore, these percentages dropped to respectively 25,0 and 29,7 in the delayed post-test

**Question 7:**

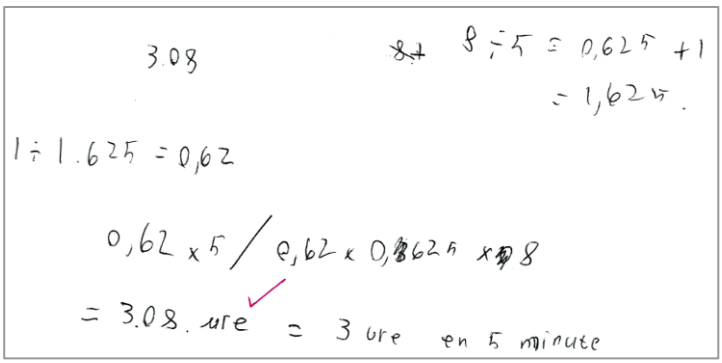
Pump A can fill a tank with water in 5 hours. Pump B can fill the same tank in 8 hours. How long will it take to fill up the tank if both pumps work simultaneously? (Round your answer to the nearest minute).

| Cognitive level (CAPS) | Competency cluster & level |
|---|---|
| **Level 3: Problem-solving**<br><br>The learner must model this situation regarding the combined rates of the two pumps, determine this rate and answer to the nearest min | **Reflection cluster – Level 5/6** |

**Learner S22**




**Learner L43**



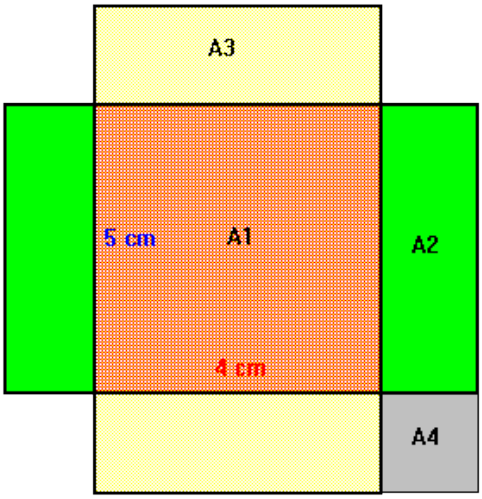
Question 7 was the most challenging question with SETH learners' 10,7% and non-SETH learners' 5,4% in the post-test. Matters were worse in the delayed post-test: 3,6% for the SETH learners and 2,7% for the non-SETH learners. This question has a high cognitive demand since it is of a problem-solving nature (level 4) which learners normally find challenging. Learners S22 and L43 were two of the few learners who tried the problem and solved it correctly. Many learners did not try the problem at all, those who tried, did not realise that they should determine the combined rate of the two pumps.

**Factor 3: Questions one and eight**

Question 1 formed part of factor one as well and not shown again.

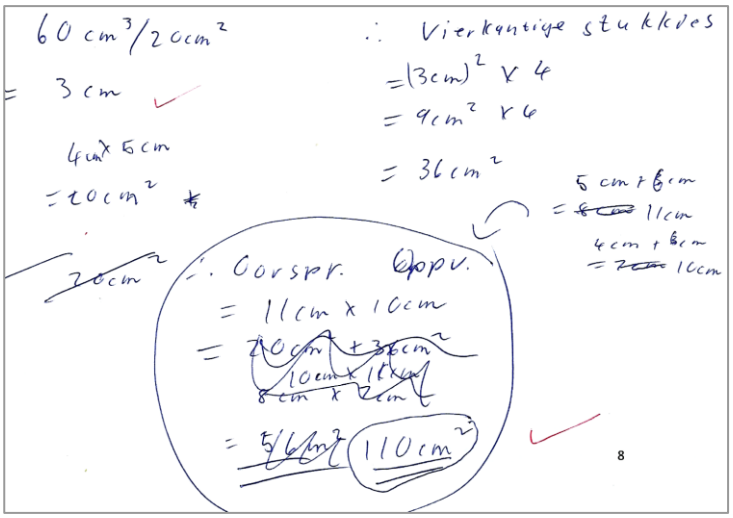
**Question 8:**

Four small square pieces of wood are cut out of the four corners of a rectangular piece of wood. The wood is then used to make a box. The volume of the box is 60cm$^3$. The length is 5cm and the breadth 4cm. Calculate the original area of the piece of wood (before anything was cut out.

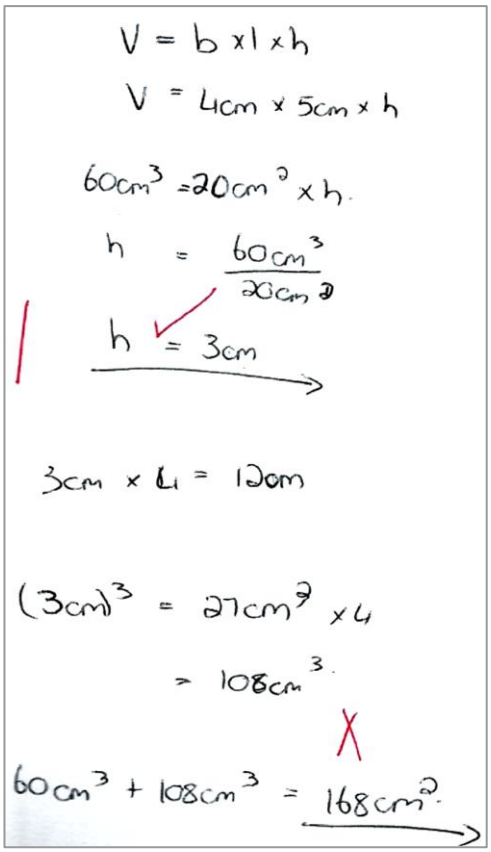



| Cognitive level (CAPS) | Competency cluster & level |
|---|---|
| **Level 4: Problem-solving**<br><br>The learner must determine the height of the box, realise that this is the length of the pieces cut out, find the length and breadth of the wood, and determine the area of the original piece of wood | **Reflection cluster – Level 5/6** |

**Learner L56**




**Learner S10**




Question 8 is also an example of problem-solving, a level 4 problem. Learner L56 got the correct answer, 110 $cm^2$. Learner S10 managed to find the height of the box, but not the area of the original piece of wood. Most common difficulties were: learners did not grasp that the length of the pieces cut out, is the height of the box, they did not add the various lengths correctly to determine the length and the breadth of the wood to find its area. In this question, the average for the SETH learners in the post-test was 35,7% and 24,3% for the non-SETH learners. In the delayed post-test, the SETH learners scored 46,4% and the non-SETH learners 23,0%. These results confirm the high level of cognitive demand experienced by the learners.

**In conclusion:**

Learners' mathematical competence was investigated over time to determine how mathematical competence enhances in a problem-solving learning context (cf. §4.3). The following changes were observed: This cohort of SETH learners showed continuous improvement in their mathematical competence throughout the investigation. Their mathematical competence improved from the pre-test to the post-test, and from the post-test to the delayed post-test. Similarly, the non-SETH learners also showed improvement throughout the empirical investigation, although their performance was lower than those of the SETH learners in all three tests.

## 5.3 Qualitative data analysis and interpretation

The qualitative data generation and analysis followed those of the quantitative data. The following measuring instruments were used to obtain qualitative data: two open-ended questionnaires completed by the SETH learners, task-based interviews with 24 SETH and non-SETH learners, and individual interviews with the four participating Mathematics teachers. These measuring instruments are analysed, interpreted and discussed in the next sections.

### 5.3.1 Analysis of the SETH questionnaires

The SETH learners completed two different open-ended questionnaires: questionnaire one at the end of the first year and questionnaire two ten months later in the following year. Refer to Addenda 9.1 and 9.2 for these questionnaires. The questionnaires intended to determine learners' experiences, feelings, and challenges, regarding their involvement in the SETH Academy and specifically the Mathematics related activities. To ensure the learners' anonymity, the grade 8 learners were allocated the codes 81, 82, and onwards, while grade 9 learners received a 91, 92, and onwards.

#### 5.3.1.1 The first SETH questionnaire

A total of thirty-seven grade 8 SETH learners and a total of twenty-eight grade 9 SETH learners (N = 65) completed this questionnaire at the end of the first year of the empirical investigation. The purpose was to obtain feedback from the learners on their experiences of the SETH Academy. Two major themes emerged from the data analysis executed on ATLAS.ti™: SETH experience and Mathematics worksheets. A discussion of these themes follows in the next section.

**Theme 1: The SETH experience**

There was a need to determine learners' experience of the SETH Academy to improve the quality of the various interventions continuously. Sub-themes of this theme were involvement, enjoyment, challenges and performance (in Mathematics and in general). Figure 5-6 shows the coding structure for the SETH experience.

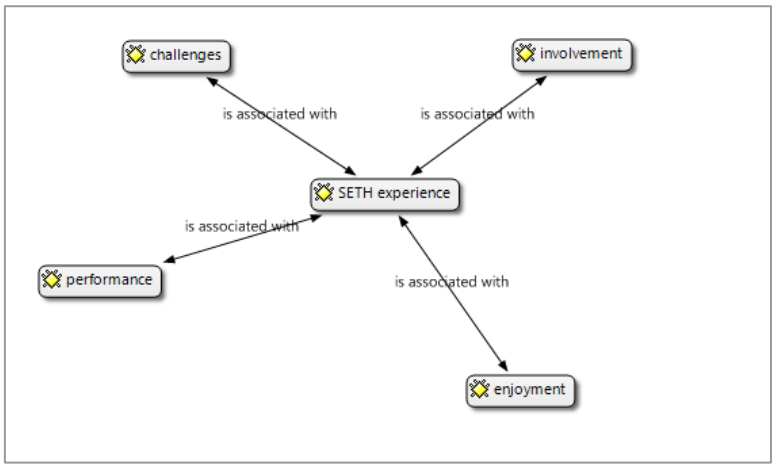



**Figure 5-6: Coding structure for the participants' responses to their experiences of the SETH Academy**

**Sub-theme 1: Challenges**

Learners mentioned many challenges, but the main one was the Mathematics worksheets. Three of the learners commented as follows:

> *The maths worksheets are really challenging and really push you to your limit. It is nice to think on a different spectrum from the maths we do at school, but sometimes the questions are so hard that it sometimes seems impossible to solve them. The facilitators don't explain properly. Therefore, you end up not even understanding the work. (922)*

> *The Mathematics worksheets were a hassle for me. Most of the questions in these worksheets always either left me perplexed or frustrated. It was a struggle for me to comprehend and solve the problems, but after a while, I got used to finishing the questions on the first page without much of a hassle. (85)*

> *The Mathematics worksheets, because it is boring, and I would rather do the math at home. (828)*

The reading sessions seemed to be a challenge to many learners as observed in the following comments:

> *Reading, because the topics we chose were totally different to the actual reading piece that we got. I really love reading but not the way we had to. (810)*

> *The scholastic reading, don't get me wrong, I love reading books, etc., but I feel the topics we get are too bland and not very interesting. (813)*

> *The reading because I get the same level-score every time and I found out that I get the same reading passages even if I change the topic. (26)*

Another challenge was the time factor. The SETH interventions are after school and learners commented honestly about this challenge. Some responses are:

> *It takes a lot of time. Now that the sessions only take place on Mondays it is much better! Sometimes we do not feel like SETH because we are tired and know that we still have much work to do after SETH. (831)*

> *Sometimes after school, we have a lot of homework and a test to study for, but the session cannot be postponed because the arrangements have already been made. (917)*

> *The maths and reading sessions. The reading material is super boring and totally not interesting. It's outdated, and that really makes it difficult for me to read it enthusiastically. The format of the maths papers is boring. (91)*

> *To learn for a test when we have SETH. (824)*

Furthermore, learners mentioned people-related challenges as shown in the following comments:

> *Interacting with other people. Being an introvert prevented me from working, laughing and communication with others. (816)*

> *When we do group work, I like to have a fair say, but there's always someone who tries to speak over or for me. (912)*

> *I never really thought of this question, but my biggest challenge in SETH is the people (learners) that are in SETH. (915)*

> *Listening to people like lectures. (83)*

In summary, learners' most significant challenges were: The Mathematics worksheets, aspects related to people and time, and the reading activities.

**Sub-theme 2: Involvement:**

Learners gave exciting feedback related to their involvement in the SETH Academy.

> *My journey with the SETH-academy has been extraordinary although there are times when I feel as though the lessons are unnecessary and not beneficial but overall, I have learned quite a lot of knowledge from my involvement with SETH. (914)*

> *The SETH academy is full of opportunities that other people do not have or get! SETH is a nice program even though sometimes I find it tiring and boring, but it's nice. (915)*

*Some sessions were great sessions, but some sessions were boring. I'm not complaining or anything I know that we are all different and have different gifts and interest. SETH academy is a wonderful program because it helps us see what we like and what we don't like, so we can develop ourselves, the leaders of tomorrow. (927)*

*SETH was very interesting to me despite the times I found some sessions to be boring and frustrating. I really learned so much and acquired so many skills. It was an awesome experience, and I'm glad to have joined the SETH program as most of the sessions I attended were eye-opening. (85)*

*There were good times and bad times. I think SETH is a very good program, but it has its advantages and its disadvantages. Much progress has been made in different types of things in life that has influenced me! It was very enjoyable to be part of SETH. (827)*

A few learners indicated that they do not wish to remain part of the SETH Academy, but the majority answered yes to this question. A few responses follow:

*No, because we will be having two sessions, and, in those sessions, we will just be doing the same things every time we go to SETH, but also when I hear about the plans SETH has for us, I'd want to remain a part of the SETH. (91)*

*If it stays the same, No. The lessons are very long and time-consuming. If the lessons are shorter and have more diversity, then yes. (92)*

*Yes, I enjoyed it a lot, and I've learned so many new things that I wouldn't have learned otherwise. It also helped to make links between what we do in SETH and what we do in school. (96)*

*Yes! Exposure! SETH exposes us to new things and challenges we face in our everyday life and builds us, as we are the future of this world. (913)*

*Yes, because it is something unique. (88)*

**Sub-theme 3: Enjoyment:**

From learners' responses, it was evident that many of them enjoyed practical sessions, excursions, Mathematics, music and the Comair trip the most. Some of their comments are listed below:

*Our practical sessions, when we move around and build things, we learn a lot and its buckets of fun! At these lessons, we learn and have fun (e.g. river walking, building flashlights). (813)*

*Our agricultural, insects and water sessions as well as the business game that we had. I liked it because it was more interactive sessions. (817)*

*The Comair visit, we could understand more about planes, and we touched planes, and we flew them. (812)*

*If we go on excursions or when we do practical activities. I like the excursions because I like to see how things are done in real-life. I like the practical's where we can do and see things for ourselves (96)*

*Music and maths. It shows how almost everything has math in it. (81)*

On the other hand, the least enjoyable activities were completing the Mathematics worksheets (mentioned under challenges), reading (under challenges too), and factors related to human nature such as listening, sitting still, concentrating and communicating with others. Some comments follow:

*The ones where we must sit in a room 90% of the time and do nothing but always listen. (88)* and *when we must sit still and listen to the professors speak the whole time without doing anything practical. (89)*

*The ones in the classroom because most of the time they speak Afrikaans, and I get the info later, and I get bored, tired and sleepy. (811)*

*The scholastic reading, don't get me wrong, I love reading books etc., but I feel the topics we get are too bland and not very interesting. (813)*

*I am not a good listener so basically, I do not enjoy sessions where I will have to sit in the same spot and listen for hours. (816)*

**Sub-theme 4: Performance:**

The fourth sub-theme under SETH experience is learners' performance related to Mathematics and in general. One of the aims of the SETH Academy is to improve learners' Mathematics achievement to prepare them for tertiary education in Mathematics related subjects. It was, therefore, important to obtain the learners' views on this important aspect. Some of them responded in the following manner:

*Not really on my Mathematics, but on my performance in general, yes. I sometimes used the skills and information I learned from the SETH sessions in the classroom, and it sometimes helped improve my marks. (85)*

*No, my marks dropped anyway (89)* and *No, not really. Everything is the same. It's just time-consuming on days that I have sports, and that's important to me. (92)*

*Yes, it did, SETH gave me a new approach/outlook on matters in life, not only did it improve my marks, it changed me, Thanks, SETH, You rock! (813)*

*Yes, I won't lie but SETH has changed the way I see Maths. It has taught me to have a positive outlook on Maths. (91)*

*I think so, it helped me to understand it better, and it had an influence on my performance. (911)*

**Theme 2: The Mathematics worksheets**

The Mathematics worksheets came forth as a second main theme during the analysis process. This theme is discussed in the subsequent section. Figure 5-7 shows the coding structure for the theme Mathematics worksheets. The first sub-theme is learners' experience regarding them.

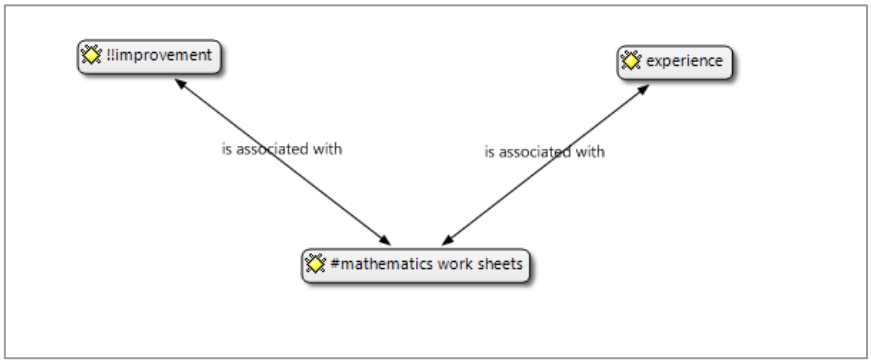



**Figure 5-7: Coding structure for the participants' responses to their experiences of the Mathematics worksheets**

**Sub-theme 1: Learners' experience**

Learners had to complete Mathematics worksheets during every SETH session. They had mixed feelings about the worksheets and their value as illustrated by a few comments:

*Although they are hard and difficult to understand, I honestly feel like they have a positive impact on us. (88)*

*I found it frustrating when I kept on getting a question wrong because I do not know how to solve it. (811)*

*In the beginning, it was not nice. But I feel it helped me to solve problems and tackle the new ones. Some worksheets were a bit difficult, but it was fun to solve them. Sometimes it was upsetting to me to have solved the problem but still not understand why. (96)*

*Regarding the Math worksheets, I personally think that they are difficult, but at the end, we seem to get the answers correct with assistance from the students. These worksheets 'wars us up' for exam and school. But sometimes these worksheets are way too long. (913)*

*I feel the Math worksheets are too difficult for grade 9 it is also very difficult to have so much math at school only to have more in our afternoons which is probably the reason for my attitude toward the Math Worksheets. They are also too technical, and one must concentrate to solve them. (918)*

**Sub-theme 2: Improvement of the Mathematics worksheets**

The purpose of this questionnaire was to determine learners' views and experiences of the Mathematics worksheets to improve the Mathematics interventions. It was thus important to hear from the learners how the worksheets can be improved. Responses included: 'I do not know, they are ok, make them easier, make them more challenging, include an example first, and ask questions more clearly'. A few interesting responses are shown:

*Well first they should be made shorter so that its possible for us to finish them. Because we often get a Math worksheet over ten pages which we most of the time don't even finish, which on the other hand it's also a waste of paper. We should mark the whole worksheet before we move on to another worksheet, so that's everybody knows where they're made a mistake because some learners are too shy to ask the students for help. (913)*

*I think that our Mathematics problems should relate to something learners of "our" standard can understand and that they should correlate with the work we do in school, but they must be a bit harder to give us a challenge. (917)*

*They are very challenging, I enjoy challenges, they are difficult from school papers. They are the best Math worksheets I've ever done because you see where Math is applicable in real life, they don't just ask sums and formulas. (927)*

*I think you should do more and more worksheets. Practice and practice often. This will help develop your brain. You must try harder each time. It's not always fun but you will reap the rewards if you work hard. (827)*

*It must stay hard but, just of the work we have done or are busy doing. (820)*

**Conclusions:**

This first questionnaire provided interesting information and valuable feedback regarding learners' experiences of the SETH Academy. In conclusion, the following comments:

- The Mathematics sessions and worksheets of 2016 did not have the expected results, but this has since been addressed;
- Learners value practical activities, excursions and activities where they are actively involved and not only expected to be observers;

- Many of the learners believe that most of the SETH activities are enriching, helpful and valuable, and that they would prefer to remain part of it even if their marks do not really improve;
- The reading material and activities need to be reconsidered and adjusted to suit the needs and expectations of these learners.

In the next section, the responses in the second SETH questionnaire are analysed and discussed.

#### 5.3.1.2 The second SETH questionnaire

The second questionnaire was administered approximately ten months after the first one during the second year of the empirical enquiry (2017). The intent was to receive feedback from the SETH learners on their experiences of the Mathematics sessions. Since the first questionnaire, the approach to the Mathematics sessions changed from completing difficult and lengthy Mathematics worksheets (exercises) to interactive problem-solving activities that the learners seemed to enjoy and value more. A total of 39 grade 8 learners and a total of 24 grade 9 learners (N = 63) completed this questionnaire. Two major themes arose from the analysis of the responses on ATLAS.ti™: Mathematics sessions and Mathematics as the subject. Participants' responses to the second questionnaire are hereafter discussed according to these central themes.

**Theme 1: The Mathematics sessions**

The SETH learners have one approximately three-hour Mathematics session per month during the term. This session is on a Monday afternoon from 14:15-17:00, half an hour after school. During this session, they complete interactive, real-world problems related to their school work. The sessions aim to improve learners' problem-solving skills, to assist them to work cooperatively and to utilise technology to assist them during problem-solving. Figure 5-8 shows the coding structure for the theme Mathematics sessions. Five sub-themes arose from the analysis on ATLAS.ti™. They are challenges, enjoyment, frequency, technology, and the improvement of the sessions. Each sub-theme is discussed hereafter.

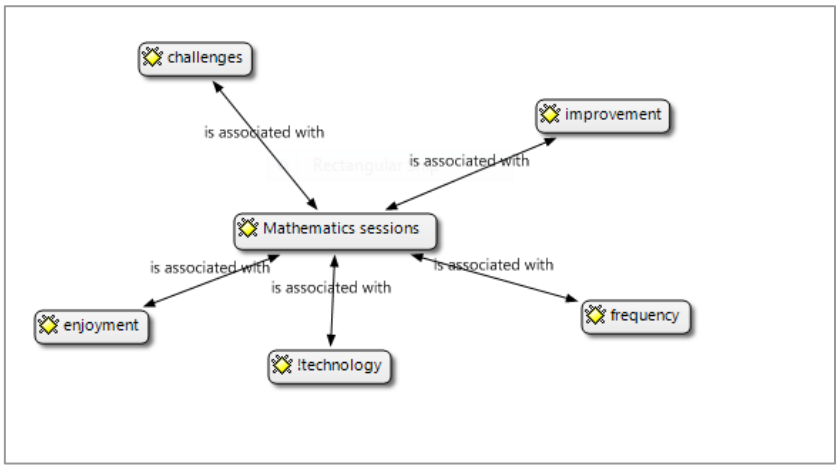



**Figure 5-8: Coding structure for the participants' responses to their experiences of the Mathematics sessions**

**Sub-theme 1: Challenges encountered in the Mathematics sessions**

The SETH learners are knowledgeable and gifted and selected based on their academic achievement. They, however, experience certain challenges in the Mathematics sessions as indicated by a few of their responses:

> *The activities can be quite difficult so answering the questions is a bit challenging. I also fail to understand what is being said - sometimes. (922)*
>
> *Some of the overly difficult Math problems we encounter, but it is extremely fun to find new solutions in the end. (921)*
>
> *To remain focused and to take part in the conversation, since I am very uncertain about my mathematical abilities. (918)*
>
> *What I find the most challenging is working in pairs or groups because I get nervous and scared that I may not be smart enough to their level. (917)*
>
> *The word sums. (81 & 82)*
>
> *The geometry. (87)*
>
> *Finding the answers when there is a prize. I get very nervous, and I can't think fast during that period when I know I am working for something against other people and their speed in thinking. (810)*

**Sub-theme 2: Enjoyment of the sessions**

Learners mentioned specific aspects of Mathematics that they enjoy most such as: problem-solving, algebra, and word problems as indicated by the following responses:

*I enjoy problem-solving. (814 & 815)*

*I love the brain teasers. (812)*

*Geometry is the most difficult for me to understand. (813)*

*The interesting scenario's we are given that show the reality in all our math problems. The interesting computer-based programmes we use. The interesting teacher we have and his educated insight. (921)*

*When you finish the problems because you feel achieved like you reached your goal. (819)*

Activities that the learners enjoy least involve aspects of Mathematics and the presentation of the sessions. Here are a few comments:

*Word sums, constructions, explaining to the others how I got to the answer. (815)*

*Geometry. (818)*

*Interruptions when solving a problem or if working in groups my partner doesn't listen to my findings or understanding. (821)*

*Being put in a group. (922)*

**Sub-theme 3: Frequency of the sessions**

On analysis of the questionnaire, it was evident that most learners prefer that the number of sessions stays the same. Only a few opportunistic learners felt that there could be more sessions. A few of their responses are included:

*Um, I think I'm ok with the current number of math sessions we have now. Due to the Math sessions always identifying current Math troubles and providing solutions, if done too frequently there will be no more worthwhile problems to solve. (921)*

*Yes, one topic for each maths session is better than many topics on one day. (916)*

*Oh yes, they give more enlightenment and reason than at school, and it helps school maths in the process. (914)*

*No, I do not like maths. (839)*

**Sub-theme 4: Technology used during the sessions**

The fourth sub-theme under the Mathematics sessions is technology. Various forms of technology are used during the Mathematics sessions: computers and software packages,

projectors, smart boards, cell phones, plicker cards, and calculators. This is evident from the following responses made by learners:

> *Mr X found an app which takes all our answers, but it only gives multiple choice questions and then it draws up a graph to show what percentage of the class got the correct answer. (clicker) (810)*

> *Projectors, plicker cards, computers, white board. (814)*

> *Projectors to display on the board and earphones to translate Afrikaans to English. (819)*

> *Computers with new integrated programmes. Specific Math orientated programmes that make it easier to work with the scenarios given. A computer/picture grading system. (921)*

> Smartboard, computer. (836)

**Sub-theme 5: Improvement of the sessions**

Overall it seemed that the learners are satisfied with the Mathematics sessions at present. The approach in the sessions changed from the beginning of the year.

> *Nothing much, they're interesting. (93)*

> *I don't know what can be done, but I'm not enjoying them. (97)*

> *Regular breaks, even if it is only for two minutes. (so that we can drink water since we are not allowed to take water into the computer lab). (98)*

> *They could spend more time on word sums rather than algebra. (913)*

> *I enjoy math classes because of the teacher who teaches u. He makes it fun. But don't make the reflection time so long. (915)*

> *I do not feel like anything must be changed now cause all the sessions of this year have been amazing. (917)*

> *The Mathematics presenters may have to explain a little more thoroughly. Breaks can be a bit longer. Summaries of the work done can assist us in doing revision. It can be given at the end of each Mathematics session. Smaller groups of SETH pupils at a session. (823)*

> *Include mathematical games that include the work and helps us memorize it but is still fun. They should prevent it from being like a normal Maths class where you sit at your table and watch the teacher but should be something new and fun. (824)*

### Theme 2: Mathematics

Figure 5-9 represents the coding structure for the participants' views on Mathematics as subject. Two sub-themes emerged from learners' responses in theme two. They are views on the nature of Mathematics as school subject and ways in which the learners study, learn or practise Mathematics. Both sub-themes are analysed in the following section.

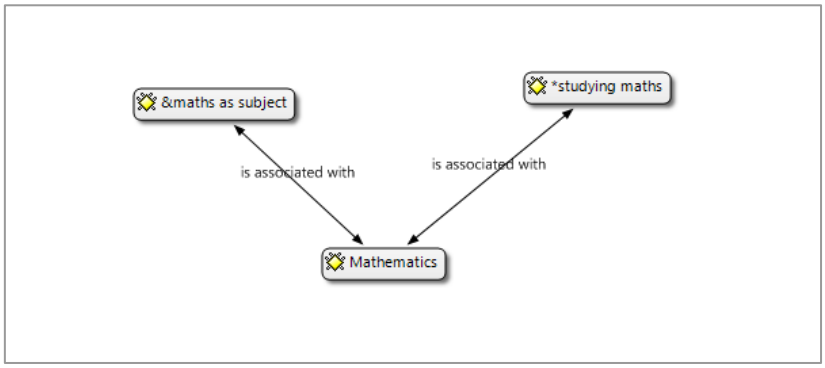



**Figure 5-9: Coding structure for the participants' responses on Mathematics**

### Sub-theme 1: Views on Mathematics

Learners had a variety of, and some interesting views on Mathematics as a subject as highlighted in their responses:

> *Challenging and boring. (89)*
>
> *A "common sense" subject I don't think Maths changes. You just need to think and use what you know and come up with ways to solve problems quicker and easier. (810)*
>
> *It is a very challenging subject, but it is very important as we use it in our everyday lives. (812)*
>
> *It is super challenging and mind-blowing, but once you get used to it and understand it, it becomes very interesting and helps in my everyday life. (917)*
>
> *The best; it's a subject which I enjoy in all of them. (813)*
>
> *It is a complicated subject, which needs a lot of focus and practice. But you must also have a right teacher that knows what he is talking about and who has no problem with explaining things repeatedly. But all in all, Mathematics is a difficult subject at times. (922)*
>
> *I would say that Mathematics is a challenging subject which needs one to focus always, it is full of problems which you need to solve. (814)*
>
> *Challenging. Math requires determination and participation as well as interest. (815)*

**Sub-theme 2: Studying Mathematics**

From learners' responses, it seems evident that they regard Mathematics as important and that they have specific ways in which they study, practise or learn for assessments. This ranges from revising the content, working through problems, completing self-tests, working through previous examination papers, and working through the examples in the book. A few comments illustrate this:

> *I practise sums in the book. (81)*
>
> *Work through old exam papers. Read from the book. (83)*
>
> *I study the laws and methods and then I do many exercises of everything. (84)*
>
> *I study a week before the test and go through all the work to make sure that I understand it. (834)*
>
> *I do the revision tests at the end of each topic. (923)*
>
> *By practising (over and over) the work, I must study. (922)*
>
> *Do all the activities we did in class on my own, and then mark them, assess and evaluate what I can do (shorter way) to avoid making the same mistake. (916)*

**Conclusions:**

Questionnaire two yielded interesting information related to the Mathematics sessions and learners' views on Mathematics. In conclusion, the following remarks:

- Many learners seem to enjoy the 2017 Mathematics sessions more than in 2016 and feel that the number of sessions is sufficient;
- A variety of technology is used during the sessions to enhance the learning experience;
- Some learners find word problems, geometry, and aspects of algebra challenging;
- Numerous learners view Mathematics as challenging and tedious, while others enjoy the subject and the challenges it offers; and
- Learners mostly learn Mathematics by studying the theory and formulas, working through examples, completing problems on their own, and working through previous examination papers.

In the subsequent section, the task-based interviews with learners are analysed and discussed.

### 5.3.2 Analysis of task-based interviews with learners

Task-based interviews were conducted to answer the third sub-question: *How can the mathematical competence and the study orientation of secondary-school learners be enhanced in a problem-solving learning context?* (§ 4.3)

Twenty-four task-based interviews were conducted with grade 8 (2016), grade 9 (2016) and grade 8 (2017) SETH learners (N = 14) and with grade 8 (2016), grade 9 (2016) and grade 8 (2017) non-SETH learners (N = 10). Each learner received a code at the onset of the empirical investigation: the letter S for a SETH learner followed by a numeral and the letter L for a non-SETH learner followed by a numeral. The 2017 grade 8 learners were allocated an 8S or 8L followed by a numeral.

The purpose of these interviews was to determine learners' views regarding their feelings and experiences during problem-solving and their problem-solving behaviour. There were six questions related to the mathematical competence tests learners completed earlier on. A specific problem in the test was chosen for each learner for which the learner then had to explain the specific solution strategy and the perceived view on the correctness of the solution (they did not receive their tests back afterwards). Refer to Addendum 10.1 for the interview schedule and Addendum 10.4 for the transcribed interviews. Once again, learners' responses were coded and analysed on ATLAS.ti™. Two major themes became apparent during the analysis process: problem-solving behaviour, and emotions related to problem-solving. The themes are discussed in the next section.

**Theme 1: Problem-solving behaviour**

Problem-solving behaviour, one of the fields in the SOM questionnaire, encompasses the following cognitive and metacognitive learning strategies: planning, self-monitoring, self-regulation, decision-making, and self-evaluation during mathematical problem-solving

(Maree et al., 2011; Steyn & Maree, 2003). (§ 3.4.6). Furthermore, the problem handling competency is one of the eight mathematical competencies described in the Danish KOM Project (§ 2.6.2) and named problem posing and solving in the PISA Mathematics Assessment Framework (§ 2.7.3) (Niss & Højgaard, 2011; OECD, 2013b).

These three concepts refer to the same aspect, i.e. problem-solving. Each of the five facets mentioned above emerged as sub-themes during the interviews. Figure 5-10 indicates the coding structure for participants' views on their problem-solving behaviour. Each sub-theme is discussed in the subsequent section.

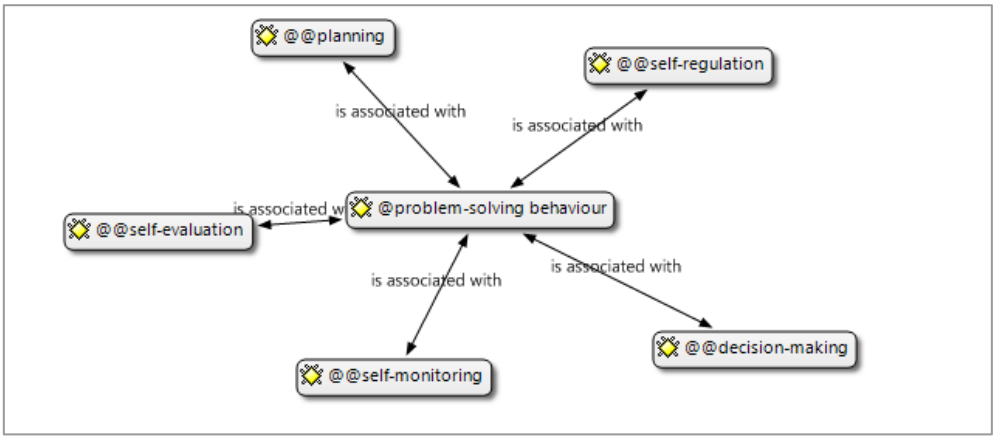



**Figure 5-10: Coding structure for the participants' views on their problem-solving behaviour**

**Sub-theme 1: Planning**

Planning plays an important role at the onset and during the problem-solving process. Polya's model for problem-solving (§ 2.5.2) typifies the four essential and useful steps: understand the problem, make a plan, carry out the plan, and look back (Schunk, 2012).

From learners' responses, it became evident that most of them commence by reading the problem well, often a few times until they understand the problem and know what is asked.

> Ek lees eers die vraag totdat ek heeltemal verstaan wat die vraag vir my vra. Dan skryf ek eers 'n algebraïese vergelyking as ek kan, en dan los ek hom op. (*I first read the question until I fully understand what the questions ask from me. Then I write an algebraic expression if I can, and then I solve it).* (L97)

> *I just read it through. I just read through it, mam.* (8S58)

> *Okay, the first thing I do is I just read through it to picture it in my mind so like if they give an example of a boy or something, I just imagine it so that I can get a realistic sense to know that like so I can relate to it more and then from there then I can start calculating in terms that I'll understand more.* (S24)

Once learners understand the question, they make a plan to solve it as voiced by the following learners. These plans entail: To write an equation, underline or write down the given, and visualise the problem. Here are quotes from some of the learners' responses:

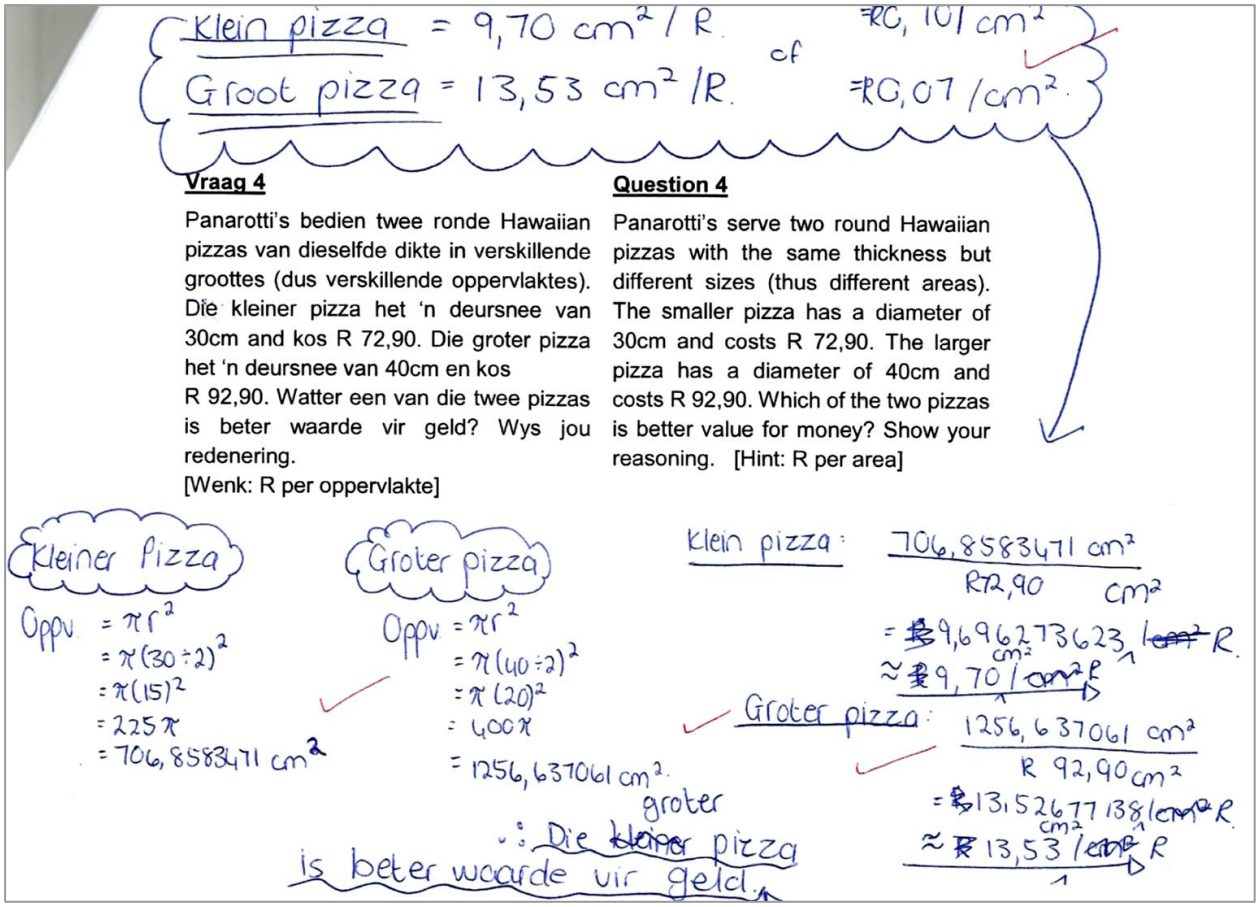
> *I try to see what is the easiest method to do it and then like I follow steps that I've learned in class and if it doesn't work out, then I don't know, I just do whatever is going to give me an answer that looks correct*. (L69)

*Well, I read the question and make sure that I understand and then most of the times I draw diagrams to understand the question better so ja.* (S20)

*Well, first I read the question, and then I try to make an image for myself like many times when they say to calculate the area of a rectangle it's 6 cm long, then I draw a picture for myself because it's easier for me to visualize and then write the question and then ja. I start from there.* (S14)

**Sub-theme 2: Self-monitoring**

The way in which learner S17 solved the pizza problem in Question 4 is an excellent example of self-monitoring.

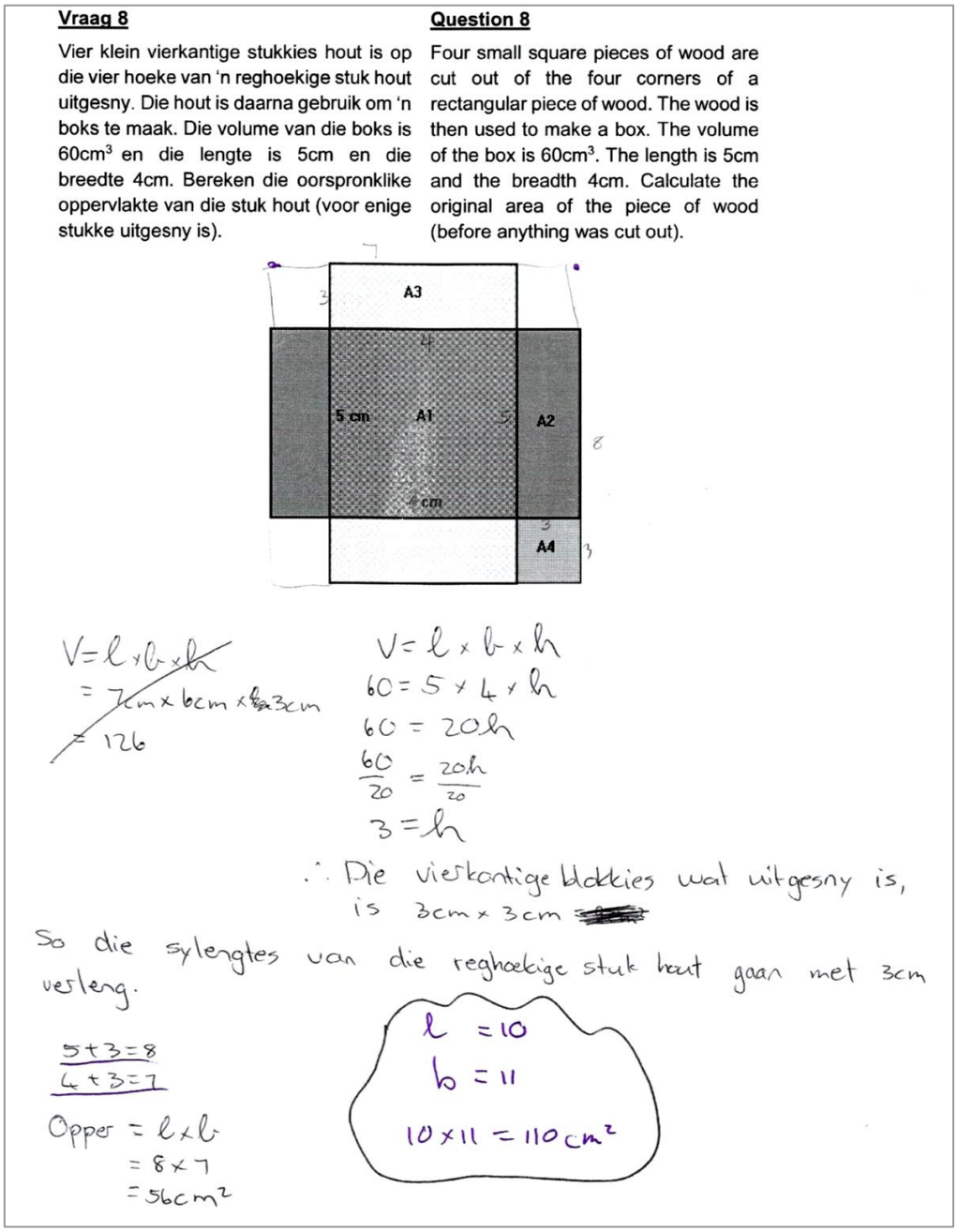



Hulle het die deursnee gegee en as jy die oppervlakte uitwerk, soek jy die raduis. So toe werk ek die oppervlakte uit en die oppervlakte het ek gedeel deur die prys van die pizza en dan kry jy hoeveel vierkante cm dit per rand was. En dan so kan jy uitwerk watse een duurder of goedkoper was. (*They gave the diameter, and if you calculate the area, you look for the radius. So then I calculated the area, and I divided the area by the price of the pizza, and then you find how many square meter per rand it was. So you can determine which pizza is more expensive or cheaper).*

The learner seemed confused (crossing out of some things) and was prompted about this with the following response:

> Ja, ek het toe ek my vraestel weer deurgaan na die tyd, toe maak hierdie nie vir my lekker sin nie. En toe kyk ek mooi en toe sien ek moes nie sê ek dink ek het eers gesê hoeveel cm kwadraat per R en dit moes andersom wees so toe skryf ek net die bo en doen dit oor. (*Yes, when I checked my question paper afterwards, this did not make sense to me. When I looked well, I saw that I said cm square per R and it had to be the other way around, so I wrote this on top and reworked it).*

Another example of self-monitoring is the solution of Question 8 completed by learner S22. The calculation in the bubble was done during the interview.

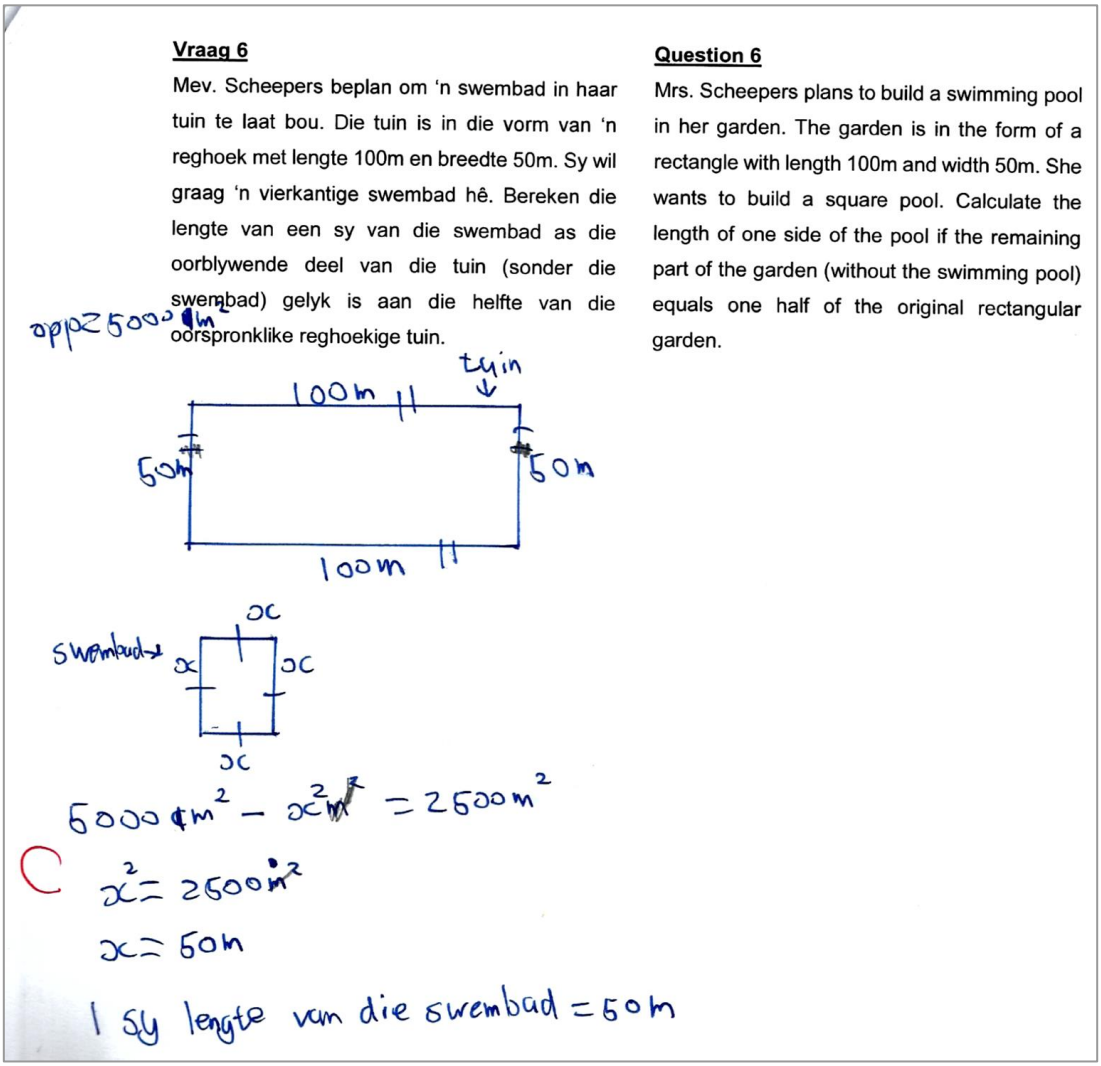


On the question why he used 5 + 3 = 8 and 4 + 3 = 7 to determine the area of the original piece of wood, the response was:

> Ok, sooo nou vang ek wat ek fout gemaak het, ek het net een blokkie bygetel in plaas van altwee. (*Okay, soooo now I see what I did wrongly, I only added one small block and not both of them)* (meaning 3 cm on the one side, but not on the other side too).

**Sub-theme 3: Self-regulation**

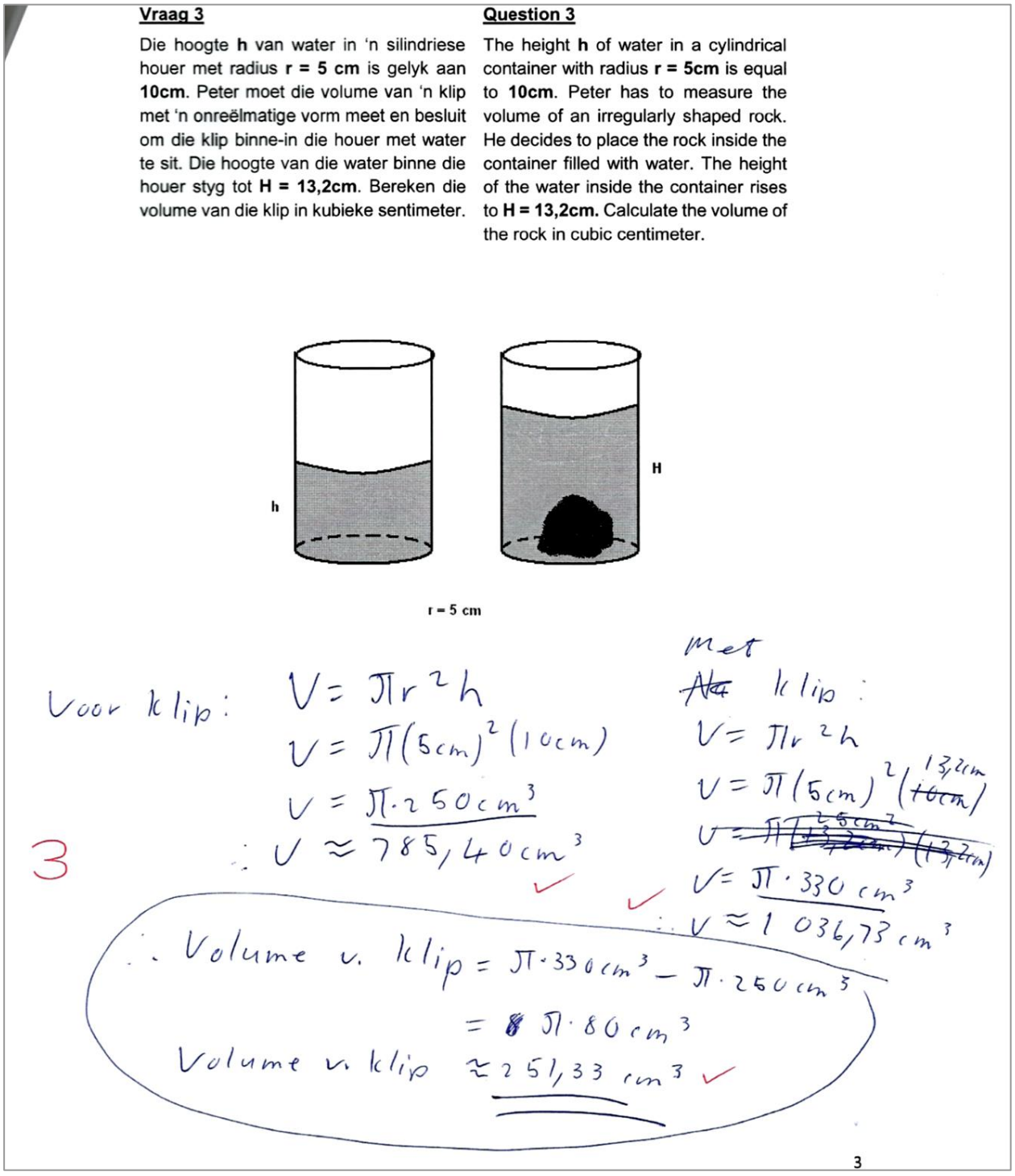
Learner 8L101 had to explain his self-regulation during his innovative solution to Question 6 regarding the swimming pool. His solution is included below:




*The swimming pool has to be a square. Well, first of all, if the area has to be 2 500 square meters with the length and breadth included and the remaining part of the garden equal to half of the original garden, then it means that the area is given by x squared. 5 000 meter square minus x square equals 2 500 square meters. If x square is 2 500 square meter, then x is 50.*

Being asked why x is 50, he responded: *Because the square root of 2 500 is 50. This says that the length of the swimming pool is 50.*

Another example of self-regulation is the response of learner L56 to Question 3 during the interview.



**Vraag 3**

Die hoogte **h** van water in 'n silindriese houer met radius **r = 5 cm** is gelyk aan **10cm**. Peter moet die volume van 'n klip met 'n onreëlmatige vorm meet en besluit om die klip binne-in die houer met water te sit. Die hoogte van die water binne die houer styg tot **H = 13,2cm**. Bereken die volume van die klip in kubieke sentimeter.

**Question 3**

The height **h** of water in a cylindrical container with radius **r = 5cm** is equal to **10cm**. Peter has to measure the volume of an irregularly shaped rock. He decides to place the rock inside the container filled with water. The height of the water inside the container rises to **H = 13,2cm.** Calculate the volume of the rock in cubic centimeter.



Voor klip: $V = \pi r^2 h$

$V = \pi (5cm)^2 (10cm)$

$V = \pi \cdot 250 cm^3$

$\therefore V \approx 785,40 cm^3$ ✓

3

met klip: $V = \pi r^2 h$

$V = \pi (5cm)^2 (13,2cm)$

$V = \pi \cdot 330 cm^3$ ✓

$\therefore V \approx 1036,73 cm^3$

$\therefore$ Volume v. klip $= \pi \cdot 330 cm^3 - \pi \cdot 250 cm^3$

$= 80\pi \cdot cm^3$

Volume v. klip $\approx 251,33 cm^3$ ✓

3

This learner explained his solution brilliantly and even added the following comment not mentioned by any other learner:

> Hulle sê hierso die klip is heeltemal in water. So as hy nou 'n stukkie uitgesteek het, dan sou mens nog kon sê daar is kanse dat jy daai stuk mis van die klip, maar hy is heeltemal op die bodem van die silinder. (*They say here that the stone is completely in the water. So if some part of it stood out, then one could say there is a chance that you will miss that part of the stone, but it is completely on the bottom of the cylinder).*

**Sub-theme 4: Decision-making**

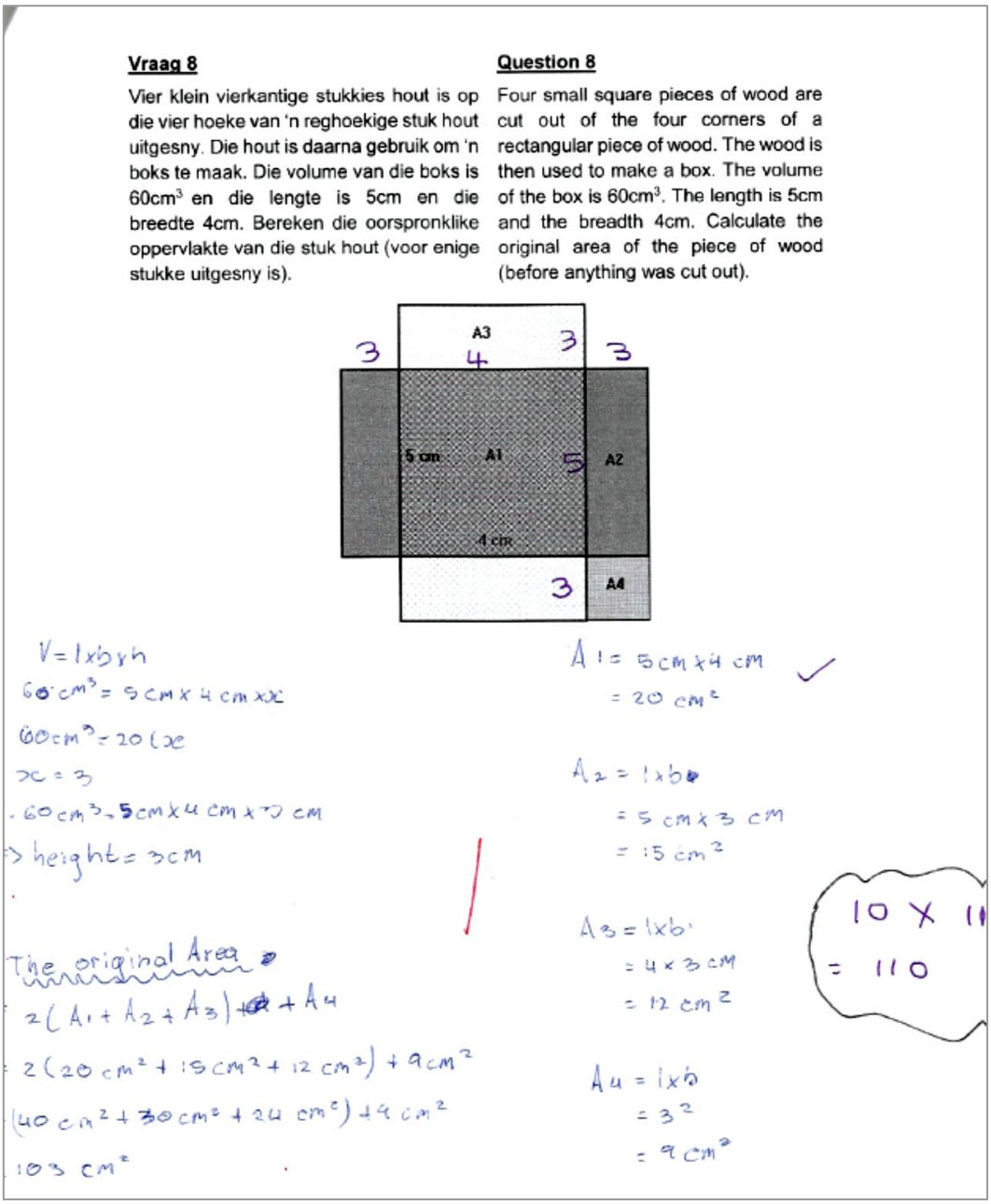
Decision-making relates to Polya's second and third steps, i.e. to plan and to carry out that plan.

Learner S1 was asked about his thinking when solving Question 8 below. His comments were:

> *Okay they gave us the volume and volume is equal to l x b x h and they gave us the length already and then I, the volume was 60 cm cubed so then I divided to find out what times 5 x 4 = 60 cm cubed and 3 would have given you 60 cm cubed if you multiplied it by 5 times 4. So that is how I got the 3 cm then I used it for to calculate the rest of the areas.*

The learner realised that he made a mistake in determining the area of the original piece of wood. He used 5 cm as the length and 4 cm as the breadth and not 10 cm and 11 cm.

> *Mam cause I, Mam I thought the area only involved the outline parts so I didn't add all the lengths.*



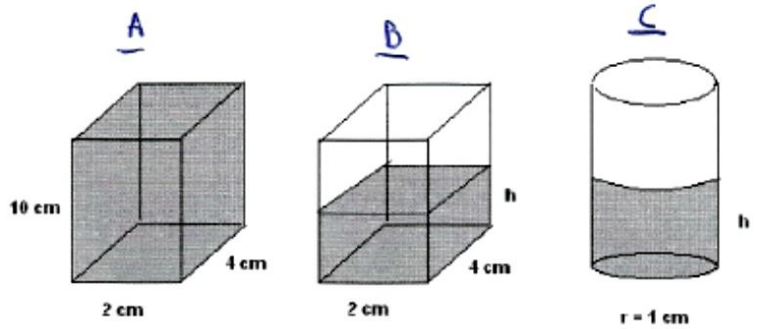

Learner 8S61 innovatively solved Question 5 and explained his problem-solving thinking as follows:

**Vraag 5**

Die reghoekige prisma aan die linkerkant was aanvanklik vol water. Water is toe daaruit gegooi in die reghoekige prisma en silinder aan die regterkant sodat die hoogtes van die water in beide houers (die reghoekige silinder en die reghoekige prisma) gelyk is. Bereken die hoogte h van die water in beide houers. (Rond jou antwoord af tot die naaste tiende van 'n cm).

**Question 5**

The cuboid on the left was initially filled with water. Water is then emptied from it into the cuboid on the right and the rectangular cylinder on the right in such a way that the height h in both containers (the rectangular cylinder and the cuboid) are equal. Calculate the height h of the water in these two containers to the right. (Round your answer to the nearest tenth of a cm)




A) $V = L \times B \times H$
$= 4 \times 2 \times 10$
$= 80 cm^3$

$V = L \times B \times H$
$= 4 \times 2 \times 5$
$= 40 cm^3$

$V = \pi r^2 h$
$= \pi (1)^2 (5)$
$= \pi (5)$
$= 15 cm^3$

H=5 -> te min
H=7 -> te min
H=8 -> te veel

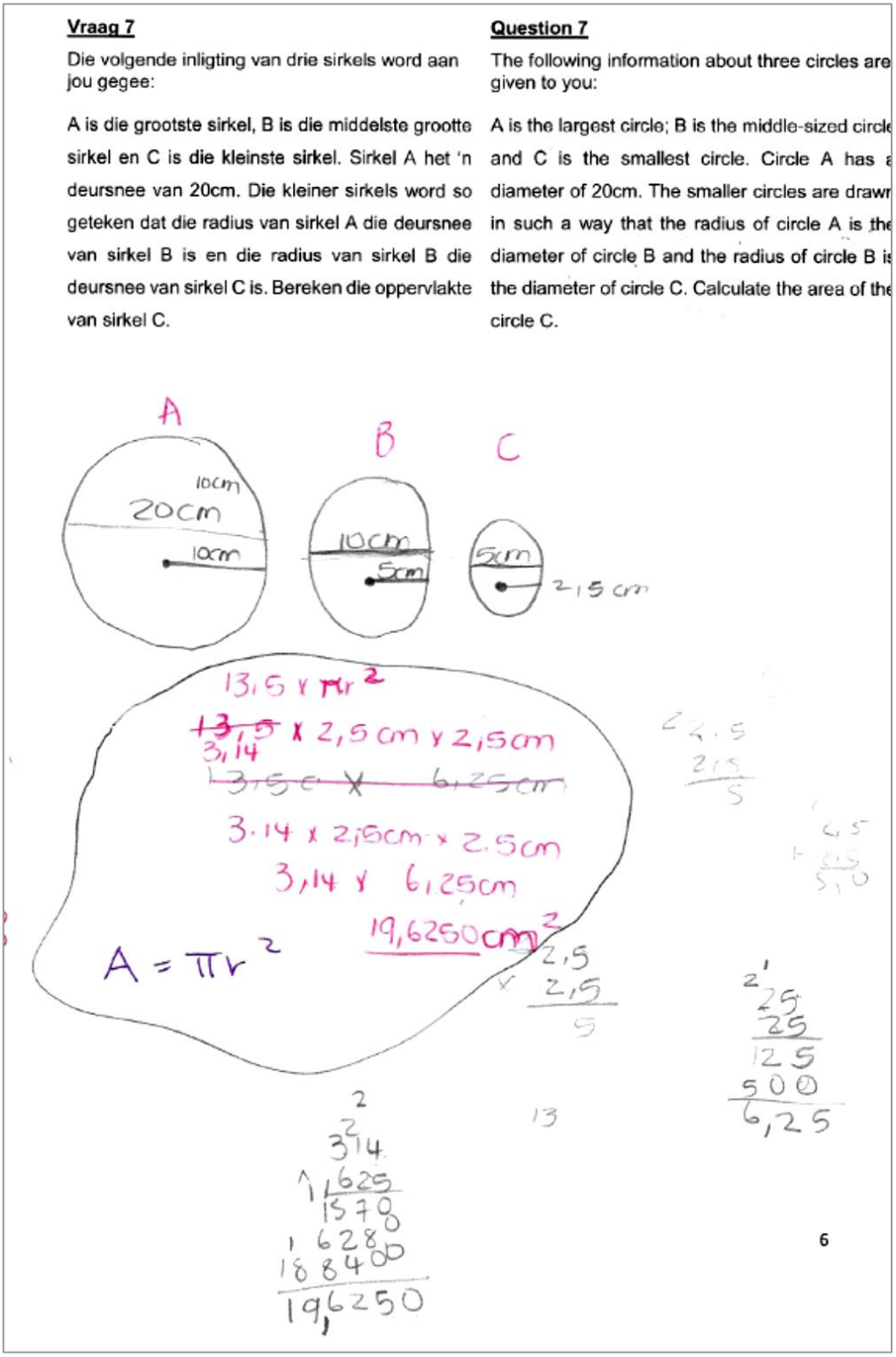
H=7,5 -> te veel
H=7,3 -> te veel
H=7,2 -> net reg.

Die hoogte van albei houers is 7,2cm.

Ek het eers die totale volume van die kubus uitgewerk, toe het ek begin hoogtes vat en met elkeen het ek gesê trail en error probeer wat ek eers elke hoogte probeer maal het met vyf. Toe kom ek agter dit gaan heeltemal te min wees daarso is baie wat oor is as jy eers die kubus sin die hoogte vyf vervang en daardie hoogte toe sien ek al twee sin is dan heeltemal te min om daarvan 'n totaal van 80 te kry. Ja, tot ek gesien het dis te veel toe begin ek met tussen die min en te veel begin ek toe kommas uitwerk. (*I first calculated the total volume of the cube, then I started taking different heights (5, 6 and 8) and with each height, by means of trial and error, I*

*multiplied each height by five. I realized that it is far too small if you substitute the cube's height by five and that height, then I saw that both are too little to give a total of 80. Until I saw it became too much, then I started working with the commas).*

Learner 8S58 was asked about her thinking when solving Question 7. Her solution is seen below:



She explained her thinking in this manner:

> *So mam, the diameter of the circle is 20, so obviously, the radius of it is half of 20, so it's 10. So here they said the B circle is the radius, the diameter of it is the radius of the circle A. So, I did it 10 cm then they said the radius of B is half than the diameter. So I made it 5 centimetres. So, see mam the radius of it is 5cm, and the half of it, the diameter of it is 5 then die radius of it is 2.5 cm which is half of 5 cm. The area equals pie times radius squared. So, the radius squared you see you times it by 2.5 cm times 2.5 cm which as a squared then the pie is 3,14. Then you test it, mam.*

On being asked if she thinks that the answer is correct her response was*: I do not know mam, yeah I think so.*

**Sub-theme 5: Self-evaluation**

Self-evaluation or reflection plays an important role during the problem-solving process and evaluating the correctness of the solution. This relates to the last step in Polya's problem-solving model: look back (cf. § 2.5.2). Learners must also reflect on their problem-solving abilities. Most learners regard themselves as good problem-solvers. Examples of their comments are:

> Partykeer. Want soos, ek dink partykeer nie mooi hoe om by die antwoord uit te kom nie, ek maak klein foute of ek los iets kleins uit, so ek sien dit op verkeerde manier as wat ek moet en dan kry ek 'n oplossing, maar nie 'n regte oplossing nie. (*Sometimes. Because I sometimes do not think properly how to solve the problem, I make small mistakes, or I leave something small out, so I see it in the wrong from what I should, and then I find a solution, but not the correct solution).* (S12)

> Ek voel net dis vir my baie maklik om probleme op te los in wiskunde so ek voel ja dit is vir my lekker om probleme op te los. *(I feel it is very easy for me to solve problems in Mathematics so yes, I feel it is nice to solve problems).* (8L97)

> *I actually do I mean I like solving problems and I always find a way to connect things like something that I do, and I do enjoy solving problems. I always try to find the root cause of the actual thing that I have to find out so I would say that I am a good problem solver.* (S24)

Learners can express their likes and dislikes regarding specific content areas as seen in the following responses:

> *Generally, I am a good problem-solver, yes but then there are some word problems that I really struggle with sometimes, but yeah*. (S 1)

> Ek hou van dit as dit soos meetkunde en daai goed is en as dit algebra is nie so baie nie, maar ek hou van probleemoplossing, dis vir my nogal lekker. (*I like it if it is geometry and those stuff and if it is algebra not that much, but I like problem-solving, it is enjoyable in some way).* (S22)

Learners have specific ways in which they verify their solutions to problems (Polya's last step, 'look back') as evident by a few of their responses:

> Soos gewoonlik as ek dink dit maak nie sin lekker of so iets nie, dan sal ek weer lees en dit dalk weer doen met potlood of iets, maar gewoonlik gaan ek net aan. (*Like normally when I it does not make sense or something like that, then I will read again and perhaps do it again in pencil or something like that, but normally I just carry on).* (L104)

> Ek vat gewoonlik die antwoorde, veral as ons nou met x begin werk, dan vervang ek eers x in die vergelyking in om te kyk of dit tog by die finale antwoord uitkom wat toe reg is. *(I normally take the answers, especially if we now start to work with x, then I substitute x in the equation to see if it does come to the final answer that was then correct). (8S61)*

> *If I reach a solution, but I'm not a 100% sure, I just quickly work it out to see if it does work, but if in the end I do get a solution and it works out I'm sort of happy that like I applied the steps right and everything. I get that moment of relief and happiness and actually got it.* (S24)

**Theme 2: Emotions**

Nowadays researchers recognize the role and effect of conative and affective factors during the problem-solving process. Conative factors such as motivation and volition and affective factors such as self-confidence, positive emotions, and availing beliefs, also play an important role in learners' study orientation in Mathematics and mathematical competence (De Corte, 2015; Schoenfeld, 1985). (§ 2.6.5, 3.6 & 3.7) One of the fields in the SOM questionnaire is Mathematics anxiety (§ 3.4.5). High levels of Mathematics anxiety hampers the problem-solving process (Lai et al., 2015). Two sub-themes, positive emotions and negative emotions became evident during the analysis procedure as shown in Figure 5-11 below:

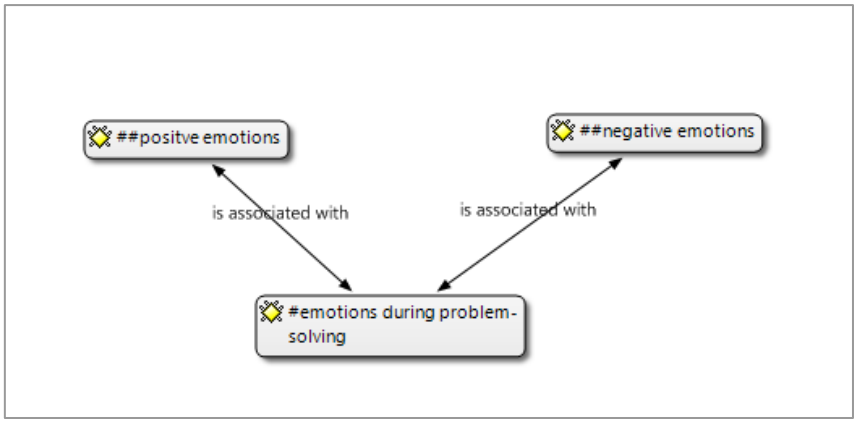


**Figure 5-11: Coding structure for the participants' views on their emotions during problem-solving**

**Sub-theme 1: Positive emotions**

Positive emotions refer to feeling confident, relaxed, calm, happy, excited, enjoying and liking something. Some of the interviewees uttered these emotions. The following responses indicate this:

> Wel, die meneer gee vir ons so baie probleme om te oefen, maar ek dink ook ek het die talent om wiskunde te doen. (*Well, the teacher gives us so many problems to practise, but I also think I have the talent to do Mathematics).* (8L104)

> Dis net lekker vir my om 'n wiskunde probleem op te los, so dis daai lekker gevoel wanneer ek 'n wiskunde probleem oplos. (*It is just nice for me to solve a Mathematics problem, it is that nice feeling when I solve a Mathematics problem).* (8L97)

> Ek hou van daai algebraïese probleme en ek hou nogal van die waar jy spesifieke onbekendes moet uitwerk, dis nogal lekker. (*I like those algebraic problems, and I like those where you must solve specific unknowns, I enjoy that).* (S23)

> *I'm calm and relaxed mam*. (S25)

> *Mam sometimes like now, nervous but other times like if I'm right, then I am confident.* (L69)

Some of the learners' views regarding their problem-solving abilities are indicators of positive emotions as shown by the following responses:

> *Yes mam, I just feel like it. Like I'm good in problem-solving.* (8S58)

> Nogal ja tannie, ek hou baie daarvan, so hoe meer ek probleme ek oplos, hoe makliker raak dit vir my en uitdagend raak dit vir my, en ek los dit partykeer dan nou nogal vinnig op en ander kere vat ek lank. Ek beskou myself as redelik goed. (*Yes, I like it a lot. The more problems I solve, the easier and more challenging it becomes for me, and often I solve them quite quick and other times I take long. I see myself as good).* (8L101)

> *In a sense mam, but like it depends on what kind of problem-solving it is. Because like I enjoy solving problems if I understand and know what to do, but if I have to like to go through different ways, I don't so, yeah*. (S20)

**Sub-theme 2: Negative emotions**

Typical negative emotions expressed by the interviewed learners are: being anxious or nervous, panic, scary, stress, do not know, pinned, and annoyed. These responses illustrate these emotions:

> Ek stres aan die begin, maar ja as ek ja, hang af of dit 'n moeilike probleem is of nie. As ek eers daardeur lees en so min of meer weet wat om te doen, dan is dit okay, maar as ek nie weet wat om te doen nie, dan begin ek stres. (*I stress at the beginning, but yes if I yes, it depends if the problem is difficult or not. If I read through it and know what to do, then it is okay, but if I do not know what to do, then I begin to stress).* (S12)

> Dit hang af van soos die vraag, as ek daarmee sukkel dan sal ek dalk bietjie senuweeagtig voel, maar gewoonlik hou ek van wiskunde so dis vir my lekker. (*It depends on the question, if I struggle with it, then I get a little nervous, but generally I like Mathematics and I enjoy it).* (L104)

> *Mam sometimes it's scary, but then I try to solve it. (8S58)*

> Gewoonlik gaan ek rustig aan. Dit hang af hoeveel tyd ons het. (*Normally I continue in a relaxed way. It depends on how much time we have).* (S12)

> *Okay, mam sometimes I feel pinned, before I do my maths. But when I read the question after and after I get that, I can do that question.* (8S68)

The specific problem-solving context (classwork, homework or examinations) and the time factor often contributes to learners' negative emotions as proven by these learner's responses:

> *Well it depends, like during an exam, if I see like I'm running out of time and I see o my gosh I must solve this problem, I start panicking and freaking out but then in the beginning if I have like enough time then I can, I'm calm and ja.* (S20)

> Ek begin paniekerig raak, dalk as ek sien ek het min tyd oor en ek het nog baie om te doen, maar dit is omtrent al wat my regtig bietjie bang maak. (*I start panicking, perhaps when I have little time left and I still have a lot to do, but it is all that really scares me a little).* (L56)

> Dit is okay as ek soos begin, maar sodra ek begin en eks nie heeltemal seker nie, dan begin ek bietjie te stres en ja, dan raak dit bietjie moeilik. Die eksamen is baie erger as die huiswerk in die klas. (*It is okay when I start, but as soon as I start, and I am not completely sure, then I stress a bit and yes, then it gets a little difficult. The exam is much worse than the homework in the class).* (S23)

> *Mam I normally feel anxious but when it's, when it's an exam, I feel anxious, but when we do class work I just, I don't know, I feel calm and I feel like I can do it.* (S14)

On the other hand, some of the learners' views regarding their problem-solving abilities display negative emotions as shown by the following responses:

> Want ek dink partykeer nie mooi hoe om by die antwoord uit te kom nie. Ek maak klein foute of ek los klein goed uit, so ek sien dit op verkeerde manier as wat ek moet en dan kry ek 'n oplossing, maar nie 'n regte oplossing nie. (*Because I often do not think well how to get to the answer. I make small mistakes, or I leave small things out, so I see it in the wrong way from what I should and then I find a solution, but not a correct solution).* (S12)

> *Well mam, some problems are easier to understand than others, so this one I solve better than others and then some problems I just don't understand what is going on so then I struggle a lot. I get annoyed if I struggle and I sometimes tend to skip the problem and go and do a thing that I understand.* (S25)

### 5.3.3 Analysis of individual interviews with Mathematics teachers

The interviews with the Mathematics teachers were conducted a few days after those with the learners. The four interviewed Mathematics teachers are involved with the SETH learners in the classroom. The intention of the interviews was to seek their views on SETH learners' feelings and problem-solving abilities and possible changes due to SETH. Refer to Addendum 11.1 for this interview schedule. The codes T1-T4 were used for the teachers in the transcriptions.

The four transcribed interviews were coded and analysed on ATLAS.ti™. Two central themes emerged from the analysis: learners' feelings and problem-solving abilities. Figure 5-12 illustrates the coding structure for the interviews with the teachers.

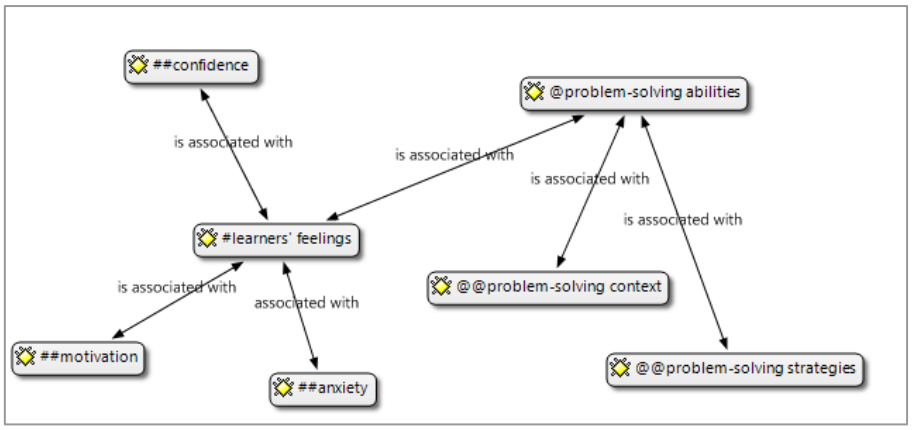



**Figure 5-12: Coding structure for the interviews with the Mathematics teachers**

#### Theme 1: Learners' feelings

Study attitude is one of the six fields in the SOM questionnaire that the learners completed during the empirical investigation (Maree et al., 2011). Learners' feelings and attitudes towards

Mathematics play an important role in the learning of Mathematics and is one of the important factors influencing their achievement (Arhin, 2015; Mohamed & Waheed, 2011). (§ 3.4.2)

Three sub-themes emerged from this main theme: motivation, confidence and anxiety and a discussion follow in the following section.

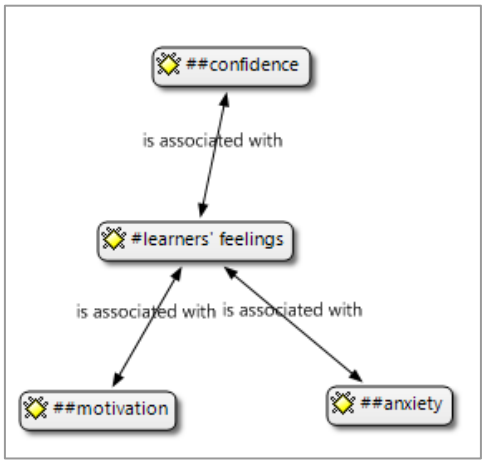



**Figure 5-13: Coding structure for learners' feelings**

**Sub-theme 1: Motivation**

Motivation means being eager or keen to do something and the willingness or general desire of a person to do something (De Corte, 2015; Heckhausen, 2007). Motivation plays a crucial role in the learning of Mathematics and subsequent achievement in the subject (Erasmus, 2013b; Molokoli, 2005).

One aspect of motivation is related to learners' willingness to learn Mathematics. The participants observed that the SETH learners are more motivated to ask questions, more inclined to do Mathematics and better motivated to attempt solving a problem than before. Examples of their responses are:

> Hulle is gewillig om te wil leer wanneer hulle iets nie dadelik regkry nie. (*They are willing to learn when they do not get something right immediately).* (T4)

> So, ek kan sien party het nou meer vrymoedigheid om te kom vrae vra. (*So, I can see some of them now have more confidence to come and ask questions).* (T1)

**Sub-theme 2: Confidence**

For learners to be successful in Mathematics, a certain amount of confidence or self-efficacy is essential. Learners must feel self-assured due to their inherent abilities and qualities. Bandura (1977) initially suggested that self-efficacy affects people's choice of the type of activities they

engage with, the amount of effort they put in and the degree of perseverance. Similarly, learners' motivation for their schoolwork relates to their academic self-efficacy. Self-efficacy beliefs relate positively to the choice of tasks, task values, intrinsic motivation, and persistence (Bong & Skaalvik, 2003). A learner's self-confidence, which has interfaces with self-concept, expectancy, and self-efficacy, is the most crucial prerequisite for achievement in Mathematics (Erasmus, 2013b, p. 14).

Learners seem more positive towards Mathematics than in the past. They are more willing to ask questions and more confident as they experience success in solving problems. They are more inclined to do Mathematics. Many learners' attitudes have improved due to the use of technology and the new approach to Mathematics in the SETH sessions. The following responses illustrate this:

> Soos wat hulle sukses behaal, is hulle meer positief teenoor Wiskunde. Hulle kan sien dat hulle ook iets kan regkry. (*As they achieve success, they become more positive towards Mathematics. They can see that they can also get something right).* (T1
>
> Mens kan duidelik sien hulle is baie meer ingestel om Wiskunde te wil doen. (*One can clearly see that they are more inclined to want to do Mathematics).* (T3)
>
> Hulle is bereid om te sukkel. (*They are prepared to struggle)*. (T3)
>
> Hulle het meer vertroue om 'n probleem aan te pak. (*They have more confidence to attempt a problem).* (T1)
>
> Hulle vat daai challenge en hulle pak dit aan en hulle probeer en probeer en probeer. (*They take that challenge and they tackle it and they try and try and try).* (T2)

**Sub-theme 3: Anxiety**

Mathematics anxiety is one of the fields in the SOM questionnaire that determines a learner's study orientation in Mathematics and was discussed in § 3.4.5 (Maree et al., 2011). High levels of Mathematics anxiety hamper success in Mathematics and have a negative impact on problem-solving abilities and subsequent performance in the subject (Erasmus, 2013b; Steyn & Du Plessis, 2007).

From the participants' responses, learners' Mathematics anxiety seems to be related to writing tests and examinations and not to everyday mathematics class activities and homework. Working against time, causes many learners to become scared and tense. In the absence of a time constraint, learners are more relaxed, focused and willing to solve problems. This corresponds with learners' responses during their interviews. (Section 5.3.2)

Some of the comments are:

> Oor die algemeen lyk hulle angsvlakke vir my beter as sê nou maar aan die begin van die jaar. (*In general, their anxiety levels look better to me as say at the beginning of the year).* (T1)

> Ek dink dit het verlaag hierdie jaar. Daar is definitief ’n rustigheid ’n groter rustigheid. (*I think it has lowered this year. There is a calmness, a peacefulness, more calmness)*. (T3)

> Ja, die angsvlakke kan ek definitief sê het verlaag. Die paartjies wat wel in die SETH program is, hulle is baie kalmer in die klasse. Hulle voel nie, ja dit sal ek definitief sê, kon ek agterkom angsvlakke is definitief laer. (*Yes, the anxiety levels can I surely say have lowered. The few who are in the SETH programme, they are much calmer in class. They don’t feel, yes this I will say, I could see that their anxiety levels are lower).* (T4)

> So ek dink dis ook maar oor hulle gemakliker raak, maar hulle het maar nog steeds daai gewone stres voor ’n toets of so. (*So, I think it is also because they become more relaxed, but they do still have that ordinary stress before a test or so).* (T1)

Some learners experience anxiety related to their SETH bursary. They fear that they might forfeit the bursary due to poor performance in Mathematics and therefore put in much more effort. This results in stress caused by an extrinsic factor.

> Hulle is so bang as hulle swak doen dan verloor hulle hulle SETH beurs en dit is oor die algemeen die Engelse kinders wat dan veral uit die rural gemeenskap uitkom. (*They are so scared that if they perform poorly, they will lose their SETH bursary. It is generally the English learners who come from the rural community).* (T2)

**Theme 2: Problem-solving abilities**

Two sub-themes became evident in the second main theme: problem-solving strategies and the problem-solving context.

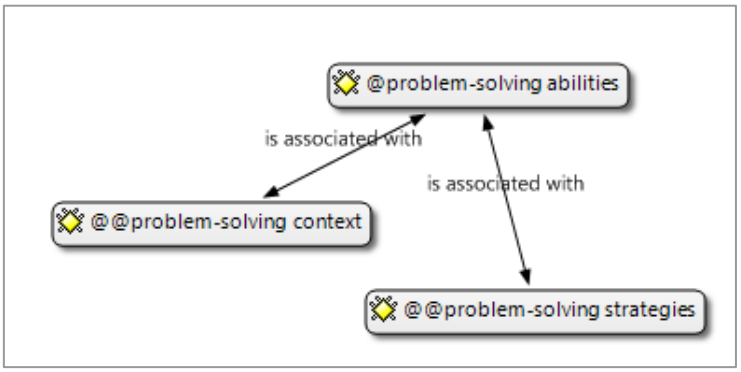



**Figure 5-14: Coding structure for problem-solving abilities**

**Sub-theme 1: Problem-solving strategies**

As discussed in § 2.5.2, the focus of this study is on learning through problem-solving. Polya's heuristic problem-solving model is of great value in this regard. The four steps in the model are: understand the problem, devise a plan, carry out the plan, and look back (Schunk, 2012, p. 302; Van de Walle et al., 2015, p. 58). These stages are as follows:

**Understand the problem**: The learner analyses the problem regarding the given, the missing information and what is required to do to solve the problem. For example: write the problem more directly or use a graph or sketch to represent the problem.
**Devise a plan**: The learner organises the facts and variables and chooses an appropriate method to solve the problem.
**Carry out the plan**: The learner uses proofs to see if the chosen strategy was suitable and thinks about other possible strategies.
**Look back**: The learner checks the answer to see if it is realistic and a solution to the problem (Schoenfeld, 1992; Schunk, 2012; Tzohar-Rozen & Kramarski, 2014).

The SETH learners must comply with high selection criteria and are knowledgeable and gifted learners. They accept challenges readily, are determined to solve problems and willing to struggle until they achieve success. Learners tend to be more confident in attempting to solve a problem. They are more willing to struggle to succeed, especially when they are rewarded with success. Success leads to a more positive attitude.

Learners read the problem a few times and then devise a strategy to solve it. In the Mathematics sessions and the classroom, the emphasis is on reading the problem well and understanding it before attempting to solve it.

One teacher commented on the improvement of learners' problem-solving attempts:

> Ja, dit het definitief verander. Die lees voor die tyd, die verstaan van die problem, dit het definitief verander en ons kinders kry deesdae in die toetse die meer die moeiliker goed reg. (*Yes, it changed. The reading before the time, the understanding of the problem, it changed and nowadays our children get the more difficult problems correct).* (T2)

Learners use a creative strategy to solve problems such as the use of colours and diagrams.

> Ek dink soms niemand gaan die probleem regkry nie en dan redeneer van hulle dit uit met Wiskunde wat ek nog nie met hulle gedoen het nie. Hulle redeneer dit uit, baie kreatief so hulle vat daai challenge en hulle pak dit aan en hulle probeer en probeer en probeer. (*I often think that nobody will get the problem right and then some of them reason about it with Mathematics that I*

*have not done with them. They reason about it, very creatively, so they take that challenge, and they tackle it, and they try and try and try).* (T2)

However, the tendency is that learners improved in solving complicated word problems and real-life scenarios, but often struggle with the recalling of facts, easy procedures and straight forward steps.

> Ons kinders kry deesdae in die toetse die moeiliker goed reg en hulle sukkel meer met die procedural stuff so, want ons gee nie meer so baie aandag aan die vlak twee goedjies nie. Nou moet ons dit weer balanseer, so ja daar het definitief 'n groot verandering plaasgevind. (*Nowadays our children succeed with the more complicated stuff, and they struggle with the procedural stuff because we do not now give much attention to the level two stuff. Now we must balance it again, so yes there has been a huge change).* (T2)

There is room for improvement when it comes to reflection during Mathematics activities. Some of the learners can explain how they reached the solution and can verify the correctness of the solution to the problem. Others find it challenging to reflect. The programme is full and often does not lend itself to sufficient time for reflection.

> Hulle reflekteer nog nie vir my genoeg nie, nog glad nie. Ek dink dit is as gevolg van die SETH sessies in die middae. Daar is selde genoeg tyd oor om goed te reflekteer. (*They do not reflect enough for me, not at all. I think it is because of the SETH sessions in the afternoon. There is seldom enough time left to reflect well).* (T2)

> Wat ek graag in my klaskamer doen, is ek laat hulle verduidelik wat hulle gedoen het. (*What I do in my classroom is I let them explain what they have done).* (T3)

> As hulle sien hulle antwoord is verkeerd, kan hulle teruggaan en sê maar hier het ek my fout gemaak. en dan kan hulle dit verander. (*When they see their answer is incorrect, they can go back and say but here I made my mistake and then they can change it).* (T3)

> Hulle sal self verbaal byvoorbeeld terugvoer gee en wanneer ons toetse deurgaan dalk na die tyd. (*They will, for example, give verbal feedback and when we go through tests, perhaps afterwards).* (T4)

**Sub-theme 2: Problem-solving context**

Problem-solving occurs during the Mathematics sessions which are once a month on a Monday from 14:15-17:00. These sessions remain a challenge for learners' motivation and endurance. Learners are tired after the school day and must still do homework after the sessions and often prepare for a test later the week. Therefore, the sessions must be vibrant and lively to keep the SETH learners on board. For this reason, the sessions changed from completing worksheets with many problems like doing homework, i.e. doing just more and more of the same type of

problems to a more interactive style of presentation. Two participants responded to this change with:

> Dit was aaklig gewees. Dit was vir my okay gewees, maar om kinders deur dit moes gesien sit het, dis jy sit en huiswerk doen of nie huiswerk nie, maar jy sit en somme doen die heeltyd. *It was terrible. (It was okay for me, but to see children sit through this, you sit and do homework or not homework, but you do problems the whole time).* (T3)

> Dit verskil regtig noord, suid, wes en oos van mekaar. *It really differs north, south, west and east from each other).* (T4)

The learners work collaboratively in groups and rely on one another to solve problems successfully in a cooperative manner. Various forms of technology such as clickers, a smart board, cell phones, calculators, and computers are utilized. Three of the respondents commented as follows:

> Ja, dit is baie lekker en daai kinders se ervaring na die tyd en die terugvoer na die tyd is net jy weet ons is op die regte plek, op die regte pad. (*Yes, it is very enjoyable and those children's experience afterwards and the feedback afterwards, you just know you are at the right place, on the right track).* (T1)

> Nou is dit baie meer interaktief. Die kinders het die geleentheid om vrae te vra, die kinders kry die geleentheid om self lesse aan te bied. Ek dink dit is tipies waarvan hulle sê hierdie is nou 'n learner-centred approach wat ons nou mee besig is*. (Now it is much more interactive. The children can ask questions; the children can present lessons themselves. I think this is typically what they say is a learner-centred approach that we are now busy with).* (T3)

> Ek dink mens oefen iets dalk nie so diep in soos wat mens nou sou gedoen het met die vorige werkskaarte en so of self in die klaskamer nie. Jy doen vyf van dieselfde soort, jy doen sommer vyf faktorisering of vyf vrae wat gaan oor patrone en alles nie so mens kan sê byvoorbeeld in plaas van om tien somme in daai tyd te doen, kan mens nou net twee somme doen, maar jy doen daai somme in soveel meer diepte. (*I think perhaps one does not practise something in such depth as in the case of the previous worksheets and even as in the classroom. You do five problems of the same type, you do five factorisations or five questions on patterns, and so instead of doing ten problems during that time, one can now only do two sums, but you can do those problems in much more depth).* (T3)

In conclusion, the teachers' responses seemed favourable towards the changes in learners' feelings when doing Mathematics and their problem-solving abilities.

## 5.4 Interpretation of the quantitative and qualitative data

The quantitative mathematical competence tests and SOM data enabled me to answer the first two sub-questions: *What does mathematical competence entail?* and *what does study orientation in Mathematics entail?* The qualitative data enabled me to answer the third sub-question: *How can the mathematical competence and the study orientation of secondary school learners be enhanced in a problem-solving learning context?*

These three sub-questions are addressed to answer the central research question that guided this study: *What guidelines can be developed to enhance the mathematical competence and study orientation of secondary school learners in a problem-solving learning context?*

The findings in the respective phases are presented in Chapter 6 and the research question answered. The research culminates in appropriate guidelines for the enhancement of mathematical competence and study orientation in a problem-solving learning context.

## 5.5 Chapter summary

Chapter 5 provided the results, analysis and interpretation of the quantitative and qualitative data generated in the empirical investigation. The reliability and construct validity of the SOM questionnaire for the sample was firstly proved, followed by the statistical analysis of the performance of the learners. A question analysis of the two mathematical competence tests followed. Subsequently, the statistical analysis of these tests was discussed in detail.

The qualitative data comprised the two open-ended SETH questionnaires, task-based interviews with 24 learners, and four interviews with the SETH Mathematics teachers. The data were coded, analysed and interpreted. Finally, the quantitative data and qualitative data were interpreted. The subsequent and concluding chapter presents the summary, findings, conclusion and limitations of the study.

# CHAPTER 6 SUMMARY, FINDINGS, RECOMMENDATIONS AND LIMITATIONS

## 6.1 Introduction

This concluding chapter presents a summary of the study. The findings are explicitly stated, and conclusions drawn to answer the research question. Suitable guidelines to enhance the mathematical competence and study orientation of secondary school learners in a problem-solving learning context are presented. Limitations of the study are pointed out and suggestions made for further research in this field. The value of the research is stated. The chapter concludes with a reflection on the research journey. Figure 6-1 represents an overview of Chapter 6.

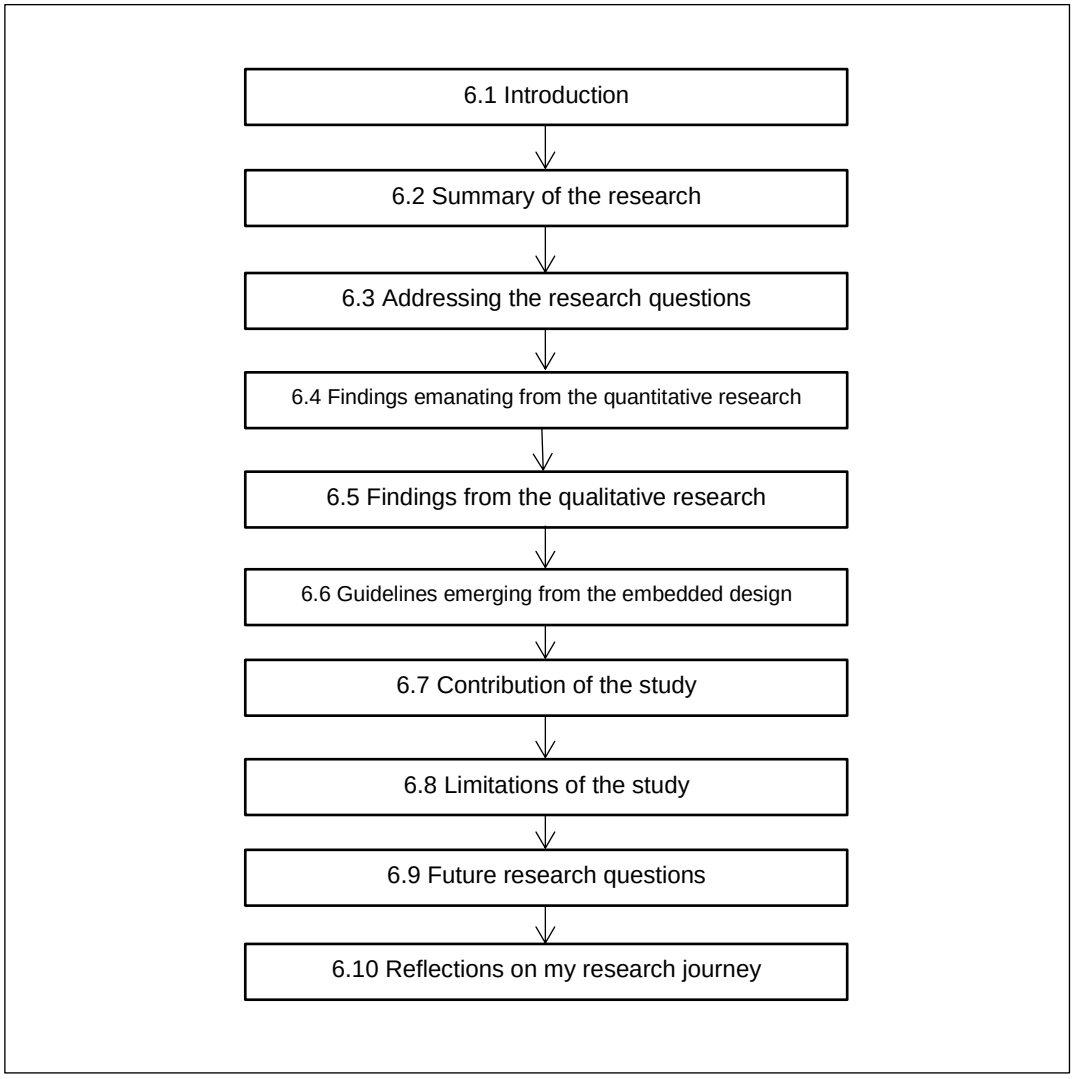



**Figure 6-1: An overview of Chapter 6**

## 6.2 Summary of the research

This section entails a summary of the research. An overview of each preceding chapter follows.

### 6.2.1 Chapter One: Orientation to the research journey

Chapter 1 laid the foundation for the study regarding the following aspects: the problem statement, motivation for the study, an overview of the essential constructs, the research questions and purpose, the embedded mixed method research design, and ethical aspects.

### 6.2.2 Chapter Two: Teaching and Learning Mathematics for mathematical competence

Chapter 2 provided the theoretical framework constructed as the "investigation lens" for the study regarding mathematical competence and focuses on Mathematics, the teaching and learning of Mathematics, mathematical competence, and the PISA Mathematics Assessment Framework. The chapter culminated providing possible strategies to enhance the mathematical competence of learners.

### 6.2.3 Chapter Three: Study orientation in Mathematics

Chapter 3 completed the construction of the theoretical framework ("lens") about study orientation in Mathematics (SOM) that is discussed regarding the six fields in the SOM questionnaire: study attitude, study habits, problem-solving behaviour, Mathematics anxiety, study milieu, and information processing. The role of affective and conative factors on study orientation was discussed. The chapter concluded with suggestions to enhance learners' study orientation in Mathematics.

### 6.2.4 Chapter Four: Research design and methodology

Chapter 4 gave a brief discussion of pragmatism as a worldview and the embedded mixed method research design employed in the study. This discussion included the quantitative and qualitative measuring instruments, the data obtaining procedure, the data analysis, and the ethical aspects adhered to during the study. The SETH Academy as problem-solving research context was explored. Furthermore, my role as a researcher was described and the constraints in the research project mentioned.

### 6.2.5 Chapter Five: Results, data analysis and interpretation

Chapter 5 provided the results, analysis and interpretation of the qualitative and quantitative data gathered during the research project to answer the research question. This analysis entailed the results of the SOM questionnaire and mathematical competence tests, the open-

ended questionnaires, and task-based interviews with learners and individual interviews with teachers. The chapter concluded with the interpretation of both data sets.

## 6.3 Addressing the research questions

The research question which guided the study was: *What guidelines can be developed to enhance the mathematical competence and study orientation of secondary school learners in a problem-solving learning context?* To adequately address the research question of this study, three sub-questions were posed to obtain insight on the research question. These sub-questions were:

1. What does mathematical competence entail?
2. What does study orientation in Mathematics entail?
3. How can the mathematical competence and the study orientation of secondary school learners be enhanced through problem-solving?

Chapter 2 addressed the first sub-question of the study: *What does mathematical competence entail?* This chapter presented the current literature on the nature of mathematical competence. The most dominant themes were: the nature and understanding of school Mathematics, the teaching and learning of Mathematics through problem-solving, the PISA Mathematics Assessment Framework as a theory for measuring mathematical competence, and the enhancement of mathematical competence.

Chapter 3 investigated the second sub-question of the study: *What does study orientation in Mathematics entail?* This chapter presented the contemporary literature on study orientation in Mathematics. The Study Orientation Questionnaire in Mathematics (SOM) as a theory for measuring study orientation with its six encompassing fields was discussed. A reminder that only the first five SOM fields were relevant in this study since the learners are in grades 8 and 9. The sixth field, information processing, appears in the grades 10 to 12 SOM questionnaire. Furthermore, the role of affective and conative factors on study orientation, and the enhancement of study orientation were described.

Chapter 4 investigated the third sub-question of the study: *How can the mathematical competence as well as the study orientation of secondary school learners be enhanced through problem-solving?* Chapter 5 presented the quantitative results of the mathematical competence tests and the SOM questionnaire. After that followed the results of the qualitative phase, i.e. the open-ended SETH questionnaires, task-based interviews with the learners, and individual interviews with the SETH teachers. The interpretation of both data types led to an answer to this sub-question. I developed guidelines that came forth from this study. These guidelines

centred around five dominant themes: Mathematics, teaching, learning, problem-solving, and the classroom context.

## 6.4 Findings emanating from the quantitative research

The three groups of learners completed the SOM questionnaire three times during the study (§ 5.2.1 to 5.2.3). After that, the same learners wrote a mathematical competence test at three stages during the empirical investigation (§ .5.2.4 to 5.2.6). The findings of the SOM questionnaires come first.

### 6.4.1 Findings of the SOM questionnaires

The SOM pre-test was the first assessment, the baseline assessment. Initial differences between the SETH learners and non-SETH learners were accounted for statistically which enabled comparison between the groups in terms of their study orientation over time (cf. comment in § 4.8.4). After this followed the SOM post-test six months later and the delayed SOM post-test six months after that. The pre-test results are compared with those of the post-test and the delayed post-test. The findings for each of the three groups follow:

**Grade 8 (2016)**

**The SETH learners versus the non-SETH learners**

In the **pre-SOM**, there were no statistically significant differences between the SETH- and non-SETH learners in all five fields (cf. Table 5-2). Hence, the two samples were equivalent regarding their SOM. However, in the **post-SOM,** the SETH learners showed a more conducive study milieu (cf. 3.4.4 and Table 5-3) than that of the non-SETH learners. The medium effect size could indicate a difference of practical significance. (§ 6.4.1.1)

**SETH learners**

In the **pre- and post-SOM,** the Mathematics anxiety, problem-solving behaviour and study milieu of the SETH learners showed statistically significant differences (cf. Table 5-8). Their Mathematics anxiety increased. However, it was a small effect size and not practically significant. Their problem-solving behaviour improved. Again, the change was not practically significant due to a small-sized effect. The study milieu was more conducive to learning. In this case, the change was of a medium-sized effect that could have been of practical significance.

In the **pre- and delayed post-SOM,** the only significant difference for the SETH learners was in their study milieu (cf. Table 5-11). This change had a medium effect size that could have been practically significant.

**Non-SETH learners**

In the **pre- and post-SOM**, the Mathematics anxiety and study milieu of the non-SETH learners showed significant statistical differences (cf. Table 5-8). Their Mathematics anxiety was higher in the post-SOM than in the pre-SOM. However, the change had a small effect size and was not practically significant. Their study milieu was more beneficial in the post- than in the pre-SOM. In this case, the effect size was a small-sized effect and of no practical significance.

In the **pre- and delayed post-SOM,** the non-SETH learners showed statistically significant differences in each of the five SOM fields (cf. Table 5-11). Their study attitude improved, but with a small effect size. Mathematics anxiety increased with a medium effect size that could be of practical significance. Their study habits seemed to improve, although the change was of a small effect size. Their problem-solving behaviour improved with a medium effect size which could be of practical significance. Their study milieu seemed to become more conducive to learning. The effect size was medium and could be practically significant.

**In conclusion:**

The SETH learners' Mathematics anxiety, study milieu and problem-solving behaviour changed significantly from the pre-SOM to the post-SOM. Their Mathematics anxiety increased, their problem-solving behaviour improved, and their study milieu became more conducive to learning. However, the only significant change between the pre-SOM and delayed post-SOM was in their study milieu. Study milieu refers to learners' social, physical and experienced milieu (Refer to § 3.4.4).

The non-SETH learners showed significant changes in their study milieu and Mathematics anxiety from the pre- to the post-SOM. Their study milieu became more conducive to learning. Furthermore, each of the five fields study attitude, study milieu, Mathematics anxiety, problem-solving behaviour, and study habits showed significant changes from the pre- to the delayed post-SOM.

**Grade 8 (2017)**

These learners completed only a pre- and post-SOM due to time constraints.

**SETH vs non-SETH learners**

In the **pre-SOM**, the SETH learners showed significantly better problem-solving behaviour than the non-SETH learners (cf. Table 5-6). The medium effect size could be an indication of practical significance.

In the **post-SOM**, the problem-solving behaviour of the SETH learners was also significantly better than those of the non-SETH learners (See Table 5-7). This change was a large effect size and an indication of practical significance (§ 6.4.1.3).

**SETH learners**

From the **pre-** to the **post-SOM**, these learners' study attitude weakened, and their study habits became less favourable (cf. Table 5-10). However, the change in study attitude was a small effect size, and not practically significant. The change in study habits was practically insignificant due to a small effect size.

**Non-SETH learners**

From the **pre-** to the **post-SOM**, the study attitude of the non-SETH learners deteriorated (See Table 5-10). In this case, it was a small effect size and not practically significant.

**In conclusion:**

The SETH learners' study attitude weakened, and their study habits were less favourable in the post-test. The non-SETH learners' study attitude in the post-test was less favourable than in the pre-test.

**Grade 9 (2016)**

**SETH vs non-SETH learners**

In the **pre-SOM,** there were no statistically significant differences between the SETH - and non-SETH-learners in their Mathematics anxiety and study milieu. However, statistically, significant differences were evident in their study attitude, study habits and problem-solving behaviour (cf. Table 5-4). The SETH learners showed more positive study attitudes with a medium effect size that could have been of practical significance. They had more effective study habits. The difference is practically significant due to a large effect size. Better problem-solving behaviour than the non-SETH learners was evident in this test. In this case, the medium effect size could be an indicator of practical significance.

In the **post-SOM**, similar results emerged: the SETH learners had better study attitudes, study habits and problem-solving behaviour than the non-SETH learners (cf. Table 5-5 and § 6.4.1.2). The SETH learners' study attitudes were more positive than those of their counterparts. The large effect size could be an indicator of practical significance. Their study habits were more effective due to a medium size effect, and therefore an indicator of practical significance. The

problem-solving behaviour of these learners was better than the non-SETH learners'. A medium-sized effect could be of practical significance.

**SETH learners**

**Pre- and post-SOM:**

The Mathematics anxiety and study milieu of the SETH learners showed significant differences (See Table 5-9). Their Mathematics anxiety was higher in the post-SOM than in the pre-SOM. There is an indication of practical significance due to a medium effect size. Their study milieu improved with a medium-sized effect, an indication of possible practical significance.

**Pre- and delayed post-SOM:**

The Mathematics anxiety of the SETH learners showed significant differences (cf. Table 5-12). Their Mathematics anxiety increased with a medium effect size which indicates possible practical significance.

**Non-SETH learners**

**Pre- and post-test:**

The non-SETH learners' Mathematics anxiety and study milieu showed significant differences (cf. Table 5-9). Their Mathematics anxiety increased with a medium effect size which is an indicator of possible practical significance. Their study milieu improved, but with no practical significance due to a small-sized effect.

**Pre- and delayed-post-SOM**:

The non-SETH learners' Mathematics anxiety showed significant differences (cf. Table 5-12). Their Mathematics anxiety increased but with a small effect size which indicates no practical significance.

**In conclusion:**

The SETH learners' Mathematics anxiety and study milieu changed significantly from the pre- to the post-SOM. However, their Mathematics anxiety changed with a medium effect size between the pre- and the delayed post-SOM, which could be of practical significance.

The non-SETH learners showed significant changes in their study milieu and Mathematics anxiety form the pre- to the post-SOM. The only significant change from the pre- to the delayed post-SOM however, was in their Mathematics anxiety.

**The effect of problem-solving learning on study orientation**

From the SOM analysis, it seems evident that the problem-solving learning context had a positive effect on the study attitude, study habits, study milieu, and problem-solving behaviour of both cohorts (SETH and non-SETH learners). However, these learners' levels of Mathematics anxiety raised during the empirical investigation. The SETH learners tend to be anxious due to the following reasons: their Mathematics marks must remain good enough to remain part of the SETH Academy, and those who have bursaries, fear that they might forfeit the bursary. The non-SETH learners might experience Mathematics anxiety because they experience Mathematics as a difficult and challenging subject and might struggle to perform well.

### 6.4.2 Findings of the learners' performance in the mathematical competence tests

The mathematical competence pre-test was the first assessment, the baseline assessment. Initial differences between the SETH learners and non-SETH learners were accounted for statistically which enabled comparison between the groups in terms of their mathematical competence over time. The findings of the learners' performance in the mathematical competence tests for each of the three samples follow next.

**Grade 8 (2016)**

**SETH vs non-SETH learners**

Table 5-18 displays the results of the SETH learners and the non-SETH learners in the pre- and post-test (independent samples). The SETH learners performed better than the non-SETH learners in the **pre-test.** This change had a large effect size and is therefore of practical significance. The SETH learners performed better in the **post-test** than the non-SETH learners. This difference presented a large-sized effect, indicating practical significance.

**SETH learners**

Table 5-20 summarises the results of the SETH learners in the **pre-test** and **post-test** and the non-SETH learners in the same tests (dependent samples). The SETH learners performed better in the **post-test** than in the **pre-test**. This difference was of practical significance due to a large effect size.

**Non-SETH learners**

The non-SETH learners had a higher mean in the **post-test** than in the **pre-test**. This difference could indicate practical significance due to a medium-sized effect.

**In conclusion:**

The grade 8 (2016) SETH learners showed sustained or continuous improvement in their response to the cognitive challenge (degree of difficulty) of the questions throughout the investigation. Their mathematical competence improved from the pre- to the post-SOM. Similarly, the non-SETH learners also showed improvement throughout the empirical investigation although their performances were lower than those of the SETH learners in both tests.

**Grade 8 (2017)**

Table 5-21 displays the results of the learners (independent samples) in the pre- and post-test.

**SETH vs non-SETH learners**

The SETH learners performed better in the **pre-test** than the non-SETH learners because initially, they were two non-equivalent cohorts. This difference had a large effect size and indicated practical significance. Thereafter, these differences were accounted for statistically to allow further comparisons between the cohorts. The SETH learners performed better in the **post-test** than the non-SETH learners. This presented a large effect size and is, therefore, practically significant.

**SETH learners**

The SETH learners performed better in the **post-test** than in the **pre-test** (cf. Table 5-19). This difference had a large effect size that is practically significant.

**Non-SETH learners**

The non-SETH learners had a higher mean in the **post-test** than in the **pre-test** (cf. Table 5-23). A medium effect size shows a possible practical significance.

**Concluding remarks:**

The grade 8 (2017) SETH learners showed continuous improvement in their mathematical competence throughout the investigation. Their mathematical competence improved from the pre-test to the post-test. Similarly, the non-SETH learners also showed improvement throughout the empirical investigation although their performance was lower than those of the SETH learners in both tests.

**Grade 9 (2016)**

This group had three assessments. Table 5-24 presents these results.

**SETH vs non-SETH learners**

Table 5-25 displays the results of these two independent samples. The SETH learners performed better in the **pre-test** than the non-SETH learners. A large effect size indicates practical significance. The SETH learners' performance in the **post-test** was better than that of the non-SETH learners. This difference could point to practical significance due to a medium-sized effect. The SETH learners performed better in the **delayed post-test** than the non-SETH learners. A large effect size showed practical significance.

**SETH learners**

Table 5-26 displays the results of the SETH learners and non-SETH learners in each of the three tests, i.e. the dependent samples. The findings are:

The SETH learners performed better in the **post-test** than in the pre-test. This difference, however, was not practically significant due to a small effect size. The SETH learners performed better in the **delayed post-test** than in the pre-test. The effect size was medium, and this could point to practical significance.

**Non-SETH learners**

Table 5-26 lists these results and the findings are: The non-SETH learners performed better in the **post-test** than in the pre-test. A medium effect size is an indicator of possible practical significance. The non-SETH learners performed better in the **delayed post-test** than in the pre-test. The effect size was a medium effect size. This could be of practical significance.

**Conclusion:**

This cohort of SETH learners showed continuous improvement in their mathematical competence throughout the investigation. Their mathematical competence improved from the pre-test to the post-test, and from the post-test to the delayed post-test. Similarly, the non-SETH learners also showed improvement throughout the empirical investigation, although their performance was lower than those of the SETH learners in all three tests.

**The effect of problem-solving on mathematical competence**

The initial differences between the SETH learners and the non-SETH learners were accounted for statistically for the baseline (pre-) assessments. The SETH cohorts and the non-SETH

cohorts were therefore equal and comparable in every way which allowed the chosen statistical tests that were done on the generated data. The impact of the SETH Academy on its learners is evident. The mathematical competence of the SETH learners displayed enhancement. Since the grades 8 and 9 learners share the classroom daily, the non-SETH learners reap the benefits from their SETH peers. The non-SETH learners also showed improvement in their mathematical competence, most probably due to their interaction with the SETH learners in the class.

## 6.5 Findings from the qualitative research

The qualitative research comprised the following: a first and second open-ended SETH questionnaire (§ 5.3.1), task-based interviews with 24 learners (§ 5.3.2), and individual interviews with four participating SETH Mathematics teachers (§ 5.3.3). The findings follow in the following three sections (cf. Addenda 9, 10 and 11).

### 6.5.1 Findings of the SETH questionnaires

Learners commented freely and openly on their feelings and experiences of the SETH Academy (§ 5.3.1). The most important findings are as follows:

- Initially, the 2016 learners' most significant challenges were: the Mathematics worksheets, aspects related to their interaction with people (listening to and working with others), the time factor (after school on Mondays), and the reading activities (§ 5.3.1).
- Learners value practical activities, excursions and activities where they are actively involved and not only expected to be observers.
- Many learners believe that the SETH activities are enriching, helpful and valuable and that they would prefer to remain part even if their marks do not improve.
- The learners who joined the SETH Academy in 2016 seem to enjoy the Mathematics sessions of 2017 more than in the past and feel that the number of sessions is sufficient.
- Various technologies are used during the sessions to enhance the learning experience.
- Some learners find word problems, geometry, and aspects of algebra a challenge.
- Numerous learners view Mathematics as challenging and tedious, while others enjoy the subject and the challenges it offers.
- Learners mostly learn Mathematics by studying the theory and formulas, working through examples, completing problems on their own, and working through previous examination papers.

**Concluding remarks:**

The SETH Academy impacted its learners' feelings and experiences in a positive manner. Even though the Mathematics sessions are on a Monday after school, participating learners realise the importance of their involvement and prefer to remain part due to the experience gained and the developmental value of the SETH Academy.

### 6.5.2 Findings of the task-based interviews with learners

Problem-solving behaviour is one of the fields in the SOM questionnaire (§ 3.4.6) and problem tackling one of the eight mathematical competencies that constitute mathematical competence (§ 2.6.2). There were interviews with twenty-four grades 8 and 9 learners to determine their feelings during problem-solving and their problem-solving behaviour (§ 5.3.2) to answer the third sub-question. The two emergent themes were problem-solving behaviour and learners' feelings.

#### 6.5.2.1 Learners' problem-solving behaviour:

Problem-solving behaviour entails cognitive and metacognitive learning strategies. These include planning, self-regulation, self-monitoring, decision-making, and self-evaluation (cf. § 3.4.6). The task-based interviews revealed the following:

- A substantial number of the learners commence with problem-solving by reading the problem well, often a few times until they understand the problem and know what the question is.
- Once learners understand the question, they make a plan to solve the problem. These plans entail to write an equation, underline or write down the given, and visualise the problem.
- Most of the interviewees could use self-monitoring during the explanation of their problem-solving procedure.
- Learners can self-regulate their behaviour although some can do it better than others.
- Learners can self-reflect regarding their problem-solving abilities and the correctness of their solutions. Most learners regard themselves as competent problem-solvers.
- Learners can express their likes and dislikes regarding specific Mathematics content areas, e.g. word sums, geometry and algebra.
- Learners have specific ways in which they verify their solutions to problems (Polya's last step, 'look back').

It seems that the SETH Academy impacted their learners' problem-solving behaviour positively. Learners can plan their problem-solving, can monitor their behaviour, can regulate their

thinking, and make appropriate decisions. They can furthermore, reflect on their attempts, the correctness of the solution, and their problem-solving abilities in general.

#### 6.5.2.2 Learners' feelings:

Learners' feelings and attitudes play an important role during the problem-solving process (§ 2.5.7). The findings are:

- Positive emotions refer to feeling confident, relaxed, calm, happy, excited, enjoying and liking something. Some of the interviewees uttered these emotions.
- Typical negative emotions expressed by the interviewed learners are: being anxious or nervous, panic, scary, stress, do not know, pinned, and annoyed.
- The specific problem-solving context (classwork, homework or examinations) and the time factor often contribute to learners' negative emotions.
- Some of the learners' views regarding their problem-solving abilities display negative emotions such as being annoyed.

It seems that the SETH Academy positively impacted their learners' feelings. Although learners are mostly positive about their SETH experiences, some do experience negative emotions such as stress, being scared, panic, and anxiety. These emotions relate to the time factor in writing tests or examinations.

**In conclusion:**

There is evidence that the SETH learners exhibit the following capabilities related to their problem-solving behaviour: planning before commencing with a problem, self-monitoring, self-regulation, decision-making, and self-evaluation. Regarding their feelings, they mostly experience positive feelings such as confidence, calmness, excitement, and enjoyment.

### 6.5.3 Findings based on the individual teacher interviews

There were interviews with the four participating Mathematics teachers to obtain their views on the SETH learners' feelings and problem-solving abilities and possible changes due to their involvement in the SETH Academy (§ 5.3.3). Two themes, learners' feelings and learners' problem-solving abilities, emerged from the interviews.

#### 6.5.3.1 Learners' feelings

The feelings of learners were one of the emergent themes from the interviews. The findings are:

- The teachers observed that the SETH learners are more motivated to ask questions, more inclined to do Mathematics and better motivated to attempt solving a problem than before.
- Learners seem more positive towards Mathematics than in the past (2016). They are more willing to ask questions and more confident as they experience success in solving problems. They are more inclined to do Mathematics. Many learners' attitude improved due to the use of technology and the new approach to Mathematics (2017) in the SETH sessions.
- From the participants' responses, learners' Mathematics anxiety seems to be related to writing tests and examinations and not to everyday Mathematics class activities and homework. Working against time, causes many learners to become scared and tense. In the absence of a time constraint, learners are more relaxed, focused and willing to solve problems.
- Some learners experience anxiety related to their SETH bursary. They fear that they might forfeit the bursary due to poor performance in Mathematics and therefore put in much more effort. This fear results in stress caused by this extrinsic factor.
- They accept challenges readily, are determined to solve problems and willing to struggle until they achieve success. Learners tend to be more confident in attempting to solve a problem. They are more willing to struggle to succeed, especially when they receive rewards for their success. Success leads to a more positive attitude.

There is a similarity between the learners' responses and those of their teachers. Learners are better motivated, accept challenges, persevere in problem-solving, and they experience lower levels of Mathematics anxiety.

#### 6.5.3.2 Learners' problem-solving abilities

The teachers reflected on the problem-solving abilities of the SETH learners. The findings emanating from the interviews are:

- Learners read the problem a few times and then devise a strategy to solve it. In the Mathematics sessions and the classroom, the emphasis is on reading the problem well and understanding it before attempting to solve it.
- Learners use a creative strategy to solve problems such as the use of colours and diagrams.
- The tendency is that learners improved in solving complicated word problems and real-life scenarios, but often struggle with the recall of facts, easy procedures and straightforward steps.

- There is room for improvement when it comes to reflection during Mathematics activities. Some of the learners can explain how they reached the solution and can verify the correctness of the solution to the problem. Others find it challenging to reflect. The SETH programme is full and often does not lend itself to sufficient time for reflection.
- The sessions changed from completing worksheets with many problems like doing homework (2016), i.e. doing just more and more of the same type of problems to a more interactive style of presentation (2017).
- The learners now work collaboratively in groups and rely on one another to solve problems successfully in a cooperative manner. There are various forms of technology such as plickers, a smart board, cell phones, calculators, and computers during the sessions.
- The teachers' responses seemed favourable towards the changes in learners' feelings when doing Mathematics and their problem-solving abilities.

The teachers' responses relate to those of the learners. Learners seem more successful in their problem-solving behaviour than before. They experience more positive feelings and emotions than negative ones.

**Concluding remarks:**

The SETH learners' Mathematics teachers observed positive changes in the learners' problem-solving behaviour and their feelings. Related to their feelings, they are more favourable. Learners are better motivated, less anxious, accept challenges more efficiently, and persevere until they are successful. Their problem-solving behaviour also improved along the way. Evidence of this is: they can solve challenging problems, use creative strategies to do so, and can reflect on their attempts. They enjoy the new approach in the Mathematics sessions (2017) more due to the interactive and collaborative nature, and the implementation of technology.

### 6.5.4 Impact of the SETH interventions

The SETH interventions made a significant difference in the overall study orientation of their learners. In each of the four SOM fields namely, study attitude, study habits, problem-solving behaviour, and study milieu, the SETH learners seemed better than the non-SETH learners. However, their Mathematics anxiety increased during the empirical investigation. This applies to all three groups involved in the study and for each assessment.

The SETH interventions led to a higher performance for the SETH learners in the Mathematics tests than for the non-SETH learners. Therefore, the SETH learners are mathematically more competent than the non-SETH learners. This applies to all three groups involved in the study and for each assessment.

## 6.6 Guidelines to enhance learners' mathematical competence and study orientation

The purpose of this study was to develop guidelines to enhance secondary school learners' mathematical competence and study orientation in a problem-solving learning context. Mathematical competence implies the ability to judge, understand, do and to utilise Mathematics in a variety of mathematical contexts and situations in which Mathematics plays or could play a role. Mathematical competence, therefore, focuses on what it takes to *do* Mathematics (§ 2.6).

Learners' total study orientation in Mathematics influences their problem-solving abilities and achievement in Mathematics (§ 3.4.7). Study orientation is a prerequisite for deeper learning which entails learning for the transfer or the application of knowledge in different contexts, critical reasoning, and problem-solving (§ 2.5.4). The study orientation of a learner, in general, plays a vital role in the learning of a subject and the subsequent achievement in the subject. There is a significant statistical association between achievement and aspects of study orientation in Mathematics. (§ 3.3)

The presented guidelines centre around the following themes: Mathematics, teaching, learning, problem-solving, and the classroom context. The guidelines relating to Mathematics centre around the language and structure of Mathematics, and aspects regarding the required skills, processes, and concepts. The guidelines are as follows:

- Mathematical competence acquires the availability of factual knowledge, procedural knowledge, real skills, and technical skills in the field of Mathematics (cf. § 2.6).
- Focus on accurate and complete concept acquisition since it is a prerequisite for learning more advanced content in Mathematics. When conceptualisation is incomplete, the transfer of learning is inadequate and problem-solving in Mathematics is hindered.
- Provide ample opportunities for learners to apply what was learned in one situation to new situations, i.e. learning for transfer. This is called deeper learning and an essential prerequisite for a positive study orientation in Mathematics (§ 2.5.4).
- Empower learners to develop into lifelong learners. Lifelong learning is the continuous, self-motivated pursuit of knowledge and a prerequisite for 'survival' in the 21$^{st}$ century (§ 2.1).

The guidelines that centred on teaching and learning, centre around the following aspects: constructivist teaching (§ 2.4.1), socio-cultural learning (§ 2.5.1), problem-solving teaching and learning (§ 2.4.2 and § 2.5.2), learning for understanding (§ 2.5.3), and the use of rich and authentic tasks. These guidelines are:

- Utilise a constructivist teaching approach that involves problem-solving, inquiry, exploration, and active forms of learning.

- Expose learners to problem-solving tasks that will enhance their abilities **to ask and answer questions in and with Mathematics** (§ 2.6.2). This includes the following abilities:
    - An awareness of the types of questions that characterise Mathematics, the ability to ask such questions, and insight into the types of answers that one can expect.
    - The ability to put forward different kinds of mathematical problems, i.e. pure/applied, closed or open-ended, and being able to solve such mathematical problems in their already formulated form.
    - Being able to analyse and build mathematical models concerning other areas.
    - The ability to reason mathematically which includes capabilities such as following and assessing chains of arguments used by others.
- Supply various opportunities to learners that will enhance their abilities **to deal with mathematical language and tools** (§ 2.6.2). These abilities include the following:
    - The ability to understand and use different kinds of representations of mathematical entities such as objects and situations.
    - The ability to deal with mathematical symbols and formal mathematical language.
    - Being able to communicate in, with, and about Mathematics.
    - The awareness of the existence and properties of different aids and tools useful in mathematical activities
- Encourage social interaction and collaboration between the learners (§ 2.5.1).
- Expose learners to problem-based learning activities where they can take the initiative, formulate learning objectives, decide on suitable resources, and implement appropriate learning strategies to solve the problem. This should enable learners to become self-directed (§ 2.8).
- Use software packages such as GeoGebra more frequently and in an integrated manner.

A variation of teaching approaches is imperative since different teaching approaches develop different mathematical competencies.

The guidelines concerned with problem-solving centred on the nature of the tasks, skills that learners ought to develop during problem-solving, and the result of problem-solving on learners' mathematical competence (§ 2.5.2, § 2.6.2 and § 3.4.6). About classroom context, the guidelines centred around a classroom conducive to learning, social interaction, collaboration, and actively involved learners (§ 2.5.1).

- Expose learners to a variety of problem-solving strategies such as observing patterns and relations in Mathematics, modelling, estimating and approximating answers, changing ineffective strategies, and executing Polya's four problem-solving steps.

- Enhance learners' cognitive and metacognitive learning strategies needed in problem-solving. These strategies include planning, self-monitoring, self-regulation, decision-making, and self-evaluation (cf. § 3.4.7).
- Create an unrestricted, secure, errors-allowing learning environment for learners to participate actively.
- Allow learners to learn through discourse, self-reflection and social interaction.
- Learning strategies thrive in a problem-solving context where learners work cooperatively in solving problems, and where social interaction realises efficiently.

The teacher plays a crucial role in the Mathematics classroom to present suitable tasks to engage the learners in problem-solving activities. Furthermore, to expose learners to cognitive - and metacognitive learning strategies to promote understanding and optimise learning (§ 3.4.6). Teachers ought to establish a community of learning (practice) between the learners. Such a community should result in the enhancement of learners' mathematical competence (§ 2.8). Furthermore, the effect thereof ought to lead to the enhancement of learners' study orientation (§ 3.8).

Learners must also take responsibility for their learning by having an investigative attitude, and actively constructing knowledge in suitable ways. Learners must acquire the specific concepts, skills, and procedures, and use these concepts, and apply these skills and procedures in novel situations (§ 2.5.4). These should result in mathematically competent, self-directed- and lifelong learners.

## 6.7 Contribution of the study

This study contributes to the subject area and discipline of Mathematics in the following manner:

- The literature review is an invaluable tool to provide insight and clarity into mathematical competence and study orientation in Mathematics as constructs. The literature review further provides insight into the enhancement and assessment of both these constructs.
- The relevant stakeholders received feedback on the current effectiveness of the SETH Academy.
- Guidelines that are practical, hands-on and meaningful indicators and useful for the future improvement of the SETH interventions, were developed.
- These guidelines could enhance the quality of teaching and learning in the project school and other schools, empower school learners at all levels to become mathematically more competent, and to improve their study orientation in Mathematics.
- The study has the potential to be part of a more comprehensive project in the Faculty of Education Sciences and the Department of Basic Education.

## 6.8 Limitations of the study

The limitations of the study are:

- The project school was the only available exemplar of a school where this investigation could be undertaken. No other school has the setting where there is curriculum-based teaching as well as an augmented problem-solving learning context.
- The groups of participants were relatively small (approximately 100 learners per grade).
- The same teachers presenting the curriculum-based learning programme teach the augmented curriculum. However, from the reflection of teachers they adjusted their teaching and learning in the classroom according to their experience in the augmented programme.

## 6.9 Future research questions

This study revealed the following future research questions:

- What will the outcome(s) be if such a study is done in more than one school where the curriculum-based teaching and the augmented problem-solving learning context are separate?
- In which way will a study with more participants influence the results?
- What effect will different teachers presenting the curriculum-based learning programme, and the augmented curriculum have on the outcome of the investigation?
- Will a quantitative research design or qualitative design yield different results?

## 6.10 Reflections on my research journey

Since childhood, my desire had been to become a teacher, specifically a Mathematics teacher. My journey began as a high school Mathematics teacher, where I gained invaluable experience in the teaching and learning of Mathematics. There I developed empathy with many learners who struggled with Mathematics. I advanced to a lecturing position at a Teachers' Training College and was later involved in Engineering Education. I realised that many students experienced difficulties in Mathematics that prevent them from progressing and obtaining a tertiary qualification. Through these years I observed that many learners lack mathematical competence, do not possess an appropriate study orientation, and therefore do not qualify for tertiary education.

As a novice researcher (I completed my previous research twelve years ago), I became aware of the SETH Academy when my career at the NWU commenced five years ago. I was enticed by their mission to prepare more learners for tertiary study in Engineering and other

Mathematics-related fields. My intent was to assist the stakeholders in evaluating the effectiveness and impact of their interventions to improve them continuously. Using an embedded mixed method design was a new experience for me, and challenging at times. It was specifically challenging to keep track of the three groups involved in the study and the considerable amount of quantitative and qualitative data generated during the year-long empirical investigation. However, my research experience exceeded my highest expectations. I found the journey doing mixed method research rewarding, fascinating, enriching and enlightening.

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## ETHICS APPROVAL CERTIFICATE OF STUDY

Based on approval by the **Ethics Committee of the Faculty of Education Sciences (ESREC) on 17/03/2017** after being reviewed at the meeting held on **26/11/2015**, the North-West University Institutional Research Ethics Regulatory Committee (NWU-IRERC) hereby **approves** your study as indicated below. This implies that the NWU-IRERC grants its permission that, provided the special conditions specified below are met and pending any other authorisation that may be necessary, the study may be initiated, using the ethics number below.

**Study title: The impact of the SETH Academy on secondary school learners' mathematical competence.**

**Sub-study title: Guidelines to enhance secondary school learners' mathematical competence and study orientation in a problem solving learning context**

**Project head: Prof HD Nieuwoudt**
**Project team: T Jordaan, J Jackson**

**Ethics number**:

| N | W | U | - | HS | - | 2 | 0 | 1 | 5 | - | 0 | 2 | 3 | 5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Institution | | | | Study Number | | | | | | | Year | | Status | |

Status: S = Submission; R = Re-Submission; P = Provisional Authorisation; A = Authorisation

**Application Type: N/A**

**Commencement date**: 2017-03-17 **Expiry date**: 2018-03-17 **Risk:** N/A

**Special conditions of the approval (if applicable):**

- Translation of the informed consent document to the languages applicable to the study participants should be submitted to the ESREC (if applicable).
- Any research at governmental or private institutions, permission must still be obtained from relevant authorities and provided to the ESREC. Ethics approval is required BEFORE approval can be obtained from these authorities.

**General conditions:**

*While this ethics approval is subject to all declarations, undertakings and agreements incorporated and signed in the application form, please note the following:*

- *The study leader (principle investigator) must report in the prescribed format to the NWU-IRERC via ESREC:*
  - *annually (or as otherwise requested) on the progress of the study, and upon completion of the project*
  - *without any delay in case of any adverse event (or any matter that interrupts sound ethical principles) during the course of the project.*
  - *Annually a number of projects may be randomly selected for an external audit.*
- *The approval applies strictly to the proposal as stipulated in the application form. Would any changes to the proposal be deemed necessary during the course of the study, the study leader must apply for approval of these changes at the ESREC. Would there be deviated from the study proposal without the necessary approval of such changes, the ethics approval is immediately and automatically forfeited.*
- *The date of approval indicates the first date that the project may be started. Would the project have to continue after the expiry date, a new application must be made to the NWU-IRERC via ESREC and new approval received before or on the expiry date.*
- *In the interest of ethical responsibility the NWU-IRERC and ESREC retains the right to:*
  - *request access to any information or data at any time during the course or after completion of the study;*
  - *to ask further questions, seek additional information, require further modification or monitor the conduct of your research or the informed consent process.*
  - *withdraw or postpone approval if:*
    - *any unethical principles or practices of the project are revealed or suspected,*
    - *it becomes apparent that any relevant information was withheld from the ESREC or that information has been false or misrepresented,*
    - *the required annual report and reporting of adverse events was not done timely and accurately,*
    - *new institutional rules, national legislation or international conventions deem it necessary.*
- *ESREC can be contacted for further information or any report templates via Erna.Conradie@nwu.ac.za or 018 299 4656*

The IRERC would like to remain at your service as scientist and researcher, and wishes you well with your project. Please do not hesitate to contact the IRERC or ESREC for any further enquiries or requests for assistance.

Yours sincerely

Prof LA Du Plessis

Digitally signed by Prof LA Du Plessis
Date: 2017.04.03 08:15:07 +02'00'

**Prof Linda du Plessis**
*Chair NWU Institutional Research Ethics Regulatory Committee (IRERC)*

*H C Sieberhagen*
*SATI no 1001489*
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*Translator and Editor*
*082 3359846*
*018 2994554*

# CERTIFICATE

## OF LANGUAGE EDITING

issued on 03 November 2017

I hereby declare that I have edited the language of the thesis

**Guidelines to enhance secondary school learners' mathematical competence and study orientation in a problem-solving learning context**

by

**T Jordaan**

**0000-0003-0772-0046**

Thesis submitted in fulfilment of the requirements for the degree
Doctor Philosophiae in Mathematics Education at the
Potchefstroom Campus of the North-West University

*The responsibility to accept recommendations and effect changes remains with the author*

H C Sieberhagen
SATI no 1001489
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**Potchefstroom 03 November 2017**

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**Statistical Consultation Services**
Tel: +27 18 285 2447
Fax: +27 0 87 231 5294
Email: shawn.liebenberg@nwu.ac.za

26 October 2017

**Ms. T Jordaan, student number 22997385**

We hereby confirm that the Statistical Consultation Services of the North-West University analysed the data involved in the study of the above-mentioned student and assisted with the interpretation of the results. However, any opinion, findings or recommendations contained in this document are those of the author, and the Statistical Consultation Services of the NWU (Potchefstroom Campus) do not accept responsibility for the statistical correctness of the data reported.

Kind regards

**Mr SC Liebenberg (MSc Statistics)**
**Statistical Consultation Services**

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2520
January 2017

**INFORMED ASSENT OF GRADE 8 LEARNERS (2017)**

Dear Learner

Mathematics is a very important subject, but often misunderstood and for many a scary subject. It is also important to achieve good marks in Mathematics if you wish to study Engineering, Science, Medicine, etc. I started collecting data in 2016 and want to include you in the last part of the project. I therefore need your help in this regard.

I want to find out how you can use and apply your mathematics knowledge. The clever people call this mathematical competence. I also want to know what your study orientation in mathematics looks like. These two things tell us what your mathematics marks will look like. I plan to let you write a mathematics test and to complete some easy questions on your study orientation in mathematics. This will take place during school hours at the beginning of the year.

You are allowed to withdraw from the activities at any time if you wish to do so. All information that I get from you, is kept confidential.These activities will not interfere with your school work or after school activities. I trust that you will be willing to help me in this process. If so, please complete and sign the small form below. Thank you very much in advance.

Ms Tertia Jordaan

Jordaan

---

**Declaration by learner**

I, ……..(name of learner) in Grade …….

am willing to help you with your research. I understand that you will allow me to withdraw at any time if I choose to do so. I accept that all information regarding me will be kept in a confidential way.

Signed at (*place*) .....……. on (*date*) ……...…….. 20....

.....

**Signature of learner**

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2520

March 2016

**INFORMED ASSENT OF GRADE 8 & 9 LEARNERS**

Dear Learner

I am sure that you are aware of the fact that Mathematics is a very important subject, but often misunderstood and for many a scary subject. It is also important to achieve good marks in Mathematics if you wish to study Engineering, Science, Medicine, etc. I have an idea on what we can do to try to help, but I need your help to achieve this.

I want to find out how you can use and apply your mathematics knowledge. The clever people call this mathematical competence. I also want to know what your study orientation in mathematics looks like. These two things tell us what your mathematics marks will look like.

I plan to let you write two short mathematics tests, one during April and the other one during October. You will also have to complete some easy questions on your study orientation in mathematics during the same times. All this will happen during school hours.

You will be allowed to withdraw from the activities at any time if you wish to do so. All information that I get from you, will be kept confidential. My activities will not interfere with your school work or after school activities.

I trust that you will be willing to help me in this process. If so, please complete and sign the small form at the back of this page. Thank you very much in advance.

Ms Tertia Jordaan

Jordaan

**Declaration by learner**

I, ……..(name of learner) in grade …….

am willing to help you with your research. I understand that you will allow me to withdraw at any time if I choose to do so. I accept that all information regarding me will be kept in a confidential way.

I am a SETH learner YES / NO Please circle the option related to you

Signed at (*place*) .....…..…….. on (*date*) ……...…….. 20....

.....
**Signature of learner**

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2520
21 October 2015

**PERMISSION OF GRADE 8 & 9 PARENTS**

**Title of the research project:**

Guidelines to enhance secondary school learners' mathematical competence and study orientation in a problem-solving learning context

Dear Parent

I plan to undertake research at your child's/children's school, Ferdinand Postma, during 2016. The research will take place within the SETH Academy of the Faculty of Engineering of the North-West University at the Potchefstroom Campus.

It is well known that many learners do not qualify for tertiary studies where mathematics is a prerequisite. Furthermore, learners experience difficulty with mathematics at higher institutions due to the fact that they are not mathematically competent and incapable of advanced reasoning skills required at this level.

The aim of my research is to determine the level of mathematical competence and study orientation of the grade 8 & 9 learners' in the SETH Academy as well as all the other grade 8 & 9 learners in the school. It is very important to determine the levels of mathamatical competence at which learners are functioning and how these levels can be further enhanced through problem-solving activities. The intention is to pro-actively enhance the levels of mathematical competence of the learners in order to better prepare them for post-school studies.

The research will be administered as follows:

1. A mathematical pre-test and the Study Orientation Questionnaire in Mathematics (SOM) will be completed by all these learners in March 2016.
2. Learners' mathematical tasks, tests and examinations will be analysed at regular intervals during the year.
3. Sixteen learners will be selected to take part in task-based interviews. The reason for the interviews is to determine learners' thinking and reasoning while doing problem solving activities in mathematics.
4. A mathematical post-test and the SOM questionnaire will be completed again by all these learners in September 2016.

Permission will firstly be obtained from the Department of Basic Education (Tlokwe Region) and your school principal. I therefore want to request you to allow your child to participate in my research.

The following ethical principles will be maintained throughout the study:

- ✓ All data will be treated with confidentiality
- ✓ Your child will remain anonymous
- ✓ Your child's participation in my research will not jeopardise any activities in the SETH Academy or within the school context in any way

Your child could benefit from this research because the results of the study should lead to the improvement of mathematics teaching and learning at the school. This could also improve your child's performance in mathematics. I include the following additional information:

**Contact details:**

**Promotor:** Prof HD Nieuwoudt
Contact number: (018) 299 1875
Email: hercules.nieuwoudt@nwu.ac.za

**Researcher:** Ms T Jordaan
**Contact details:**
Faculty of Education Sciences
Building B11
Potchefstroom
2531
Contact number: 018 299 4580
Email: tertia.jordaan@nwu.ac.za

---

**Declaration by parent/guardian**

I, the undersigned, ……, the parent/guardian of (*child's name)*....., Gr. .....(.....) hereby grant my permission that he/she may participate in this research. I understand that the research will be to the benefit of my child.

Signed at (*place*) .....…..…….. on (*date*) ……...…….. 20.....

.....

**Signature of parent/guardian**

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2520
31 January 2016

**INFORMED CONSENT LETTER OF PARTICIPANTS (MATHEMATICS TEACHERS)**

**TITLE OF THE RESEARCH PROJECT:**
Guidelines to enhance secondary school learners' mathematical competence and study orientation in a problem-solving learning context

**Promotor:** Prof HD Nieuwoudt

Contact number: (018) 299 1875
Email: hercules.nieuwoudt@nwu.ac.za

**Researcher:** Ms T Jordaan

**Contact details:**
Faculty of Education Sciences
Building B11
Potchefstroom
2531

Contact numbers: 018 299 4580 / 082 929 8213
Email: tertia.jordaan@nwu.ac.za

Dear mathematics teacher

You are hereby invited to take part in my research that will take place at your school during 2016. The research will be within the SETH Academy with which you are familiar.

The aim of the research is to determine the effect of the SETH Academy on learners' mathematical competence and study orientation. There is a need to know to which extent the SETH Academy is improving learners' mathematical competence to keep improving their mathematics interventions.

I plan to collect data during 2016 and will work with the SETH learners as well as all the other non-SETH learners in grade 8 & 9. My role will be that of an observer reasearcher,

but I will need your **assistance** with the following aspects during the different stages of the data collection procedure:

1. Administering a pre-test in March 2016 and a post-test in September 2016 to measure the learners' levels of mathematical competence;
2. Administering the Study Orientaion in Mathematics Questionnaire (SOM) at the beginning of 2016 and towards the end of the year;
3. Access to learners' mathematical tasks and assessments in order to assess them in terms of their levels of mathematical competence, and
4. Task-based interviews with 16 purposively chosen learners.

I need to have an individual interview with you as mathematics teacher at the school. The aim of the interview is to determine your view(s) regarding the effect of the SETH Academy on the learners' mathematical competence and study orientation in general as well in particular.

All information will be treated confidentially and your privacy will be respected at all times. I trust that you will participate in this study. I believe that the results of my research will not only assist local stakeholders, but that gained knowledge and insight could make an international contribution too.

---

**Declaration by participating teacher**

I, the undersigned, ……..., hereby grant my permission to participate in this research. I understand that the research will be to the benefit of the participating learners of our school.

Signed at (*place*) .....…..…….. on (*date*) ……...…….. 20.....

.....
**Signature of participant**

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January 2017

**PERMISSION OF GRADE 8 PARENTS (2017)**

**Title of the research project:**

Guidelines to enhance secondary school learners' mathematical competence and study orientation in a problem solving learning context

Dear Parent

It is well-known that many learners do not qualify for tertiary studies where mathematics is a pre-requisite. Furthermore, learners experience difficulty with mathematics at higher institutions due to the fact that they are not mathematically competent and incapable of advanced reasoning skills required at this level.

I started with research at the school during 2016. The research takes place within the SETH Academy of the Faculty of Engineering of the North-West University at the Potchefstroom Campus. The aim of this research is to determine the level of mathematical competence as well as study orientation of the grade 8 & 9 learners' in the SETH Academy as well as all the other grade 8 & 9 learners in the school. It is very important to determine the levels of mathamatical competence at which learners are functioning and how these levels can be further enhanced through problem solving activities. The intention is to pro-actively enhance the levels of mathematical competence of the learners in order to better prepare them for post-school studies.

I plan to gather additional data including the new grade 8 learners during the first part of 2017. I therefore want to request you to allow your child to participate in the research.

Your child is asked to write:

1. A mathematical test; and
2. To complete the Study Orientation Questionnaire in Mathematics (SOM).

The following ethical principles are maintained throughout the study:

- ✓ All data are treated with confidentiality.
- ✓ Your child remains anonymous.
- ✓ Your child's participation in the research does not jeopardise any activities in the SETH Academy or within the school context in any way.

Your child could benefit from this research because the results of the study should lead to the improvement of mathematics teaching and learning at the school. This could also improve your child's performance in mathematics.

I include the following additional information:

**Contact details:**

**Promotor:** Prof HD Nieuwoudt
Contact number: (018) 299 1875
Email: hercules.nieuwoudt@nwu.ac.za

**Researcher:** Ms T Jordaan

**Contact details:**
Faculty of Education Sciences
Building B11
Potchefstroom
2531
Contact number: 018 299 4580
Email: tertia.jordaan@nwu.ac.za

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**Declaration by parent/guardian**

I, the undersigned, ……, the parent/guardian of (*child's name)*....., Gr. .....(.....) hereby grant my permission that he/she may participate in this research. I understand that the research will be to the benefit of my child.

Signed at (*place*) .....……. on (*date*) ……...…….. 20.....

.....

**Signature of parent/guardian**

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2520
Januarie 2017

**INGELIGTE INSTEMMING VAN GRAAD 8 LEERDERS (2017)**

Beste Leerder

Wiskunde is ’n baie belangrike vak, maar word dikwels misverstaan en is daarom vir baie leerders ’n “scary” vak. Dit is verder belangrik om goeie punte in Wiskunde te kry as jy ingenieurswese, wetenskap, medies, ens. wil gaan studeer. Ek het in 2016 begin om hieroor inligting in te samel en wil jou nou deel maak van die laaste gedeelte van die projek. Ek het daarvoor jou hulp nodig

Ek wil graag uitvind hoe jy jou wiskunde-kennis kan gebruik en toepas. Die slim mense noem dit wiskundige bevoegdheid. Ek wil ook weet wat jou ingesteldheid teenoor wiskunde is. Hierdie twee dinge vertel vir ons hoe jou wiskundepunte sal lyk. Ek wil vra dat jy ‘n wiskundetoets skryf en dat jy ook ‘n paar maklike vrae oor jou wiskunde ingesteldheid moet beantwoord. Dit sal aan die begin van die skooljaar gedoen word.

Jy mag te enige tyd onttrek uit die aktiwiteite as jy sou verkies om dit te doen. Verder sal alle inligting wat ek van jou kry, vertroulik gebruik word. Die aktiwiteite sal nie inmeng met jou skoolwerk of na-skoolse aktiwiteite nie.

Ek hoop dat jy sal instem om my hiermee te help. As jy wil help, vul asb die klein vorm hieronder in en onderteken dit. Ek sê by voorbaat baie dankie vir jou bereidwilligheid.

Mev. Tertia Jordaan

Jordaan

---

**Verklaring deur die leerder**

Ek, ……..(naam van leerder) in Graad …….

is gewillig om jou te help met jou ondersoek. Ek verstaan dat jy my sal toelaat om enige tyd te onttrek as ek verkies om dit te doen. Ek aanvaar dat alle inligting van my vertroulik hanteer sal woed.

Geteken te (*plek*) .....…..…….. op (*datum*) ……...…….. 20....

.....

**Handtekening van leerder**

NORTH-WEST UNIVERSITY
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2520

Maart 2016

**INGELIGTE INSTEMMING VAN GRAAD 8 & 9 LEERDERS**

Beste Leerder

Ek is seker dat jy weet dat Wiskunde ’n baie belangrike vak is, maar baie keer nie verstaan word nie en vir baie ’n “scary” vak is. Dit is ook belangrik om goeie punte in Wiskunde te kry as jy Ingenieurswese, Wetenskap, Medies, ens. wil gaan studeer. Ek het ’n idee wat ons kan doen om te help, maar ek het jou hulp nodig om te kyk of dit sal werk.

Ek wil uitvind hoe jy jou wiskunde-kennis kan gebruik en toepas. Die slim mense noem dit wiskundige bevoegdheid. Ek wil ook weet wat jou ingesteldheid teenoor Wiskunde is. Hierdie twee dinge vertel vir ons hoe jou wiskundepunte sal lyk.

Ek wil hê dat jy twee kort wiskundetoetse sal skryf, een in April en die ander een in Oktober. Jy sal ook ‘n paar maklike vrae oor jou wiskunde ingesteldheid moet beantwoord op dieselfde tye. Al hierdie dinge sal in skooltyd gebeur.

Jy mag te enige tyd onttrek uit die aktiwiteite as jy sou verkies om dit te doen. Verder sal alle inligting wat ek van jou kry, vertroulik gebruik word. My aktiwiteite sal nie inmeng met jou skoolwerk of na-skoolse aktiwiteite nie.

Ek hoop dat jy kans sal sien om my te help met wat ek graag wil doen. As jy wil help, teken en vul asb die klein vorm aan die agterkant van die bladsy in. Ek sê solank baie dankie vir jou hulp.

Mev. Tertia Jordaan

Jordaan

**Verklaring deur die leerder**

Ek, ……..(naam van leerder) in graad …….

is gewillig om jou te help met jou ondersoek. Ek verstaan dat jy my sal toelaat om enige tyd te onttrek as ek verkies om dit te doen. Ek aanvaar dat alle inligting van my vertroulik hanteer sal word.

Ek is ŉ SETH leerder JA / NEE Omkring asb die een wat op jou van toepassing is

Geteken te (*plek*) .....…..…….. op (*datum*) ……...…….. 20....

.....
**Handtekening van leerder**

NORTH-WEST UNIVERSITY
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Maart 2016

**INGELIGTE TOESTEMMING VAN WISKUNDE ONDERWYSERS**

**TITEL VAN DIE NAVORSINGSPROJEK:**
"Guidelines to enhance secondary school learners' mathematical competence and study orientation in a problem solving learning context"

**Promotor:** Prof HD Nieuwoudt
Kontaknommer: (018) 299 1875
Epos: hercules.nieuwoudt@nwu.ac.za

**Navorser:** Mev. T Jordaan
**Kontakbesonderhede:**
Fakulteit van Opvoedingswetenskappe
Gebou B11
Potchefstroom
2531

Kontaknommers: 018 299 4580 / 082 929 8213
Epos: tertia.jordaan@nwu.ac.za

Geagte wiskunde onderwyser

U word uitgenooi om deel te neem aan my navorsing wat by u skool sal plaasvind gedurende 2016. Die navorsing sal binne die SETH Akademie plaasvind, waarmee u reeds vertroud is.

Die doel van die navorsing is om die effek van die SETH Akademie op leerders se wiskundige bevoegdheid sowel as studie-oriëntasie te bepaal. Daar is 'n behoefte om vas te stel tot watter mate die SETH Akademie leerders se wiskundige bevoegdheid bevorder om sodoende aan te hou om die wiskunde sessies te verbeter.

My plan is om gedurende die jaar data in te samel. Ek wil graag met al die graad 8 & 9 leerders werk. My rol sal diè van waarnemende navorser wees, maar ek het u hulp nodig met die volgende sake gedurende die verskillende fases van die data-insamelingsproses:

1. Om ‘n voortoets in April 2016 en ‘n natoets in Oktober 2016 af te neem om leerders se vlakke van wiskundige bevoegdheid te bepaal. Hierdie toetse sal op die leerders se toetsroosters geskeduleer word;
2. Om die Studie-oriëntasie in Wiskunde vraelys (SOW) ook in April en Oktober 2016 af te neem;
3. Om my toe te laat om leerders se wiskundige take en assesserings te ondersoek in terme van hulle vlakke van wiskundige bevoegdheid; en
4. Om taakgebaseerde onderhoude met 16 leerders te voer wat gekies sal word op grond van die resultate van die voortoets..

Ek wil ook graag ‘n individuele onderhoud met u as wiskunde onderwyser voer. Die doel van die onderhoud is om u siening(s) aangaande die effek van die SETH Akademie op leerders se wiskundige bevoegdheid en studie-oriëntasie in die algemeen, maar ook spesifiek te bepaal.

Ek vertrou dat u aan die navorsing sal deelneem. Alle inligting sal vertroulik hanteer word en u privaatheid sal ten alle tye gerespekteer word. U behou ook die reg voor om te enige tyd uit die navorsing te onttrek. Ek hoop dat u aan die navorsing sal kan deelneem. Ek glo dat die resultate van my navorsing die plaaslike belanghebbendes sal help, maar ook dat dit ‘n nasionale bydrae kan lewer.

---

**Verklaring deur deelnemende onderwyser**

Ek, die ondergetekende, ……., verleen hiermee my toestemming om deel te neem aan hierdie navorsing. Ek verstaan dat die navorsing tot die voordeel van die deelnemende leerders van ons skool behoort te wees.

Geteken te (*plek*) .....…….. op(*datum*) ……...…….. 20.....

.....
**Handtekening van onderwyser**

NORTH-WEST UNIVERSITY
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2520
Januarie 2017

**TOESTEMMING VAN GRAAD 8 OUERS (2017)**

**TITEL VAN DIE NAVORSINGSPROJEK:**

"Guidelines to enhance secondary school learners' mathematical competence and study orientation in a problem solving learning context"

Geagte Ouer

Dit is alombekend dat baie leerders nie kwalifiseer vir verdere studie aan 'n universiteit waar wiskunde 'n voorvereiste is nie. Baie studente ondervind ook probleme met wiskunde op universiteit omdat hulle nie wiskundig bevoegd is nie en ook omdat hulle nie oor die gevorderde redeneringsvaardighede beskik wat op universiteit van hulle verwag word nie.

Ek het gedurende 2016 begin met navorsing by die skool. Die navorsing vind plaas binne die SETH Akademie van die Fakulteit Ingenieurswese van die Noordwes-Universiteit op die Potchefstroomkampus. Die doel van die navorsing is om die vlak van wiskundige bevoegdheid sowel as die studie-oriëntasie van al die graad 8 & 9 in die skool te bepaal. Dit is nodig om te weet op watter bevoegdheidsvlakke leerders funksioneer sodat hierdie vlakke bevorder kan word deur probleemoplossingsaktiwiteite. Die doelwit is om hierdie bevoegdheidsvlakke van leerders pro-aktief te bevorder sodat leerders beter voorbereid sal wees vir naskoolse studies.

Ek beplan om addisionele data met die nuwe graad 8 leerders in te samel gedurende die eerste gedeelte van 2017. Ek vra dus dat u asb u kind sal toelaat om aan die navorsing deel te neem.

Die volgende word van u kind gevra:

1. Om 'n wiskundetoets te skryf, en
2. Om die Studie-oriëntasievraelys in wiskunde (SOW) te voltooi.

Die volgende etiese beginsels word tydens die navorsing gehandhaaf:

- ✓ Alle data word vertroulik hanteer
- ✓ U kind bly ten alle tye anoniem en
- ✓ U kind se deelname in die navorsing meng geensins in met enige aktiwiteite van die SETH Akademie of die skool as sulks nie

U kind behoort baat te vind by die navorsing omdat die resultate kan lei tot die verbetering van wiskunde onderrig en leer in die skool. Dit kan ook u kind se prestasie in wiskunde bevorder.

Ek sluit die volgende addisionele inligting in:

**Kontakbesonderhede:**

**Promotor:** Prof HD Nieuwoudt
Kontaknommer: (018) 299 1875
Epos: hercules.nieuwoudt@nwu.ac.za

**Navorser:** Mev. T Jordaan

**Kontakbesonderhede:**
Fakulteit van Opvoedingswetenskappe
Gebou B11
Potchefstroom
2531
Kontaknommer: 018 299 4580
Epos: tertia.jordaan@nwu.ac.za

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**Verklaring deur die ouer/voog**

Ek, die ondergetekende, ……., die ouer/voog van (*kind se naam)*....., Gr. .....(.....) gee hiermee my toestemming dat hy/sy aan die navorsing mag deelneem. Ek verstaan dat die navorsing tot my kind se voordeel sal wees.

Geteken te (*plek*) .....…..…….. op (*datum*) ……...……..20.....

.....

**Handtekening van ouer/voog**

NORTH-WEST UNIVERSITY
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Interne Bussie 539
Potchefstroom
2520
31 Januarie 2016

**TOESTEMMING VAN GRAAD 8 & 9 OUERS**

**TITEL VAN DIE NAVORSINGSPROJEK:**

"Guidelines to enhance secondary school learners' mathematical competence and study orientation in a problem solving learning context"

Geagte Ouer

Ek beplan om gedurende 2016 navorsing by u kind/kinders se skool, Ferdinand Postma, te doen. Die navorsing sal plaasvind binne die SETH Akademie van die Fakulteit Ingenieurswese van die Noordwes-Universiteit op die Potchefstroomkampus.

Dit is alombekend dat baie leerders nie kwalifiseer vir verdere studie aan 'n universiteit waar wiskunde 'n voorvereiste is nie. Baie studente ondervind ook probleme met wiskunde op universiteit omdat hulle nie wiskundig bevoegd is nie en ook omdat hulle nie oor die gevorderde redeneringsvaardighede beskik wat op universiteit van hulle verwag word nie.

Die doel van my navorsing is om die vlak van wiskundige bevoegdheid sowel as die studie-oriëntasie van al die graad 8 & 9 in die skool te bepaal. Dit is nodig om te weet op watter bevoegdheidsvlakke leerders funksioneer sodat hierdie vlakke bevorder kan word deur probleemoplossingsaktiwiteite. Die doelwit is om hierdie bevoegdheidsvlakke van leerders pro-aktief te bevorder sodat leerders beter voorbereid sal wees vir naskoolse studies.

Die navorsing sal as volg uitgevoer word:

1. 'n Wiskunde voortoets en die Studie-oriëntasievraelys in wiskunde (SOW) sal gedurende Maart 2016 deur al die graad 8 & 9 leerders voltooi word.
2. Leerders se wiskundige take, toetse en eksamenvraestelle sal op gereelde basis gedurende die jaar geanaliseer word.
3. Sestien leerders sal gekies word om deel te neem aan taakgebaseerde onderhoude. Die rede vir die onderhoude is om leerders se denke en redenering tydens probleemoplossingsaktiwiteite te bepaal.
4. 'n Wiskunde natoets en die SOW vraeslys sal weer deur al die leerders in graad 8 & 9 voltooi word gedurende September 2016.

Toestemming sal eerstens by die Departement van Basiese Onderwys (Tlokwe Distrik) verkry word asook u skoolhoof. Ek wil u dus versoek om u kind toe laat om aan my navorsing deel te neem.

Die volgende etiese beginsels sal tydens die navorsing gehandhaaf word:

- ✓ Alle data sal vertroulik hanteer word.
- ✓ U kind sal ten alle tye anoniem bly.
- ✓ U kind se deelname in my navorsing sal geensins inmeng met enige aktiwiteite van die SETH Akademie of die skool as sulks nie.

U kind behoort baat te vind by die navorsing omdat die resultate kan lei tot die verbetering van wiskunde onderrig en leer in die skool. Dit kan ook u kind se prestasie in wiskunde bevorder.

Ek sluit die volgende addisionele inligting in:

**Kontakbesonderhede:**

**Promotor:** Prof HD Nieuwoudt
Kontaknommer: (018) 299 1875
Epos: hercules.nieuwoudt@nwu.ac.za

**Navorser:** Mev. T Jordaan

**Kontakbesonderhede:**
Fakulteit van Opvoedingswetenskappe
Gebou B11
Potchefstroom
2531
Kontaknommer: 018 299 4580
Epos: tertia.jordaan@nwu.ac.za

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**Verklaring deur die ouer/voog:**

Ek, die ondergetekende, ……., die ouer/voog van (*kind se naam)*....., Gr. .....(.....) gee hiermee my toestemming dat hy/sy aan die navorsing mag deelneem. Ek verstaan dat die navorsing tot my kind se voordeel sal wees.

Geteken te (*plek*) .....…..…….. op (*datum*) ……...……..20.....

.....

**Handtekening van ouer/voog:**

**Education and Sport Development**
Department of Education and Sport Development
Departement van Onderwys en Sport Ontwikkeling
Lefapha la Thuto le Tlhabololo ya Metshameko
**NORTH WEST PROVINCE**

Temane Building
8 O.R. Tambo Street, Potchefstroom
Private Bag X1256,
Potchefstroom 2520
Tel.: (018) 299-8216
Fax: (018) 294-8234
Enquiries: Mr H. Motara
e-mail: hmotara@nwpg.gov.za

## DR KENNETH KAUNDA DISTRICT

## OFFICE OF THE DISTRICT DIRECTOR

01 February 2016

Ms T Jordaan
Registration Number: 22997385
North West University – Potchefstroom Campus

**PERMISSION TO CONDUCT RESEARCH "GUIDELINES TO ENHANCE SECONDARY SCHOOL LEARNERS' MATHEMATICAL COMPETENCE AND STUDY ORIENTATION INA PROBLEM SOLVING LEARNING CONTEXT" AT FERDINAND POSTMA HIGH SCHOOL – TLOKWE AREA OFFICE IN DR KENNETH KAUNDA DISTRICT**

The above matter refers.

Permission is hereby granted to you to conduct your research at Ferdinand Postma High School – Tlokwe Area Office in Dr Kenneth Kaunda District under the following provisions:

- **The activity you undertake at the school should not tamper with the normal process of teaching and learning; and will take place after school hours.**
- **You inform the principal of your identified school of your impending visit and activity;**
- **You provide my office with a report in respect of your findings from the research; and**
- **You obtain prior permission from this office before availing your findings for public or media consumption.**

Wishing you well in your endeavour.

Thanking you

**MR H MOTARA**
**DISTRICT DIRECTOR**
**DR KENNETH KAUNDA DISTRICT**

*cc* *Ms S S Yssel – Area Manager: Tlokwe*

NORTH-WEST UNIVERSITY
YUNIBESITI YA BOKONE-BOPHIRIMA
NOORDWES-UNIVERSITEIT
POTCHEFSTROOM CAMPUS

Private Bag X6001
Internal Box 539
Potchefstroom
2520
21 October 2015

The Department of Basic Education
The Executive District Director
Dr Kenneth Kaunda District

**Permission to undertake research at Ferdinand Postma School in Potchefstroom**

Dear Mr Motara

I am a staff member and registered PhD student (Mathematics Education) at the North-West University. My registration number is 22997385. The title of my study is: **Guidelines to enhance secondary school learners' mathematical competence and study orientation in a problem solving learning context.**

My study will take place within the Science, Engineering, Technology and Health (SETH) Academy of the Faculty of Engineering of the North-West University at the Potchefstroom Campus, based at the Ferdinand Postma School in Potchefstroom (Tlokwe Area Office). The overarching aim of the SETH Academy is to assist learners to become more proficient in Mathematics and to pro-actively prepare them for tertiary studies in Mathematics or where Mathematics is a prerequisite.

The aim of my research is to determine the effect of the SETH Academy on learners' mathematical competence as well as their study orientation. There is a need to know to which extent the SETH Academy is improving learners' mathematical competence in order to keep improving their mathematics interventions.

I plan to collect data during 2016 and will work with the SETH learners as well as all the other non-SETH learners in grade 8 & 9. My role will be that of an observer reasearcher, but I need permission to do the following in the school with the learners and the four mathematics teachers involved:

1. To administer (in grade 8 & 9) a pre-test in March 2016 and a post-test in September 2016 to measure the learners' levels of mathematical competence;
2. To administer (in grade 8 & 9) the Study Orientaion in Mathematics Questionnaire (SOM) at the beginning of 2016 and towards the end of the year;
3. To have access to learners' mathematical tasks and assessments in order to assess them in terms of their levels of mathematical competence;
4. To have task-based interviews with 16 purposively chosen learners, and

5. To have individual interviews with each of the four mathematics teachers at the school.

Permission, if granted by you, to conduct my study will also be obtained from the school principal. I will further request informed consent from the four mathematics teachers and the parents of all the learners involved.

I trust that you will allow me to execute this study at the school. I believe that the results of my research will not only assist local stakeholders, but that gained knowledge and insight could make an international contribution too.

I include the following additional information:

**Reference numbers:**

**Promotor:** Prof HD Nieuwoudt
Contact number: 018 299 1875
Email: hercules.nieuwoudt@nwu.ac.za

**Researcher:** Ms T Jordaan
**Contact details:**
Faculty of Education Sciences
Building B11
Potchefstroom
2520
Contact numbers: 018 299 4580 / 082 929 8213
Email: tertia.jordaan@nwu.ac.za

Yours sincerely

Ms Tertia Jordaan

NORTH-WEST UNIVERSITY
YUNIBESITI YA BOKONE-BOPHIRIMA
NOORDWES-UNIVERSITEIT
POTCHEFSTROOM CAMPUS

Private Bag X6001
Internal Box 539
Potchefstroom
2520
31 January 2016

The Principal and School Governing Body
Ferdinand Postma School

**Permission to undertake research at your school**

Dear Sir

I am a staff member and registered PhD student (Mathematics Education) at the North-West University. The title of my study is: **Guidelines to enhance secondary school learners' mathematical competence and study orientation in a problem solving learning context.**

My study will take place within the Science, Engineering, Technology and Health (SETH) Academy of the Faculty of Engineering of the North-West University at the Potchefstroom Campus. The overarching aim of the SETH Academy is to assist learners to become more competent in Mathematics and to pro-actively prepare them for tertiary studies in Mathematics or where Mathematics is a prerequisite.

The aim of my research is to determine the effect of the SETH Academy on learners' mathematical competence as well as study orientation. There is a need to know to which extent the SETH Academy is improving learners' mathematical competence in order to keep improving their mathematics interventions.

I plan to collect data during 2016 and will work with the SETH learners as well as all the other non-SETH learners in grade 8 & 9. My role will be that of an observer reasearcher, but I need permission to do the following in the school with these learners and the four mathematics teachers:

1. To administer a pre-test in March 2016 and a post-test in September 2016 to measure the learners' levels of mathematical competence;
2. To administer the Study Orientaion in Mathematics Questionnaire (SOM) at the beginning of 2016 and towards the end of the year in grade 8 & 9;
3. To have access to learners' mathematical tasks and assessments in order to assess them in terms of their levels of mathematical competence;
4. To have task-based interviews with 16 purposively chosen learners, and
5. To have individual interviews with each of the four mathematics teachers at the school.

I will obtain permission from the Department of Basic Education (Tlokwe region). I will further request informed consent from the four mathematics teachers and the parents of all the learners involved in this study.

I trust that you will allow me to execute this study at your school. I believe that the results of my research will not only assist local stakeholders, but that gained knowledge and insight could make an international contribution too.

I include the following additional information:

**Reference numbers:**

**Promotor:** Prof HD Nieuwoudt
Contact number: 018 299 1875
Email: hercules.nieuwoudt@nwu.ac.za

**Researcher:** Ms T Jordaan
**Contact details:**
Faculty of Education Sciences
Building B11
Potchefstroom
2520
Contact numbers: 018 299 4580 / 082 929 8213
Email: tertia.jordaan@nwu.ac.za

I hope to hear from you soon.

Yours sincerely

Ms Tertia Jordaan

**HOËRSKOOL · FERDINAND POSTMA · HIGH SCHOOL**

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Tel: (018) 290 7610

10 Mei 2016

## NAVORSING TOESTEMMING

Hiermee gee ek, Mnr. A.J. Labuachagne, toestemming aan Mev. Tertia Jordaan om data te versamel by Hoërskool Ferdinand Postma vir haar PhD; op voorwaarde dat die betrokke leerders en hul ouers skriftelik toestemming daarvoor gee.

Mev. Jordaan kry toestemming:

1. Om 'n voortoets in April 2016 en 'n natoets in Oktober 2016 af te neem om die vlakke van al die graad 8 & 9 leerders se wiskundige bevoegdheid te meet;
2. Om die Studie-oriëntasievraelys in Wiskunde (SOW) aan die begin van 2016 en weer aan die einde van die jaar met dieselfde leerders af te neem;
3. Om toegang te verkry tot hierdie leerders se wiskundetake en formele assesserings om sodoende hulle vlakke van wiskundige bevoegdheid te bepaal;
4. Om taakgebaseerde onderhoude met 16 gekose leerders uit die groep leerders te voer, en
5. Om individuele onderhoude met elk van die ses wiskunde onderwysers by die skool te voer.

Mnr. A.J. Labuschagne
Hoof

| R = RARELY | S = SOMETIMES | F = FREQUENTLY | G = GENERALLY | A = ALMOST ALWAYS |
|---|---|---|---|---|

| | |
|---|---|
| 1. | I enjoy solving Maths problems. |
| 2. | While answering tests or exams in Maths, I panic. |
| 3. | I catch up lost work in Maths. |
| 4. | I explain Maths to my friends, parents or other persons. |
| 5. | My teachers uses words that I do not know and that confuses me |
| 6. | I believe that I can do well in Maths. |
| 7. | When I do Maths in class, I get anxious. |
| 8. | I test myself in writing as well as orally on Maths that I learn. |
| 9. | I can think of examples where i use Maths outside the class. |
| 10. | I like the place where i do my homework and prepare for tests and exams in Maths. |
| 11. | If the Math lesson is boring, I do something which interest me more; writing letters for instance. |
| 12. | I cannot speak clearly when I suddenly have to answer a question in a Maths class. |
| 13. | I postpone my Maths homework and do something i enjoy more. |
| 14. | I know what to do when I have to solve Maths problems. |
| 15. | Unhappiness or frustration prevents me from working as hard as I can in Maths. |
| 16. | I think the Maths topics are useful. |
| 17. | I lose marks in Maths tests because I cross out correct answers. |
| 18. | I repeatedly read through a longer problem until i fully understand what is going on. |
| 19. | I try to find connections between different sections of Maths. |
| 20. | I am too frightened of my Maths teacher to ask questions about Maths. |
| 21. | It is more important to me to know how to solve a Maths problem than just find the answer. |
| 22. | When my friends talk about a sum or way of solving a problem in the Maths class, I chew on my fingernails, pencil or other objects. |
| 23. | I keep my Maths homework UP to date by completing every day’s work properly. |
| 24. | As far as I can, I look for less difficult example of a Maths problem to try to solve it (to see how work that I know well is connected to new work). |
| 25. | I ask my teacher to help me understand Maths assignments that are not clear to me. |

| | |
|---|---|
| 26. | I try to carry out the following four steps for problem solving in Maths: Fins out what is given and asked; make a plan; carry out the plan and verify the solution. |
| 27. | When i do Maths with other learners, I make sure that I also try to work out the answers. |
| 28. | During the Maths lesson I pay attention to the work. |
| 29. | I play nervously with my pen, ruler or something else when I have to solve difficult Maths problems. |
| 30. | While doing my homework in Maths, it is important to me. To find out which concepts (ideas) I do not understand. |
| 31. | I find it possible to convey my mathematical knowledge in Maths tests and exams. |
| 32. | It is my parents or teachers fault that I do not work hard at Maths. |
| 33. | When I started doing Maths I become sleepy, tired or bored. |
| 34. | I lose marks in Maths tests and exams because I work too quickly or too slowly. |
| 35. | I postpone my Maths homework (or to learn for a Maths test) by doing something else first. |
| 36. | I try to apply the Maths that I learn in class in everyday life. |
| 37. | I cannot see or hear well in the Maths class, but I hesitate to mention it to my teacher. |
| 38. | After having worked for a while I find that I cannot concentrate on Maths any more. |
| 39. | While writing Maths tests or exams, I become worried when I see how quickly the other children work while I make slow progress because I battle. |
| 40. | I make sure that I follow up my Maths tests and exams and that I understand why I have made mistakes. |
| 41. | I first read through all the work quickly to get a complete picture of the test or exam work in Maths on which I shall be tested before I begin preparing. |
| 42. | I get poor marks in Maths because of the situation at home. |
| 43. | I talk enthusiastically to my parents and friends about Maths. |
| 44. | Even though I know that certain sums are incorrect, I mark them correct. |
| 45. | I learn formulas and theorems until I know them by heart. |
| 46. | When I find that I do not understand a sum, I look at it from another angle or read it in another way. |
| 47. | I do not understand words in Maths. |
| 48. | I believe it is important to use Maths to help me make the world a better place. |
| 49. | In the Maths class, I find that I have to visit the toilet. |

| | |
|---|---|
| 50. | I make sure that my sketches in Geometry are big and clear; I use colour pencils to make the sketches more clear to me. |
| 51. | While doing a long sum, I stop in between to make sure that I understand what I have already done. |
| 52. | I am unsure whether my work is correct, but i hesitate to ask my teacher questions in this regard. |
| 53. | Maths is a subject in which problem solving is more important than memorization. |
| 54. | I try to understand why the rules in Maths work. |
| 55. | I continue to work in Maths, even if I find it uninteresting or boring. |
| 56. | In the Maths class I perspire more than in other classes. |
| 57. | When I get totally stuck while trying to solve a problem in Maths, I go back to the beginning of it. |
| 58. | It is important to me. To estimate my answers in Maths before doing the actual calculations. |
| 59. | The names and examples that used in “word problems” are unfamiliar to me. |
| 60. | I try to be interested in Maths even if it seems more enjoyable to do something else. |
| 61. | I struggle with certain sums because I have not read them carefully. |
| 62. | When preparing for Maths tests and exams, I work out a number of new problems and not only well-known problems. |
| 63. | I talk to my friends about Maths and we discuss mathematical terms and concepts (ideas). |
| 64. | Personal problems are why I cannot do my best in Maths. |
| 65. | I look for help when I have problems with Maths. |
| 66. | I move my feet when my Maths teacher askes me a question. |
| 67. | I work out previous Maths tests and exam papers. |
| 68. | I ask questions and take part in discussions during the Maths lesson. |
| 69. | I read slowly, therefor I do not complete my test and exam papers. |
| 70. | I make sure that I understand formulas and theorems before I memorize them. |
| 71. | I am afraid to discuss my personal problems with my Maths teacher. |
| 72. | I make sure that i know how much time I need for revision before Maths tests and exams and I plan my time accordingly. |
| 73. | I know which subsections of Maths I cannot do. |
| 74. | When I come across a new word or symbol in Maths, I make sure that I understand it. |

| | |
|---|---|
| 75. | I try to find patterns when I do Maths. |
| 76. | I look at smaller details when I study Maths and I cannot see the whole picture. |
| LEARNERS IN GRADE 7,8 AND 9 STOP HERE. DID YOU ANSWER ALL OF THE QUESTIONS? CHECK AND SEE. WAIT UNTIL YOU ARE TOLD WHAT TO DO. | |
| THIS PART IS TO BE COMPLETED ONLY BY LEARNERS IN GRADE 10, 11 AND 12. | |
| 77. | I do badly in Geometry because I make wrong assumptions; accepting, for example, that any point 0 within a circle must necessarily be the center of the circle. |
| 78. | I find, especially in Geometry, that I attribute properties to sketches while it does not have the properties. |
| 79. | I work out problems until I am convinced that I carried out the steps in problem solving in Maths. |
| 80. | I only find that i do not understand the sums when the teacher goes through the solutions (gives the answers). |
| 81. | My mark for geometry is lower than it should be because I cannot apply certain theorems during Maths tests and exams. |
| 82. | I forget theorems and formulas that I do know when I write Maths tests and exams. |
| 83. | I make use of tables, sketches and diagrams to solve Maths problems. |
| 84. | I lose marks because I prove something that I was not asked to prove in Maths tests and exams. |
| 85. | I check my answers in Maths carefully to make sure that I have not made any mistakes. |
| 86. | I give incorrect numerical values to unknowns. |
| 87. | I lose marks because I apply some theorems or formulas incorrectly. |
| 88. | Some theorems or formulas I either remember only partially correct or not at all. |
| 89. | I use formulas/symbols incorrectly. |
| 90. | I memorize Maths theorems and formulas by not only reading them, but also by writing them Down and discussing them with friends. |
| 91. | During exams and tests I ignore facts that are “given”, or I accept something as “given” when it is not the case. |
| 92. | I made careless mistakes in Maths. |
| DID YOU ANSWER ALL OF THE QUESTIONS? CHECK AND SEE. WAIT UNTIL YOU ARE TOLD WHAT TO DO. | |

# Studie-oriëntasie in Wiskunde / Study Orientation in Mathematics

**Naam/Name:** _____ **Graad/Grade:** _____

| R = Byna Nooit / Rarely | S = Soms / Sometimes | F = Dikwels / Frequently | G = Gewoonlik / Generally | A = Altyd / Always |
|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| **1** | R | S | F | G | A |
| **2** | R | S | F | G | A |
| **3** | R | S | F | G | A |
| **4** | R | S | F | G | A |
| **5** | R | S | F | G | A |
| **6** | R | S | F | G | A |
| **7** | R | S | F | G | A |
| **8** | R | S | F | G | A |
| **9** | R | S | F | G | A |
| **10** | R | S | F | G | A |
| **11** | R | S | F | G | A |
| **12** | R | S | F | G | A |
| **13** | R | S | F | G | A |
| **14** | R | S | F | G | A |
| **15** | R | S | F | G | A |
| **16** | R | S | F | G | A |
| **17** | R | S | F | G | A |
| **18** | R | S | F | G | A |
| **19** | R | S | F | G | A |
| **20** | R | S | F | G | A |
| **21** | R | S | F | G | A |
| **22** | R | S | F | G | A |
| **23** | R | S | F | G | A |
| **24** | R | S | F | G | A |
| **25** | R | S | F | G | A |
| **26** | R | S | F | G | A |
| **27** | R | S | F | G | A |
| **28** | R | S | F | G | A |
| **29** | R | S | F | G | A |
| **30** | R | S | F | G | A |
| **31** | R | S | F | G | A |
| **32** | R | S | F | G | A |
| **33** | R | S | F | G | A |
| **34** | R | S | F | G | A |
| **35** | R | S | F | G | A |
| **36** | R | S | F | G | A |
| **37** | R | S | F | G | A |
| **38** | R | S | F | G | A |

| | | | | | |
|---|---|---|---|---|---|
| **39** | R | S | F | G | A |
| **40** | R | S | F | G | A |
| **41** | R | S | F | G | A |
| **42** | R | S | F | G | A |
| **43** | R | S | F | G | A |
| **44** | R | S | F | G | A |
| **45** | R | S | F | G | A |
| **46** | R | S | F | G | A |
| **47** | R | S | F | G | A |
| **48** | R | S | F | G | A |
| **49** | R | S | F | G | A |
| **50** | R | S | F | G | A |
| **51** | R | S | F | G | A |
| **52** | R | S | F | G | A |
| **53** | R | S | F | G | A |
| **54** | R | S | F | G | A |
| **55** | R | S | F | G | A |
| **56** | R | S | F | G | A |
| **57** | R | S | F | G | A |
| **58** | R | S | F | G | A |
| **59** | R | S | F | G | A |
| **60** | R | S | F | G | A |
| **61** | R | S | F | G | A |
| **62** | R | S | F | G | A |
| **63** | R | S | F | G | A |
| **64** | R | S | F | G | A |
| **65** | R | S | F | G | A |
| **66** | R | S | F | G | A |
| **67** | R | S | F | G | A |
| **68** | R | S | F | G | A |
| **69** | R | S | F | G | A |
| **70** | R | S | F | G | A |
| **71** | R | S | F | G | A |
| **72** | R | S | F | G | A |
| **73** | R | S | F | G | A |
| **74** | R | S | F | G | A |
| **75** | R | S | F | G | A |
| **76** | R | S | F | G | A |

| SOM field | Questions in the field | Total number |
|---|---|---|
| **Study attitude** | 1 6 11 16 21 28 33 38 43 48 55 60 65 70 | **14** |
| | | |
| **Mathematics anxiety** | 2 7 12 17 22 29 34 39 44 49 56 61 66 71 | **14** |
| | | |
| **Study habits** | 3 8 13 18 23 27 30 35 40 45 50 54 57 62 67 72 74 | **17** |
| | | |
| **Problem-solving behaviour** | 4 9 14 19 24 26 31 36 41 46 51 53 58 63 68 73 75 76 | **18** |
| | | |
| **Study milieu** | 5 10 15 20 25 32 37 42 47 52 59 64 69 | **13** |
| | | |
| **Total** | | **76** |
| | | |
| **Questions reversed** | 2 5 7 11 12 13 15 17 20 22 29 32 33 34 35 37 38 39 42 44 47 49 52 56 59 61 64 66 69 71 76 | **31** |

**Table 14 Percentile ranks for grade 8 and 9 learners jointly**

| Percentile rank | Raw scores | | | | | | Percentile rank |
|---|---|---|---|---|---|---|---|
| | Field 1 | Field 2 | Field 3 | Field 4 | Field 5 | Total | |
| 99,9 | 56 | 56 | 67 | 68 | 52 | 281 | 99,9 |
| 99 | 54 | 54 | 64 | 61 | 50 | 266 | 99 |
| 97 | 52 | 52 | 60 | 57 | 49 | 256 | 97 |
| 95 | 50 | 50 | 58 | 54 | 48 | 246 | 95 |
| 90 | 47 | 48 | 55 | 50 | 46 | 232 | 90 |
| 85 | 45 | 46 | 52 | 47 | 44 | 224 | 85 |
| 80 | 43 | 44 | 50 | 45 | 43 | 216 | 80 |
| 75 | 41 | 42 | 48 | 44 | 41 | 208 | 75 |
| 70 | 40 | 41 | 46 | 42 | 40 | 200 | 70 |
| 65 | 39 | 40 | 44 | 41 | 38 | 196 | 65 |
| 60 | 38 | 38 | 42 | 40 | 37 | 188 | 60 |
| 55 | 36 | 37 | 40 | 38 | 36 | 180 | 55 |
| 50 | 35 | 36 | 39 | 37 | 34 | 176 | 50 |
| 45 | 34 | 35 | 38 | 36 | 33 | 170 | 45 |
| 40 | 32 | 34 | 36 | 34 | 32 | 168 | 40 |
| 35 | 31 | 32 | 34 | 33 | 31 | 162 | 35 |
| 30 | 30 | 30 | 33 | 32 | 30 | 158 | 30 |
| 25 | 28 | 29 | 31 | 30 | 29 | 154 | 25 |
| 20 | 27 | 28 | 30 | 28 | 27 | 150 | 20 |
| 15 | 25 | 26 | 27 | 26 | 25 | 146 | 15 |
| 10 | 23 | 23 | 25 | 24 | 23 | 140 | 10 |
| 5 | 20 | 20 | 20 | 20 | 20 | 130 | 5 |
| 3 | 18 | 18 | 18 | 18 | 18 | 120 | 3 |
| 1 | 14 | 13 | 12 | 14 | 15 | 106 | 1 |

```
FILTER OFF.
USE ALL.
EXECUTE.
FACTOR
  /VARIABLES Q1_2 Q2_2 Q3_2 Q4_2 Q5_2 Q6_2 Q7_2 Q8_2 Q9_2 Q10_2 Q11_2 Q12_2
    Q25_2 Q26_2 Q27_2 Q28_2 Q29_2 Q30_2 Q31_2 Q32_2 Q33_2 Q34_2 Q35_2 Q36_2
    Q50_2 Q51_2 Q52_2 Q53_2 Q54_2 Q55_2 Q56_2 Q57_2 Q58_2 Q59_2 Q60_2 Q61_2
    Q75_2 Q76_2
  /MISSING LISTWISE
  /ANALYSIS Q1_2 Q2_2 Q3_2 Q4_2 Q5_2 Q6_2 Q7_2 Q8_2 Q9_2 Q10_2 Q11_2 Q12_2 Q
    Q25_2 Q26_2 Q27_2 Q28_2 Q29_2 Q30_2 Q31_2 Q32_2 Q33_2 Q34_2 Q35_2 Q36_2
    Q50_2 Q51_2 Q52_2 Q53_2 Q54_2 Q55_2 Q56_2 Q57_2 Q58_2 Q59_2 Q60_2 Q61_2
    Q75_2 Q76_2
  /PRINT INITIAL CORRELATION DET KMO EXTRACTION ROTATION
  /FORMAT SORT BLANK(.316)
  /CRITERIA MINEIGEN(1) ITERATE(500)
  /EXTRACTION PAF
  /CRITERIA ITERATE(500) DELTA(0)
  /ROTATION OBLIMIN
  /METHOD=CORRELATION.
```

# Factor Analysis

**Notes**

| | | |
|---|---|---|
| Output Created | | 15-AUG-2017 10:03:24 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\PRE_POST_2016 (Fixed).sav |
| | Active Dataset | DataSet1 |
| | Filter | <none> |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 216 |
| Missing Value Handling | Definition of Missing | MISSING=EXCLUDE: User-defined missing values are treated as missing. |
| | Cases Used | LISTWISE: Statistics are based on cases with no missing values for any variable used. |

| Syntax | FACTOR<br>/VARIABLES Q1_2 Q2_2<br>Q3_2 Q4_2 Q5_2 Q6_2 Q7_2<br>Q8_2 Q9_2 Q10_2 Q11_2<br>Q12_2 Q13_2 Q14_2 Q15_2<br>Q16_2 Q17_2 Q18_2 Q19_2<br>Q20_2 Q21_2 Q22_2 Q23_2<br>Q24_2<br>Q25_2 Q26_2 Q27_2<br>Q28_2 Q29_2 Q30_2 Q31_2<br>Q32_2 Q33_2 Q34_2 Q35_2<br>Q36_2 Q37_2 Q38_2 Q39_2<br>Q40_2 Q41_2 Q42_2 Q43_2<br>Q44_2 Q45_2 Q46_2 Q47_2<br>Q48_2 Q49_2<br>Q50_2 Q51_2 Q52_2<br>Q53_2 Q54_2 Q55_2 Q56_2<br>Q57_2 Q58_2 Q59_2 Q60_2<br>Q61_2 Q62_2 Q63_2 Q64_2<br>Q65_2 Q66_2 Q67_2 Q68_2<br>Q69_2 Q70_2 Q71_2 Q72_2<br>Q73_2 Q74_2<br>Q75_2 Q76_2<br>/MISSING LISTWISE<br>/ANALYSIS Q1_2 Q2_2 Q3_2<br>Q4_2 Q5_2 Q6_2 Q7_2 Q8_2<br>Q9_2 Q10_2 Q11_2 Q12_2<br>Q13_2 Q14_2 Q15_2 Q16_2<br>Q17_2 Q18_2 Q19_2 Q20_2<br>Q21_2 Q22_2 Q23_2 Q24_2<br>Q25_2 Q26_2 Q27_2<br>Q28_2 Q29_2 Q30_2 Q31_2<br>Q32_2 Q33_2 Q34_2 Q35_2<br>Q36_2 Q37_2 Q38_2 Q39_2<br>Q40_2 Q41_2 Q42_2 Q43_2<br>Q44_2 Q45_2 Q46_2 Q47_2<br>Q48_2 Q49_2<br>Q50_2 Q51_2 Q52_2<br>Q53_2 Q54_2 Q55_2 Q56_2<br>Q57_2 Q58_2 Q59_2 Q60_2<br>Q61_2 Q62_2 Q63_2 Q64_2<br>Q65_2 Q66_2 Q67_2 Q68_2<br>Q69_2 Q70_2 Q71_2 Q72_2<br>Q73_2 Q74_2<br>Q75_2 Q76_2<br>/PRINT INITIAL<br>CORRELATION DET KMO<br>EXTRACTION ROTATION<br>/FORMAT SORT<br>BLANK(.316)<br>/CRITERIA MINEIGEN(1)<br>ITERATE(500)<br>/EXTRACTION PAF<br>/CRITERIA ITERATE(500)<br>DELTA(0)<br>/ROTATION OBLIMIN<br>/METHOD=CORRELATION. |
|---|---|

| | | |
|---|---|---|
| Resources | Processor Time | 00:00:00.13 |
| | Elapsed Time | 00:00:00.14 |
| | Maximum Memory Required | 644384 (629.281K) bytes |

| | | Q1_2 | Q2_2 |
|---|---|---|---|
| Correlation | Q1_2 | 1.000 | 0.328 |
| | Q2_2 | 0.328 | 1.000 |
| | Q3_2 | 0.189 | 0.073 |
| | Q4_2 | 0.362 | 0.195 |
| | Q5_2 | 0.206 | 0.281 |
| | Q6_2 | 0.357 | 0.230 |
| | Q7_2 | 0.303 | 0.516 |
| | Q8_2 | 0.277 | 0.035 |
| | Q9_2 | 0.255 | 0.217 |
| | Q10_2 | 0.073 | 0.070 |
| | Q11_2 | 0.097 | 0.088 |
| | Q12_2 | 0.273 | 0.493 |
| | Q13_2 | 0.275 | 0.182 |
| | Q14_2 | 0.516 | 0.449 |
| | Q15_2 | 0.175 | 0.336 |
| | Q16_2 | 0.438 | 0.133 |
| | Q17_2 | 0.180 | 0.294 |
| | Q18_2 | 0.252 | 0.134 |
| | Q19_2 | 0.075 | 0.070 |
| | Q20_2 | 0.203 | 0.191 |
| | Q21_2 | 0.290 | 0.135 |
| | Q22_2 | 0.364 | 0.429 |
| | Q23_2 | 0.292 | 0.152 |
| | Q24_2 | 0.094 | -0.005 |
| | Q25_2 | 0.248 | 0.102 |
| | Q26_2 | 0.306 | 0.175 |
| | Q27_2 | 0.346 | 0.145 |
| | Q28_2 | 0.242 | 0.086 |
| | Q29_2 | 0.303 | 0.504 |
| | Q30_2 | 0.175 | -0.014 |
| | Q31_2 | 0.314 | 0.238 |
| | Q32_2 | 0.113 | 0.116 |
| | Q33_2 | 0.330 | 0.299 |
| | Q34_2 | 0.178 | 0.373 |
| | Q35_2 | 0.167 | 0.121 |
| | Q36_2 | 0.249 | 0.066 |
| | Q37_2 | 0.087 | 0.225 |
| | Q38_2 | 0.369 | 0.282 |

| | | | |
|---|---|---|---|
| | Q39_2 | 0.239 | 0.553 |
| | Q40_2 | 0.315 | 0.160 |
| | Q41_2 | 0.172 | 0.089 |
| | Q42_2 | 0.070 | 0.168 |
| | Q43_2 | 0.450 | 0.261 |
| | Q44_2 | 0.190 | 0.044 |
| | Q45_2 | 0.302 | 0.064 |
| | Q46_2 | 0.229 | 0.114 |
| | Q47_2 | 0.137 | 0.256 |
| | Q48_2 | 0.399 | 0.059 |
| | Q49_2 | 0.149 | 0.279 |
| | Q50_2 | 0.128 | -0.044 |
| | Q51_2 | 0.111 | 0.076 |
| | Q52_2 | 0.258 | 0.410 |
| | Q53_2 | 0.081 | -0.027 |
| | Q54_2 | 0.250 | 0.056 |
| | Q55_2 | 0.264 | -0.056 |
| | Q56_2 | 0.054 | 0.141 |
| | Q57_2 | 0.194 | 0.033 |
| | Q58_2 | -0.057 | -0.059 |
| | Q59_2 | 0.237 | 0.282 |
| | Q60_2 | 0.090 | -0.008 |
| | Q61_2 | 0.180 | 0.257 |
| | Q62_2 | 0.226 | 0.197 |
| | Q63_2 | 0.285 | 0.073 |
| | Q64_2 | 0.036 | 0.189 |
| | Q65_2 | 0.188 | 0.037 |
| | Q66_2 | 0.248 | 0.323 |
| | Q67_2 | 0.206 | 0.085 |
| | Q68_2 | 0.244 | 0.175 |
| | Q69_2 | 0.021 | 0.149 |
| | Q70_2 | 0.383 | 0.231 |
| | Q71_2 | 0.106 | 0.206 |
| | Q72_2 | 0.174 | 0.008 |
| | Q73_2 | 0.164 | 0.081 |
| | Q74_2 | 0.370 | 0.230 |
| | Q75_2 | 0.243 | 0.031 |
| | Q76_2 | 0.219 | 0.292 |

a. Determinant = 2.762E-21

## KMO and Bartlett's Test

| | | |
|---|---|---|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | 0.802 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 6761.481 |
| | df | 2850 |

| | | |
|---|---|---|
| | Sig. | 0.000 |

## Communalities

| | Initial | Extraction |
|---|---|---|
| Q1_2 | 0.691 | 0.515 |
| Q2_2 | 0.646 | 0.566 |
| Q3_2 | 0.568 | 0.469 |
| Q4_2 | 0.702 | 0.722 |
| Q5_2 | 0.590 | 0.463 |
| Q6_2 | 0.593 | 0.416 |
| Q7_2 | 0.771 | 0.816 |
| Q8_2 | 0.705 | 0.637 |
| Q9_2 | 0.589 | 0.528 |
| Q10_2 | 0.599 | 0.621 |
| Q11_2 | 0.649 | 0.549 |
| Q12_2 | 0.728 | 0.727 |
| Q13_2 | 0.725 | 0.632 |
| Q14_2 | 0.750 | 0.709 |
| Q15_2 | 0.613 | 0.495 |
| Q16_2 | 0.682 | 0.615 |
| Q17_2 | 0.669 | 0.535 |
| Q18_2 | 0.614 | 0.548 |
| Q19_2 | 0.638 | 0.536 |
| Q20_2 | 0.617 | 0.566 |
| Q21_2 | 0.646 | 0.507 |
| Q22_2 | 0.646 | 0.596 |
| Q23_2 | 0.705 | 0.667 |
| Q24_2 | 0.614 | 0.623 |
| Q25_2 | 0.697 | 0.663 |
| Q26_2 | 0.636 | 0.534 |
| Q27_2 | 0.642 | 0.502 |
| Q28_2 | 0.718 | 0.632 |
| Q29_2 | 0.729 | 0.684 |
| Q30_2 | 0.749 | 0.802 |
| Q31_2 | 0.574 | 0.443 |
| Q32_2 | 0.714 | 0.632 |
| Q33_2 | 0.731 | 0.640 |
| Q34_2 | 0.606 | 0.522 |
| Q35_2 | 0.763 | 0.789 |
| Q36_2 | 0.720 | 0.610 |
| Q37_2 | 0.645 | 0.662 |
| Q38_2 | 0.752 | 0.647 |
| Q39_2 | 0.736 | 0.669 |
| Q40_2 | 0.744 | 0.669 |
| Q41_2 | 0.579 | 0.480 |

| | | |
|---|---|---|
| Q42_2 | 0.692 | 0.664 |
| Q43_2 | 0.690 | 0.700 |
| Q44_2 | 0.564 | 0.492 |
| Q45_2 | 0.600 | 0.481 |
| Q46_2 | 0.593 | 0.550 |
| Q47_2 | 0.634 | 0.547 |
| Q48_2 | 0.683 | 0.675 |
| Q49_2 | 0.615 | 0.577 |
| Q50_2 | 0.635 | 0.530 |
| Q51_2 | 0.568 | 0.434 |
| Q52_2 | 0.746 | 0.715 |
| Q53_2 | 0.418 | 0.357 |
| Q54_2 | 0.710 | 0.601 |
| Q55_2 | 0.673 | 0.576 |
| Q56_2 | 0.600 | 0.736 |
| Q57_2 | 0.604 | 0.482 |
| Q58_2 | 0.503 | 0.422 |
| Q59_2 | 0.669 | 0.648 |
| Q60_2 | 0.538 | 0.451 |
| Q61_2 | 0.595 | 0.577 |
| Q62_2 | 0.624 | 0.405 |
| Q63_2 | 0.631 | 0.492 |
| Q64_2 | 0.698 | 0.690 |
| Q65_2 | 0.654 | 0.617 |
| Q66_2 | 0.666 | 0.558 |
| Q67_2 | 0.631 | 0.526 |
| Q68_2 | 0.682 | 0.718 |
| Q69_2 | 0.582 | 0.550 |
| Q70_2 | 0.726 | 0.660 |
| Q71_2 | 0.645 | 0.616 |
| Q72_2 | 0.665 | 0.574 |
| Q73_2 | 0.494 | 0.381 |
| Q74_2 | 0.783 | 0.707 |
| Q75_2 | 0.631 | 0.565 |
| Q76_2 | 0.635 | 0.531 |

Extraction Method: Principal Axis Factoring.

**Total Variance Explained**

| | Initial Eigenvalues | | |
|---|---|---|---|
| Factor | Total | % of Variance | Cumulative % |
| 1 | 15.840 | 20.842 | 20.842 |
| 2 | 5.415 | 7.125 | 27.967 |

| | | | |
|---|---|---|---|
| 3 | 3.318 | 4.366 | 32.333 |
| 4 | 2.956 | 3.889 | 36.222 |
| 5 | 2.233 | 2.938 | 39.160 |
| 6 | 2.074 | 2.728 | 41.888 |
| 7 | 1.973 | 2.596 | 44.484 |
| 8 | 1.900 | 2.500 | 46.984 |
| 9 | 1.782 | 2.345 | 49.329 |
| 10 | 1.657 | 2.180 | 51.509 |
| 11 | 1.557 | 2.049 | 53.559 |
| 12 | 1.503 | 1.978 | 55.536 |
| 13 | 1.470 | 1.934 | 57.470 |
| 14 | 1.416 | 1.863 | 59.333 |
| 15 | 1.309 | 1.723 | 61.056 |
| 16 | 1.269 | 1.669 | 62.725 |
| 17 | 1.154 | 1.518 | 64.244 |
| 18 | 1.119 | 1.473 | 65.717 |
| 19 | 1.087 | 1.431 | 67.147 |
| 20 | 1.062 | 1.398 | 68.545 |
| 21 | 1.022 | 1.345 | 69.890 |
| 22 | 0.997 | 1.311 | 71.202 |
| 23 | 0.946 | 1.245 | 72.447 |
| 24 | 0.908 | 1.195 | 73.641 |
| 25 | 0.892 | 1.174 | 74.816 |
| 26 | 0.880 | 1.158 | 75.974 |
| 27 | 0.814 | 1.072 | 77.045 |
| 28 | 0.798 | 1.050 | 78.095 |
| 29 | 0.756 | 0.995 | 79.089 |
| 30 | 0.726 | 0.956 | 80.045 |
| 31 | 0.681 | 0.896 | 80.941 |
| 32 | 0.675 | 0.888 | 81.829 |
| 33 | 0.657 | 0.864 | 82.693 |
| 34 | 0.616 | 0.811 | 83.504 |
| 35 | 0.599 | 0.789 | 84.293 |
| 36 | 0.590 | 0.777 | 85.069 |
| 37 | 0.559 | 0.736 | 85.805 |
| 38 | 0.549 | 0.722 | 86.527 |
| 39 | 0.535 | 0.704 | 87.231 |
| 40 | 0.521 | 0.686 | 87.917 |
| 41 | 0.484 | 0.637 | 88.554 |
| 42 | 0.462 | 0.607 | 89.162 |
| 43 | 0.452 | 0.594 | 89.756 |
| 44 | 0.443 | 0.584 | 90.339 |
| 45 | 0.422 | 0.555 | 90.894 |
| 46 | 0.402 | 0.529 | 91.423 |
| 47 | 0.395 | 0.519 | 91.943 |

| | | | |
|---|---|---|---|
| 48 | 0.386 | 0.508 | 92.451 |
| 49 | 0.357 | 0.470 | 92.921 |
| 50 | 0.352 | 0.464 | 93.384 |
| 51 | 0.342 | 0.449 | 93.834 |
| 52 | 0.329 | 0.433 | 94.267 |
| 53 | 0.316 | 0.415 | 94.683 |
| 54 | 0.296 | 0.389 | 95.072 |
| 55 | 0.288 | 0.379 | 95.451 |
| 56 | 0.273 | 0.359 | 95.809 |
| 57 | 0.255 | 0.335 | 96.144 |
| 58 | 0.248 | 0.326 | 96.470 |
| 59 | 0.232 | 0.306 | 96.776 |
| 60 | 0.217 | 0.286 | 97.062 |
| 61 | 0.209 | 0.274 | 97.337 |
| 62 | 0.199 | 0.261 | 97.598 |
| 63 | 0.190 | 0.250 | 97.848 |
| 64 | 0.179 | 0.236 | 98.084 |
| 65 | 0.162 | 0.214 | 98.297 |
| 66 | 0.159 | 0.210 | 98.507 |
| 67 | 0.151 | 0.199 | 98.706 |
| 68 | 0.145 | 0.191 | 98.897 |
| 69 | 0.131 | 0.172 | 99.070 |
| 70 | 0.128 | 0.168 | 99.238 |
| 71 | 0.112 | 0.148 | 99.386 |
| 72 | 0.111 | 0.146 | 99.532 |
| 73 | 0.107 | 0.140 | 99.673 |
| 74 | 0.095 | 0.125 | 99.797 |
| 75 | 0.082 | 0.108 | 99.905 |
| 76 | 0.072 | 0.095 | 100.000 |

Extraction Method: Principal Axis Factoring.

a. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.

| | 1 | 2 | 3 |
|---|---|---|---|
| Q74_2 | 0.721 | | |
| Q70_2 | 0.667 | | |
| Q40_2 | 0.653 | | |
| Q14_2 | 0.633 | | |
| Q38_2 | 0.632 | | |
| Q33_2 | 0.613 | | |
| Q52_2 | 0.598 | 0.376 | |
| Q23_2 | 0.586 | | -0.391 |
| Q26_2 | 0.586 | | |
| Q27_2 | 0.581 | | |

| | | | |
|---|---|---|---|
| Q18_2 | 0.567 | | |
| Q28_2 | 0.565 | | |
| Q59_2 | 0.562 | | |
| Q25_2 | 0.560 | | |
| Q30_2 | 0.558 | -0.362 | |
| Q35_2 | 0.547 | | -0.404 |
| Q13_2 | 0.541 | | -0.413 |
| Q8_2 | 0.536 | -0.348 | |
| Q1_2 | 0.536 | | |
| Q43_2 | 0.525 | | |
| Q21_2 | 0.520 | | |
| Q29_2 | 0.518 | 0.475 | |
| Q45_2 | 0.517 | | |
| Q72_2 | 0.506 | -0.347 | |
| Q67_2 | 0.494 | | |
| Q68_2 | 0.493 | | |
| Q16_2 | 0.482 | | |
| Q36_2 | 0.477 | | |
| Q22_2 | 0.471 | 0.395 | |
| Q12_2 | 0.468 | 0.448 | |
| Q62_2 | 0.464 | | |
| Q55_2 | 0.462 | | |
| Q63_2 | 0.460 | | |
| Q57_2 | 0.460 | | |
| Q4_2 | 0.459 | | 0.367 |
| Q54_2 | 0.449 | | |
| Q71_2 | 0.449 | | |
| Q5_2 | 0.429 | | |
| Q46_2 | 0.426 | | |
| Q65_2 | 0.410 | | |
| Q66_2 | 0.404 | 0.354 | |
| Q41_2 | 0.402 | | |
| Q20_2 | 0.401 | | |
| Q15_2 | 0.401 | 0.333 | |
| Q9_2 | 0.399 | | |
| Q6_2 | 0.386 | | |
| Q47_2 | 0.372 | | |
| Q10_2 | 0.356 | | |
| Q48_2 | 0.355 | | |
| Q31_2 | 0.354 | | |
| Q44_2 | 0.347 | | |
| Q49_2 | 0.323 | | |
| Q2_2 | 0.407 | 0.508 | |
| Q7_2 | 0.470 | 0.484 | |
| Q39_2 | 0.428 | 0.457 | |

| | | | |
|---|---|---|---|
| Q34_2 | 0.363 | 0.408 | |
| Q24_2 | | -0.394 | |
| Q61_2 | | 0.375 | |
| Q76_2 | 0.374 | 0.374 | |
| Q58_2 | | -0.350 | |
| Q50_2 | | -0.344 | |
| Q51_2 | | -0.318 | |
| Q60_2 | | | |
| Q3_2 | 0.386 | | -0.393 |
| Q75_2 | 0.363 | | 0.372 |
| Q11_2 | 0.387 | | |
| Q56_2 | | | |
| Q17_2 | | | |
| Q42_2 | | | |
| Q32_2 | | | -0.343 |
| Q64_2 | 0.372 | 0.316 | -0.366 |
| Q19_2 | 0.358 | | |
| Q69_2 | | | |
| Q73_2 | | | |
| Q37_2 | | | |
| Q53_2 | | | |

Extraction Method: Principal Axis Factoring.
a. 21 factors extracted. 17 iterations required.

| | 1 | 2 | 3 |
|---|---|---|---|
| Q37_2 | -0.774 | | |
| Q47_2 | -0.546 | | |
| Q12_2 | | 0.672 | |
| Q7_2 | | 0.656 | |
| Q22_2 | | 0.608 | |
| Q2_2 | | 0.582 | |
| Q29_2 | | 0.563 | |
| Q39_2 | | 0.457 | |
| Q14_2 | | 0.451 | |
| Q66_2 | | 0.401 | |
| Q3_2 | | | -0.547 |
| Q75_2 | | | 0.423 |
| Q40_2 | | | -0.363 |
| Q55_2 | | | -0.338 |
| Q58_2 | | | 0.329 |
| Q48_2 | | | |
| Q16_2 | | | |
| Q36_2 | | | |

| | | | |
|---|---|---|---|
| Q31_2 | | | |
| Q9_2 | | | |
| Q1_2 | | | |
| Q6_2 | | | |
| Q4_2 | | | |
| Q43_2 | | | |
| Q63_2 | | | |
| Q67_2 | | | |
| Q42_2 | | | |
| Q32_2 | | | |
| Q64_2 | | | |
| Q71_2 | | | |
| Q15_2 | | | |
| Q19_2 | | | |
| Q10_2 | | | |
| Q57_2 | | | |
| Q17_2 | | | |
| Q59_2 | | | |
| Q62_2 | | | |
| Q24_2 | | | |
| Q46_2 | | | |
| Q61_2 | | | |
| Q68_2 | | | |
| Q25_2 | | | |
| Q65_2 | | | |
| Q52_2 | | 0.391 | |
| Q60_2 | | | |
| Q8_2 | | | |
| Q26_2 | | | |
| Q21_2 | | | |
| Q73_2 | | | |
| Q70_2 | | | |
| Q74_2 | | | |
| Q49_2 | | | |
| Q56_2 | | | |
| Q72_2 | | | |
| Q30_2 | | | |
| Q33_2 | | | |
| Q5_2 | | | |
| Q54_2 | | | |
| Q53_2 | | | |
| Q38_2 | | | |
| Q20_2 | | | |
| Q44_2 | | | |
| Q27_2 | | | |

| | | | |
|---|---|---|---|
| Q50_2 | | | |
| Q41_2 | | | |
| Q51_2 | | | |
| Q13_2 | | | |
| Q35_2 | | | |
| Q23_2 | | | -0.346 |
| Q18_2 | | | |
| Q11_2 | | | |
| Q28_2 | | | |
| Q45_2 | | | |
| Q69_2 | | | |
| Q34_2 | | | |
| Q76_2 | | | |

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.
a. Rotation converged in 57 iterations.

| | 1 | 2 | 3 |
|---|---|---|---|
| Q37_2 | -0.785 | | |
| Q47_2 | -0.640 | 0.327 | |
| Q5_2 | -0.395 | 0.343 | |
| Q7_2 | | 0.734 | |
| Q12_2 | -0.377 | 0.714 | |
| Q29_2 | | 0.713 | |
| Q22_2 | | 0.686 | |
| Q2_2 | | 0.676 | |
| Q39_2 | | 0.622 | |
| Q14_2 | | 0.593 | |
| Q52_2 | -0.392 | 0.582 | |
| Q66_2 | | 0.491 | -0.329 |
| Q3_2 | | | -0.613 |
| Q40_2 | | | -0.452 |
| Q75_2 | | | 0.380 |
| Q48_2 | | | |
| Q16_2 | | | |
| Q36_2 | | | |
| Q1_2 | | 0.393 | |
| Q9_2 | | | |
| Q31_2 | | 0.322 | |
| Q6_2 | | | |
| Q43_2 | | | |
| Q4_2 | | | |
| Q63_2 | | | |

| | | | |
|---|---|---|---|
| Q67_2 | | | |
| Q42_2 | | | |
| Q32_2 | | | |
| Q64_2 | -0.329 | | |
| Q71_2 | | | |
| Q15_2 | | | |
| Q19_2 | | | |
| Q38_2 | | 0.385 | |
| Q10_2 | | | |
| Q57_2 | | | |
| Q17_2 | | | |
| Q62_2 | | | |
| Q24_2 | | | |
| Q46_2 | | | |
| Q61_2 | | | |
| Q68_2 | | | |
| Q25_2 | | | |
| Q65_2 | | | |
| Q60_2 | | | |
| Q8_2 | | | |
| Q26_2 | | | |
| Q54_2 | | | |
| Q21_2 | | | |
| Q55_2 | | | -0.398 |
| Q73_2 | | | |
| Q70_2 | | 0.343 | |
| Q74_2 | | | |
| Q49_2 | | | |
| Q56_2 | | | |
| Q30_2 | | | |
| Q53_2 | | | |
| Q20_2 | | | |
| Q44_2 | | | |
| Q27_2 | | | |
| Q50_2 | | | |
| Q41_2 | | | |
| Q51_2 | | | |
| Q72_2 | | | |
| Q58_2 | | | 0.318 |
| Q13_2 | | | |
| Q35_2 | | | |
| Q23_2 | | | -0.474 |
| Q18_2 | | | |
| Q33_2 | | 0.344 | |
| Q11_2 | | | |

| | | | |
|---|---|---|---|
| Q59_2 | -0.400 | 0.327 | |
| Q28_2 | | | -0.408 |
| Q45_2 | | | |
| Q69_2 | | | |
| Q34_2 | | | |
| Q76_2 | | | |

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.

| Factor | 1 | 2 | 3 |
|---|---|---|---|
| 1 | 1.000 | -0.194 | 0.103 |
| 2 | -0.194 | 1.000 | -0.011 |
| 3 | 0.103 | -0.011 | 1.000 |
| 4 | 0.067 | 0.106 | 0.003 |
| 5 | 0.079 | -0.192 | 0.030 |
| 6 | -0.160 | 0.148 | -0.100 |
| 7 | -0.096 | 0.215 | -0.004 |
| 8 | 0.012 | -0.212 | 0.084 |
| 9 | 0.021 | 0.039 | 0.056 |
| 10 | -0.040 | 0.077 | -0.057 |
| 11 | -0.191 | 0.198 | -0.158 |
| 12 | -0.036 | 0.060 | -0.012 |
| 13 | -0.154 | 0.263 | -0.024 |
| 14 | -0.007 | -0.082 | -0.081 |
| 15 | 0.073 | -0.036 | 0.136 |
| 16 | 0.002 | 0.009 | 0.003 |
| 17 | -0.103 | 0.221 | -0.072 |
| 18 | -0.045 | -0.011 | -0.073 |
| 19 | 0.090 | -0.136 | 0.160 |
| 20 | -0.074 | 0.038 | -0.155 |
| 21 | -0.179 | 0.235 | -0.024 |

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.

```
Q13_2 Q14_2 Q15_2 Q16_2 Q17_2 Q18_2 Q19_2 Q20_2 Q21_2 Q22_2 Q23_2 Q24_2
Q37_2 Q38_2 Q39_2 Q40_2 Q41_2 Q42_2 Q43_2 Q44_2 Q45_2 Q46_2 Q47_2 Q48_2 Q4
Q62_2 Q63_2 Q64_2 Q65_2 Q66_2 Q67_2 Q68_2 Q69_2 Q70_2 Q71_2 Q72_2 Q73_2 Q7
```

```
Q13_2 Q14_2 Q15_2 Q16_2 Q17_2 Q18_2 Q19_2 Q20_2 Q21_2 Q22_2 Q23_2 Q24_2
Q37_2 Q38_2 Q39_2 Q40_2 Q41_2 Q42_2 Q43_2 Q44_2 Q45_2 Q46_2 Q47_2 Q48_2 Q4
Q62_2 Q63_2 Q64_2 Q65_2 Q66_2 Q67_2 Q68_2 Q69_2 Q70_2 Q71_2 Q72_2 Q73_2 Q7
```

| Q3_2 | Q4_2 | Q5_2 | Q6_2 | Q7_2 | Q8_2 | Q9_2 |
|---|---|---|---|---|---|---|
| 0.189 | 0.362 | 0.206 | 0.357 | 0.303 | 0.277 | 0.255 |
| 0.073 | 0.195 | 0.281 | 0.230 | 0.516 | 0.035 | 0.217 |
| 1.000 | -0.012 | 0.124 | 0.026 | 0.136 | 0.293 | 0.042 |
| -0.012 | 1.000 | 0.142 | 0.221 | 0.185 | 0.169 | 0.275 |
| 0.124 | 0.142 | 1.000 | 0.032 | 0.334 | 0.037 | 0.048 |
| 0.026 | 0.221 | 0.032 | 1.000 | 0.111 | 0.196 | 0.244 |
| 0.136 | 0.185 | 0.334 | 0.111 | 1.000 | -0.003 | 0.248 |
| 0.293 | 0.169 | 0.037 | 0.196 | -0.003 | 1.000 | 0.194 |
| 0.042 | 0.275 | 0.048 | 0.244 | 0.248 | 0.194 | 1.000 |
| 0.183 | -0.045 | 0.074 | 0.218 | 0.155 | 0.266 | 0.141 |
| 0.251 | 0.067 | 0.105 | 0.103 | 0.232 | 0.303 | 0.160 |
| 0.115 | 0.254 | 0.286 | 0.162 | 0.495 | -0.002 | 0.089 |
| 0.367 | 0.168 | 0.254 | 0.075 | 0.190 | 0.379 | 0.173 |
| 0.176 | 0.389 | 0.196 | 0.361 | 0.362 | 0.317 | 0.330 |
| 0.134 | 0.097 | 0.219 | 0.107 | 0.324 | 0.095 | 0.111 |
| 0.138 | 0.248 | 0.086 | 0.245 | 0.195 | 0.325 | 0.321 |
| 0.035 | 0.019 | 0.140 | 0.180 | 0.241 | 0.013 | 0.238 |
| 0.248 | 0.216 | 0.254 | 0.205 | 0.244 | 0.367 | 0.168 |
| 0.063 | 0.259 | 0.101 | 0.164 | 0.025 | 0.258 | 0.143 |
| 0.166 | 0.178 | 0.294 | 0.204 | 0.343 | 0.159 | 0.197 |
| 0.168 | 0.242 | 0.264 | 0.220 | 0.121 | 0.291 | 0.205 |
| 0.086 | 0.248 | 0.279 | 0.133 | 0.532 | 0.078 | 0.096 |
| 0.492 | 0.142 | 0.272 | 0.085 | 0.228 | 0.284 | 0.123 |
| 0.007 | 0.110 | 0.037 | 0.292 | -0.029 | 0.223 | 0.169 |
| 0.218 | 0.297 | 0.197 | 0.268 | 0.183 | 0.391 | 0.275 |
| 0.230 | 0.311 | 0.168 | 0.275 | 0.096 | 0.532 | 0.257 |
| 0.245 | 0.293 | 0.343 | 0.248 | 0.164 | 0.222 | 0.296 |
| 0.376 | 0.168 | 0.152 | 0.093 | 0.251 | 0.291 | 0.188 |
| 0.029 | 0.281 | 0.335 | 0.295 | 0.466 | 0.134 | 0.127 |
| 0.308 | 0.190 | 0.329 | 0.070 | 0.039 | 0.327 | 0.167 |
| 0.146 | 0.145 | 0.106 | 0.300 | 0.231 | 0.128 | 0.151 |
| 0.234 | 0.113 | 0.175 | 0.158 | 0.033 | 0.226 | 0.049 |
| 0.219 | 0.201 | 0.279 | 0.171 | 0.291 | 0.302 | 0.244 |
| 0.085 | 0.114 | 0.120 | 0.168 | 0.223 | 0.122 | 0.153 |
| 0.400 | 0.229 | 0.181 | 0.030 | 0.289 | 0.482 | 0.234 |
| 0.180 | 0.347 | 0.004 | 0.172 | 0.145 | 0.304 | 0.461 |
| 0.126 | 0.129 | 0.283 | 0.008 | 0.119 | 0.015 | 0.130 |
| 0.156 | 0.228 | 0.356 | 0.241 | 0.407 | 0.246 | 0.236 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 0.052 | 0.101 | 0.200 | 0.286 | 0.504 | 0.048 | 0.164 |
| 0.379 | 0.242 | 0.310 | 0.227 | 0.233 | 0.400 | 0.222 |
| 0.226 | 0.120 | 0.166 | 0.000 | 0.178 | 0.313 | 0.092 |
| 0.029 | 0.173 | 0.269 | 0.126 | 0.054 | 0.068 | 0.018 |
| 0.171 | 0.539 | 0.148 | 0.170 | 0.240 | 0.312 | 0.298 |
| 0.211 | -0.010 | 0.138 | 0.068 | 0.126 | 0.154 | 0.185 |
| 0.232 | 0.256 | 0.244 | 0.168 | 0.104 | 0.415 | 0.112 |
| 0.131 | 0.313 | 0.149 | 0.260 | 0.106 | 0.199 | 0.207 |
| 0.196 | 0.086 | 0.437 | 0.143 | 0.196 | 0.095 | -0.067 |
| 0.035 | 0.275 | 0.070 | 0.206 | 0.058 | 0.219 | 0.382 |
| 0.015 | 0.081 | 0.230 | 0.164 | 0.391 | 0.084 | 0.212 |
| 0.143 | 0.132 | 0.082 | 0.056 | 0.125 | 0.237 | 0.134 |
| 0.025 | 0.141 | 0.026 | 0.145 | 0.034 | 0.244 | 0.226 |
| 0.223 | 0.248 | 0.357 | 0.257 | 0.474 | 0.178 | 0.219 |
| 0.034 | 0.115 | 0.022 | -0.001 | -0.038 | 0.039 | -0.035 |
| 0.046 | 0.195 | 0.189 | 0.203 | 0.157 | 0.301 | 0.324 |
| 0.357 | 0.139 | 0.179 | 0.078 | 0.038 | 0.347 | 0.159 |
| 0.008 | 0.160 | 0.008 | -0.047 | 0.322 | 0.045 | 0.322 |
| 0.189 | 0.105 | 0.201 | 0.116 | 0.216 | 0.332 | 0.125 |
| -0.119 | 0.032 | -0.032 | 0.074 | -0.130 | 0.066 | 0.072 |
| 0.167 | 0.112 | 0.408 | 0.247 | 0.323 | 0.260 | 0.167 |
| 0.119 | 0.016 | 0.087 | 0.065 | -0.053 | 0.326 | 0.136 |
| -0.047 | 0.084 | 0.137 | 0.007 | 0.275 | -0.003 | 0.071 |
| 0.133 | 0.260 | 0.152 | 0.116 | 0.118 | 0.339 | 0.213 |
| 0.089 | 0.528 | 0.158 | 0.249 | 0.026 | 0.358 | 0.252 |
| 0.131 | 0.063 | 0.224 | 0.150 | 0.161 | 0.105 | 0.025 |
| 0.221 | 0.187 | 0.130 | 0.086 | 0.043 | 0.247 | 0.108 |
| 0.234 | 0.099 | 0.257 | 0.181 | 0.413 | 0.164 | 0.040 |
| 0.229 | 0.324 | 0.154 | 0.157 | 0.171 | 0.421 | 0.115 |
| 0.153 | 0.302 | 0.176 | 0.148 | 0.249 | 0.224 | 0.232 |
| 0.069 | 0.024 | 0.083 | 0.087 | 0.045 | -0.057 | 0.008 |
| 0.209 | 0.391 | 0.230 | 0.344 | 0.271 | 0.355 | 0.201 |
| 0.104 | 0.120 | 0.168 | 0.211 | 0.172 | 0.221 | 0.109 |
| 0.263 | 0.164 | 0.124 | 0.181 | -0.016 | 0.473 | 0.096 |
| 0.110 | 0.230 | 0.109 | 0.136 | 0.112 | 0.031 | 0.023 |
| 0.360 | 0.276 | 0.303 | 0.254 | 0.255 | 0.422 | 0.137 |
| -0.113 | 0.258 | 0.062 | 0.321 | 0.066 | 0.191 | 0.306 |
| 0.138 | 0.279 | 0.152 | 0.101 | 0.290 | 0.042 | 0.160 |

| Extraction Sums of Squared Loadings | | | Rotation Sums of Squared Loadings[a] |
|---|---|---|---|
| Total | % of Variance | Cumulative % | Total |
| 15.447 | 20.325 | 20.325 | 3.196 |
| 5.015 | 6.599 | 26.924 | 6.363 |

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|---|---|---|---|
| 2.926 | 3.850 | 30.775 | 2.526 |
| 2.560 | 3.369 | 34.143 | 5.087 |
| 1.837 | 2.417 | 36.560 | 5.288 |
| 1.688 | 2.222 | 38.782 | 3.245 |
| 1.542 | 2.029 | 40.811 | 4.540 |
| 1.483 | 1.952 | 42.763 | 4.033 |
| 1.378 | 1.813 | 44.576 | 1.591 |
| 1.236 | 1.626 | 46.202 | 3.151 |
| 1.159 | 1.525 | 47.727 | 5.693 |
| 1.080 | 1.421 | 49.148 | 4.850 |
| 1.042 | 1.371 | 50.519 | 3.697 |
| 0.988 | 1.300 | 51.819 | 1.862 |
| 0.875 | 1.152 | 52.971 | 4.039 |
| 0.849 | 1.117 | 54.087 | 1.594 |
| 0.724 | 0.953 | 55.040 | 3.483 |
| 0.704 | 0.926 | 55.966 | 3.797 |
| 0.655 | 0.862 | 56.827 | 4.951 |
| 0.635 | 0.835 | 57.663 | 2.708 |
| 0.619 | 0.815 | 58.477 | 3.145 |
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| | 0.318 | | | -0.344 | | |
| 0.351 | | | | | | |
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| 0.415 | | | | | | |
| 0.370 | | | | | | |
| 0.346 | | | | | | |
| | | 0.605 | | | | |
| | | 0.429 | | | | |
| | | 0.373 | | | | |
| | | | 0.378 | | | |
| | | | 0.375 | | | |
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**Pattern Matrix[a]**

| Factor | | | | | | |
|---|---|---|---|---|---|---|
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
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| 0.770 | | | | | | |
| 0.632 | | | | | | |
| 0.428 | | | | | | |

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|---|---|---|---|---|---|---|
| 0.398 | | | | | | |
| 0.358 | | | | | | |
| 0.357 | | | | | | |
| | | | | | | |
| | -0.704 | | | | | |
| | -0.691 | | | | | |
| | -0.533 | | | | | |
| | -0.381 | | | -0.349 | | |
| | | 0.778 | | | | |
| | | 0.692 | | | | |
| | | 0.401 | 0.397 | | | |
| | | | 0.567 | | | |
| | | | 0.506 | | | |
| | | | 0.344 | | | |
| | | | | -0.729 | | |
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| | | | | | 0.469 | |
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| | | | | | | -0.707 |
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**Structure Matrix**

| | | | Factor | | | |
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| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
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| | | | | -0.333 | | |
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| | | | | -0.350 | | |
| 0.349 | -0.427 | | | -0.367 | | |
| | | | | | | |
| | | 0.440 | | | | |
| | | | | | | |
| | | 0.403 | 0.322 | | | |
| 0.335 | | | | -0.378 | | |
| 0.781 | | | | | | |
| 0.681 | | | | | | |
| 0.576 | -0.381 | | | | | |
| 0.494 | -0.416 | | | | | |
| 0.494 | | | | | | |
| 0.443 | | | | -0.349 | | |
| 0.363 | | | | | | |
| 0.335 | -0.760 | | | | | |
| | -0.758 | | | | | |
| | -0.629 | | | | | |

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|---|---|---|---|---|---|---|
| | -0.486 | | | -0.429 | | |
| | | 0.763 | | | | |
| | | 0.695 | | | | |
| | | 0.543 | 0.513 | | | |
| | | | 0.637 | | | |
| | | | 0.588 | | | |
| | -0.320 | | 0.410 | | | -0.385 |
| 0.377 | | | 0.393 | | | |
| | | | | -0.742 | | |
| | | | | -0.427 | | |
| | | | | | 0.490 | |
| | | | | | | |
| | | | | | | -0.743 |
| | -0.365 | | | | | -0.576 |
| | | | | | 0.364 | 0.377 |
| | | | | | | |
| | -0.355 | | | | | |
| | | | | | | |
| | | | | | | |
| | -0.368 | | | -0.392 | | |
| 0.369 | -0.343 | | | -0.367 | | |
| | | | | | | -0.318 |
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| | -0.408 | | | | | -0.384 |
| | -0.341 | | 0.388 | -0.348 | | |
| | | 0.375 | | | | |
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| 0.335 | | | | -0.334 | | |
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| 0.343 | | | 0.431 | | | |
| | | | 0.459 | | | |

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| | | | 0.425 | | | |
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**Factor Correlation Matrix**

| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|
| 0.067 | 0.079 | -0.160 | -0.096 | 0.012 | 0.021 | -0.040 |
| 0.106 | -0.192 | 0.148 | 0.215 | -0.212 | 0.039 | 0.077 |
| 0.003 | 0.030 | -0.100 | -0.004 | 0.084 | 0.056 | -0.057 |
| 1.000 | -0.276 | 0.084 | 0.144 | -0.196 | -0.069 | -0.107 |
| -0.276 | 1.000 | -0.010 | -0.104 | 0.091 | 0.091 | 0.159 |
| 0.084 | -0.010 | 1.000 | 0.180 | -0.103 | -0.021 | 0.042 |
| 0.144 | -0.104 | 0.180 | 1.000 | -0.151 | -0.027 | -0.065 |
| -0.196 | 0.091 | -0.103 | -0.151 | 1.000 | 0.042 | 0.124 |
| -0.069 | 0.091 | -0.021 | -0.027 | 0.042 | 1.000 | 0.150 |
| -0.107 | 0.159 | 0.042 | -0.065 | 0.124 | 0.150 | 1.000 |
| 0.152 | -0.288 | 0.167 | 0.172 | -0.151 | -0.065 | -0.164 |
| 0.212 | -0.220 | 0.048 | 0.187 | -0.234 | -0.030 | -0.198 |
| 0.115 | -0.164 | 0.150 | 0.096 | -0.138 | 0.027 | -0.098 |
| -0.042 | 0.003 | -0.033 | -0.081 | -0.018 | -0.109 | -0.136 |
| -0.157 | 0.129 | -0.022 | -0.165 | 0.087 | 0.063 | 0.152 |
| 0.071 | -0.110 | -0.031 | 0.002 | -0.056 | -0.019 | -0.118 |
| 0.201 | -0.118 | 0.094 | 0.096 | -0.142 | -0.023 | -0.109 |
| 0.139 | -0.185 | -0.014 | 0.154 | -0.150 | -0.106 | -0.192 |
| -0.193 | 0.080 | -0.130 | -0.221 | 0.131 | 0.033 | -0.014 |
| 0.127 | -0.097 | 0.063 | 0.142 | -0.111 | -0.018 | 0.016 |
| 0.117 | -0.085 | 0.081 | 0.189 | -0.105 | 0.059 | 0.084 |

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| Q10_2 | Q11_2 | Q12_2 | Q13_2 | Q14_2 | Q15_2 | Q16_2 | Q17_2 | Q18_2 |
|---|---|---|---|---|---|---|---|---|
| 0.073 | 0.097 | 0.273 | 0.275 | 0.516 | 0.175 | 0.438 | 0.180 | 0.252 |
| 0.070 | 0.088 | 0.493 | 0.182 | 0.449 | 0.336 | 0.133 | 0.294 | 0.134 |
| 0.183 | 0.251 | 0.115 | 0.367 | 0.176 | 0.134 | 0.138 | 0.035 | 0.248 |
| -0.045 | 0.067 | 0.254 | 0.168 | 0.389 | 0.097 | 0.248 | 0.019 | 0.216 |
| 0.074 | 0.105 | 0.286 | 0.254 | 0.196 | 0.219 | 0.086 | 0.140 | 0.254 |
| 0.218 | 0.103 | 0.162 | 0.075 | 0.361 | 0.107 | 0.245 | 0.180 | 0.205 |
| 0.155 | 0.232 | 0.495 | 0.190 | 0.362 | 0.324 | 0.195 | 0.241 | 0.244 |
| 0.266 | 0.303 | -0.002 | 0.379 | 0.317 | 0.095 | 0.325 | 0.013 | 0.367 |
| 0.141 | 0.160 | 0.089 | 0.173 | 0.330 | 0.111 | 0.321 | 0.238 | 0.168 |
| 1.000 | 0.199 | -0.080 | 0.200 | 0.254 | 0.175 | 0.162 | 0.197 | 0.196 |
| 0.199 | 1.000 | 0.063 | 0.415 | 0.137 | 0.303 | 0.330 | 0.140 | 0.249 |
| -0.080 | 0.063 | 1.000 | 0.145 | 0.444 | 0.234 | 0.104 | 0.176 | 0.133 |
| 0.200 | 0.415 | 0.145 | 1.000 | 0.193 | 0.279 | 0.323 | 0.132 | 0.431 |
| 0.254 | 0.137 | 0.444 | 0.193 | 1.000 | 0.163 | 0.263 | 0.269 | 0.283 |
| 0.175 | 0.303 | 0.234 | 0.279 | 0.163 | 1.000 | 0.174 | 0.271 | 0.111 |
| 0.162 | 0.330 | 0.104 | 0.323 | 0.263 | 0.174 | 1.000 | 0.295 | 0.284 |
| 0.197 | 0.140 | 0.176 | 0.132 | 0.269 | 0.271 | 0.295 | 1.000 | 0.022 |
| 0.196 | 0.249 | 0.133 | 0.431 | 0.283 | 0.111 | 0.284 | 0.022 | 1.000 |
| 0.008 | 0.121 | 0.139 | 0.166 | 0.089 | 0.154 | 0.188 | -0.036 | 0.344 |
| 0.139 | -0.005 | 0.208 | 0.103 | 0.323 | 0.192 | -0.002 | -0.090 | 0.205 |
| 0.067 | 0.223 | 0.182 | 0.334 | 0.295 | 0.088 | 0.288 | 0.200 | 0.360 |
| 0.174 | 0.170 | 0.485 | 0.193 | 0.435 | 0.274 | 0.170 | 0.291 | 0.213 |
| 0.190 | 0.324 | 0.182 | 0.539 | 0.315 | 0.258 | 0.300 | 0.061 | 0.465 |
| 0.122 | 0.013 | -0.053 | 0.119 | 0.139 | -0.021 | 0.096 | -0.064 | 0.286 |
| 0.270 | 0.104 | 0.269 | 0.244 | 0.389 | 0.138 | 0.269 | 0.004 | 0.363 |
| 0.222 | 0.317 | 0.111 | 0.295 | 0.424 | 0.094 | 0.295 | 0.107 | 0.408 |
| 0.078 | 0.186 | 0.246 | 0.362 | 0.295 | 0.195 | 0.309 | 0.100 | 0.397 |
| 0.223 | 0.459 | 0.183 | 0.359 | 0.339 | 0.223 | 0.315 | 0.201 | 0.388 |
| 0.258 | 0.108 | 0.526 | 0.189 | 0.509 | 0.275 | 0.151 | 0.324 | 0.177 |
| 0.204 | 0.132 | 0.158 | 0.374 | 0.197 | 0.042 | 0.287 | 0.098 | 0.312 |
| 0.247 | 0.100 | 0.238 | 0.074 | 0.341 | 0.059 | 0.178 | 0.123 | 0.204 |
| 0.232 | 0.152 | 0.068 | 0.325 | 0.182 | 0.186 | 0.057 | -0.061 | 0.138 |
| 0.235 | 0.370 | 0.314 | 0.505 | 0.295 | 0.352 | 0.312 | 0.246 | 0.313 |
| 0.173 | 0.204 | 0.262 | 0.123 | 0.257 | 0.318 | 0.201 | 0.318 | 0.079 |
| 0.168 | 0.502 | 0.246 | 0.636 | 0.277 | 0.208 | 0.294 | 0.048 | 0.353 |
| 0.128 | 0.284 | 0.123 | 0.192 | 0.302 | 0.103 | 0.424 | 0.078 | 0.154 |
| 0.010 | -0.065 | 0.301 | 0.161 | 0.141 | 0.164 | 0.095 | 0.037 | 0.103 |
| 0.189 | 0.314 | 0.347 | 0.359 | 0.426 | 0.360 | 0.380 | 0.413 | 0.298 |

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| 0.291 | 0.164 | 0.374 | 0.091 | 0.483 | 0.322 | 0.086 | 0.249 | 0.194 |
| 0.205 | 0.267 | 0.215 | 0.432 | 0.270 | 0.287 | 0.299 | 0.194 | 0.372 |
| 0.176 | 0.140 | 0.212 | 0.129 | 0.154 | 0.075 | 0.152 | 0.030 | 0.215 |
| 0.113 | 0.100 | 0.065 | 0.056 | 0.019 | 0.224 | 0.075 | 0.146 | 0.039 |
| 0.035 | 0.080 | 0.221 | 0.203 | 0.351 | 0.201 | 0.296 | 0.132 | 0.229 |
| 0.244 | 0.271 | 0.059 | 0.365 | 0.133 | 0.100 | 0.093 | 0.044 | 0.319 |
| 0.156 | 0.243 | 0.110 | 0.282 | 0.317 | 0.165 | 0.225 | 0.094 | 0.357 |
| 0.152 | 0.012 | 0.156 | 0.113 | 0.318 | 0.019 | 0.066 | -0.016 | 0.333 |
| 0.089 | -0.024 | 0.427 | 0.129 | 0.222 | 0.171 | 0.055 | 0.118 | 0.172 |
| 0.135 | 0.116 | -0.018 | 0.260 | 0.158 | -0.031 | 0.516 | 0.141 | 0.184 |
| 0.236 | 0.211 | 0.076 | 0.183 | 0.137 | 0.274 | 0.208 | 0.203 | 0.213 |
| 0.104 | 0.076 | 0.034 | 0.116 | 0.072 | 0.006 | 0.136 | -0.110 | 0.314 |
| 0.113 | 0.013 | 0.015 | 0.049 | 0.201 | -0.006 | 0.198 | -0.004 | 0.315 |
| 0.257 | 0.105 | 0.523 | 0.197 | 0.486 | 0.314 | 0.101 | 0.148 | 0.258 |
| -0.076 | -0.044 | 0.088 | -0.010 | 0.014 | -0.078 | -0.023 | -0.111 | 0.092 |
| 0.150 | 0.195 | 0.124 | 0.181 | 0.225 | 0.141 | 0.295 | 0.062 | 0.198 |
| 0.139 | 0.199 | 0.057 | 0.344 | 0.220 | 0.066 | 0.137 | 0.046 | 0.304 |
| 0.112 | 0.104 | 0.064 | 0.017 | 0.099 | 0.186 | 0.098 | 0.220 | -0.055 |
| 0.282 | 0.193 | 0.004 | 0.215 | 0.201 | 0.055 | 0.284 | 0.030 | 0.355 |
| -0.056 | 0.038 | -0.047 | -0.047 | -0.056 | -0.076 | 0.001 | -0.117 | 0.051 |
| 0.149 | 0.193 | 0.392 | 0.326 | 0.346 | 0.245 | 0.171 | 0.095 | 0.335 |
| 0.061 | 0.146 | -0.077 | 0.256 | 0.067 | 0.008 | 0.189 | 0.084 | 0.190 |
| 0.071 | 0.065 | 0.182 | 0.015 | 0.179 | 0.167 | 0.071 | 0.318 | -0.024 |
| 0.090 | 0.216 | 0.227 | 0.269 | 0.285 | 0.205 | 0.209 | -0.020 | 0.266 |
| -0.043 | 0.122 | 0.203 | 0.167 | 0.293 | 0.174 | 0.194 | 0.017 | 0.190 |
| 0.205 | 0.238 | 0.233 | 0.233 | 0.043 | 0.440 | 0.126 | 0.253 | 0.188 |
| 0.219 | 0.019 | 0.146 | 0.159 | 0.303 | 0.032 | 0.155 | 0.100 | 0.279 |
| 0.232 | 0.058 | 0.400 | 0.114 | 0.293 | 0.151 | -0.005 | 0.058 | 0.186 |
| 0.264 | 0.120 | 0.203 | 0.209 | 0.300 | 0.104 | 0.194 | 0.111 | 0.226 |
| 0.091 | 0.153 | 0.336 | 0.160 | 0.274 | 0.243 | 0.224 | -0.008 | 0.243 |
| 0.091 | 0.044 | 0.207 | -0.042 | 0.162 | 0.194 | 0.024 | 0.163 | -0.071 |
| 0.175 | 0.098 | 0.304 | 0.254 | 0.475 | 0.229 | 0.328 | 0.092 | 0.394 |
| 0.176 | 0.264 | 0.197 | 0.227 | 0.291 | 0.419 | 0.166 | 0.103 | 0.259 |
| 0.250 | 0.184 | 0.089 | 0.310 | 0.304 | 0.156 | 0.269 | 0.141 | 0.329 |
| 0.086 | -0.087 | 0.157 | -0.031 | 0.088 | 0.094 | 0.105 | 0.071 | 0.102 |
| 0.233 | 0.123 | 0.327 | 0.380 | 0.385 | 0.301 | 0.291 | 0.173 | 0.388 |
| 0.252 | 0.210 | 0.049 | 0.141 | 0.320 | 0.112 | 0.216 | 0.158 | 0.176 |
| 0.129 | 0.146 | 0.294 | 0.209 | 0.269 | 0.263 | 0.171 | 0.168 | 0.217 |

| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
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| | 0.512 | | | | | | | |
| | 0.473 | | | -0.444 | | | | |
| | 0.444 | | | -0.329 | | 0.361 | | -0.318 |
| | 0.402 | | | | | 0.332 | | |
| | | 0.571 | | | | | | |
| 0.422 | 0.346 | 0.525 | | | | | | |
| 0.327 | 0.328 | 0.507 | | -0.400 | | | | |
| | | 0.402 | | | | | | -0.359 |
| | | | -0.820 | | | | | |
| | | | | -0.811 | | | 0.355 | |
| | | | | | 0.567 | | | |
| 0.456 | | | | | | 0.475 | | |
| | | | | | | 0.436 | | -0.357 |
| 0.373 | | | | -0.397 | | 0.404 | | -0.335 |
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| | 0.372 | | | -0.377 | | | 0.399 | |
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| | | | | -0.378 | | | | -0.689 |
| | 0.361 | | | | | | | -0.687 |
| | | | | | | 0.340 | | -0.629 |
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| | | 0.378 | | | | | | -0.406 |
| 0.394 | | | | | | | | -0.343 |
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| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
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| -0.191 | -0.036 | -0.154 | -0.007 | 0.073 | 0.002 | -0.103 | -0.045 | 0.090 |
| 0.198 | 0.060 | 0.263 | -0.082 | -0.036 | 0.009 | 0.221 | -0.011 | -0.136 |
| -0.158 | -0.012 | -0.024 | -0.081 | 0.136 | 0.003 | -0.072 | -0.073 | 0.160 |
| 0.152 | 0.212 | 0.115 | -0.042 | -0.157 | 0.071 | 0.201 | 0.139 | -0.193 |
| -0.288 | -0.220 | -0.164 | 0.003 | 0.129 | -0.110 | -0.118 | -0.185 | 0.080 |
| 0.167 | 0.048 | 0.150 | -0.033 | -0.022 | -0.031 | 0.094 | -0.014 | -0.130 |
| 0.172 | 0.187 | 0.096 | -0.081 | -0.165 | 0.002 | 0.096 | 0.154 | -0.221 |
| -0.151 | -0.234 | -0.138 | -0.018 | 0.087 | -0.056 | -0.142 | -0.150 | 0.131 |
| -0.065 | -0.030 | 0.027 | -0.109 | 0.063 | -0.019 | -0.023 | -0.106 | 0.033 |
| -0.164 | -0.198 | -0.098 | -0.136 | 0.152 | -0.118 | -0.109 | -0.192 | -0.014 |
| 1.000 | 0.158 | 0.163 | 0.047 | -0.138 | -0.021 | 0.152 | 0.204 | -0.119 |
| 0.158 | 1.000 | 0.108 | 0.057 | -0.224 | 0.121 | 0.109 | 0.223 | -0.218 |
| 0.163 | 0.108 | 1.000 | 0.022 | -0.122 | 0.108 | 0.122 | 0.123 | -0.085 |
| 0.047 | 0.057 | 0.022 | 1.000 | -0.027 | 0.045 | -0.049 | 0.063 | 0.065 |
| -0.138 | -0.224 | -0.122 | -0.027 | 1.000 | -0.103 | -0.149 | -0.196 | 0.199 |
| -0.021 | 0.121 | 0.108 | 0.045 | -0.103 | 1.000 | 0.033 | 0.117 | -0.009 |
| 0.152 | 0.109 | 0.122 | -0.049 | -0.149 | 0.033 | 1.000 | 0.045 | -0.200 |
| 0.204 | 0.223 | 0.123 | 0.063 | -0.196 | 0.117 | 0.045 | 1.000 | -0.157 |
| -0.119 | -0.218 | -0.085 | 0.065 | 0.199 | -0.009 | -0.200 | -0.157 | 1.000 |
| 0.127 | 0.152 | 0.047 | 0.048 | -0.153 | 0.036 | 0.061 | 0.131 | -0.179 |
| 0.088 | 0.030 | 0.121 | -0.089 | -0.008 | -0.063 | 0.058 | -0.050 | -0.104 |

| Q19_2 | Q20_2 | Q21_2 | Q22_2 | Q23_2 | Q24_2 | Q25_2 | Q26_2 | Q27_2 |
|---|---|---|---|---|---|---|---|---|
| 0.075 | 0.203 | 0.290 | 0.364 | 0.292 | 0.094 | 0.248 | 0.306 | 0.346 |
| 0.070 | 0.191 | 0.135 | 0.429 | 0.152 | -0.005 | 0.102 | 0.175 | 0.145 |
| 0.063 | 0.166 | 0.168 | 0.086 | 0.492 | 0.007 | 0.218 | 0.230 | 0.245 |
| 0.259 | 0.178 | 0.242 | 0.248 | 0.142 | 0.110 | 0.297 | 0.311 | 0.293 |
| 0.101 | 0.294 | 0.264 | 0.279 | 0.272 | 0.037 | 0.197 | 0.168 | 0.343 |
| 0.164 | 0.204 | 0.220 | 0.133 | 0.085 | 0.292 | 0.268 | 0.275 | 0.248 |
| 0.025 | 0.343 | 0.121 | 0.532 | 0.228 | -0.029 | 0.183 | 0.096 | 0.164 |
| 0.258 | 0.159 | 0.291 | 0.078 | 0.284 | 0.223 | 0.391 | 0.532 | 0.222 |
| 0.143 | 0.197 | 0.205 | 0.096 | 0.123 | 0.169 | 0.275 | 0.257 | 0.296 |
| 0.008 | 0.139 | 0.067 | 0.174 | 0.190 | 0.122 | 0.270 | 0.222 | 0.078 |
| 0.121 | -0.005 | 0.223 | 0.170 | 0.324 | 0.013 | 0.104 | 0.317 | 0.186 |
| 0.139 | 0.208 | 0.182 | 0.485 | 0.182 | -0.053 | 0.269 | 0.111 | 0.246 |
| 0.166 | 0.103 | 0.334 | 0.193 | 0.539 | 0.119 | 0.244 | 0.295 | 0.362 |
| 0.089 | 0.323 | 0.295 | 0.435 | 0.315 | 0.139 | 0.389 | 0.424 | 0.295 |
| 0.154 | 0.192 | 0.088 | 0.274 | 0.258 | -0.021 | 0.138 | 0.094 | 0.195 |
| 0.188 | -0.002 | 0.288 | 0.170 | 0.300 | 0.096 | 0.269 | 0.295 | 0.309 |
| -0.036 | -0.090 | 0.200 | 0.291 | 0.061 | -0.064 | 0.004 | 0.107 | 0.100 |
| 0.344 | 0.205 | 0.360 | 0.213 | 0.465 | 0.286 | 0.363 | 0.408 | 0.397 |
| 1.000 | 0.098 | 0.250 | 0.072 | 0.155 | 0.328 | 0.139 | 0.275 | 0.141 |
| 0.098 | 1.000 | 0.200 | 0.214 | 0.251 | 0.134 | 0.402 | 0.172 | 0.257 |
| 0.250 | 0.200 | 1.000 | 0.208 | 0.268 | 0.306 | 0.258 | 0.334 | 0.413 |
| 0.072 | 0.214 | 0.208 | 1.000 | 0.215 | 0.074 | 0.149 | 0.204 | 0.127 |
| 0.155 | 0.251 | 0.268 | 0.215 | 1.000 | 0.121 | 0.283 | 0.358 | 0.460 |
| 0.328 | 0.134 | 0.306 | 0.074 | 0.121 | 1.000 | 0.191 | 0.242 | 0.239 |
| 0.139 | 0.402 | 0.258 | 0.149 | 0.283 | 0.191 | 1.000 | 0.316 | 0.400 |
| 0.275 | 0.172 | 0.334 | 0.204 | 0.358 | 0.242 | 0.316 | 1.000 | 0.345 |
| 0.141 | 0.257 | 0.413 | 0.127 | 0.460 | 0.239 | 0.400 | 0.345 | 1.000 |
| 0.157 | 0.137 | 0.227 | 0.243 | 0.481 | 0.112 | 0.343 | 0.319 | 0.339 |
| 0.149 | 0.230 | 0.265 | 0.576 | 0.185 | 0.054 | 0.192 | 0.235 | 0.180 |
| 0.237 | 0.161 | 0.380 | 0.153 | 0.318 | 0.309 | 0.366 | 0.361 | 0.460 |
| 0.060 | 0.142 | 0.049 | 0.168 | 0.202 | 0.051 | 0.195 | 0.247 | 0.195 |
| -0.106 | 0.147 | 0.160 | 0.028 | 0.280 | 0.121 | 0.238 | 0.141 | 0.257 |
| 0.224 | 0.055 | 0.375 | 0.318 | 0.458 | 0.017 | 0.191 | 0.369 | 0.346 |
| 0.103 | 0.028 | 0.136 | 0.278 | 0.139 | 0.003 | 0.052 | 0.127 | 0.107 |
| 0.201 | 0.166 | 0.291 | 0.151 | 0.509 | -0.014 | 0.285 | 0.388 | 0.260 |
| 0.252 | 0.120 | 0.252 | 0.092 | 0.218 | 0.243 | 0.259 | 0.361 | 0.333 |
| 0.063 | 0.308 | 0.134 | 0.173 | 0.283 | -0.004 | 0.124 | 0.077 | 0.121 |
| 0.160 | 0.239 | 0.303 | 0.320 | 0.392 | 0.004 | 0.273 | 0.249 | 0.300 |

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| 0.126 | 0.232 | 0.130 | 0.453 | 0.139 | 0.064 | 0.094 | 0.199 | 0.111 |
| 0.110 | 0.320 | 0.419 | 0.238 | 0.468 | 0.175 | 0.366 | 0.295 | 0.458 |
| 0.247 | 0.116 | 0.176 | 0.188 | 0.107 | 0.212 | 0.323 | 0.228 | 0.188 |
| 0.017 | 0.091 | 0.055 | 0.069 | 0.026 | 0.078 | 0.152 | 0.016 | 0.110 |
| 0.310 | 0.263 | 0.277 | 0.202 | 0.245 | 0.109 | 0.330 | 0.302 | 0.304 |
| 0.096 | 0.138 | 0.353 | 0.109 | 0.341 | 0.128 | 0.092 | 0.159 | 0.260 |
| 0.216 | 0.132 | 0.277 | 0.145 | 0.295 | 0.261 | 0.306 | 0.402 | 0.290 |
| 0.322 | 0.218 | 0.245 | 0.268 | 0.231 | 0.439 | 0.193 | 0.350 | 0.308 |
| 0.124 | 0.121 | 0.179 | 0.212 | 0.246 | 0.004 | 0.125 | 0.136 | 0.198 |
| 0.071 | 0.078 | 0.202 | 0.013 | 0.184 | 0.127 | 0.204 | 0.327 | 0.288 |
| 0.062 | 0.100 | 0.068 | 0.253 | 0.191 | 0.125 | 0.024 | 0.104 | 0.142 |
| 0.164 | 0.159 | 0.143 | 0.049 | 0.184 | 0.322 | 0.192 | 0.203 | 0.296 |
| 0.252 | 0.081 | 0.279 | 0.024 | 0.132 | 0.217 | 0.239 | 0.212 | 0.144 |
| 0.025 | 0.410 | 0.257 | 0.505 | 0.287 | 0.063 | 0.465 | 0.269 | 0.307 |
| 0.084 | -0.095 | 0.143 | 0.030 | 0.091 | 0.057 | 0.085 | 0.111 | 0.078 |
| 0.398 | 0.090 | 0.341 | 0.148 | 0.110 | 0.332 | 0.170 | 0.345 | 0.293 |
| 0.109 | 0.179 | 0.392 | 0.060 | 0.364 | 0.313 | 0.238 | 0.361 | 0.344 |
| 0.009 | 0.050 | -0.019 | 0.171 | -0.025 | 0.009 | -0.100 | 0.047 | 0.023 |
| 0.149 | 0.188 | 0.321 | 0.166 | 0.264 | 0.259 | 0.277 | 0.414 | 0.216 |
| 0.156 | 0.007 | 0.084 | -0.066 | -0.103 | 0.227 | -0.013 | 0.160 | 0.029 |
| 0.119 | 0.275 | 0.276 | 0.185 | 0.411 | 0.042 | 0.267 | 0.260 | 0.331 |
| 0.230 | 0.055 | 0.233 | -0.066 | 0.077 | 0.238 | 0.107 | 0.292 | 0.198 |
| -0.077 | -0.028 | 0.134 | 0.291 | 0.050 | -0.251 | -0.049 | -0.010 | 0.100 |
| 0.174 | 0.075 | 0.160 | 0.177 | 0.301 | 0.136 | 0.151 | 0.295 | 0.345 |
| 0.255 | 0.237 | 0.184 | 0.081 | 0.162 | 0.177 | 0.337 | 0.316 | 0.303 |
| 0.069 | 0.099 | 0.120 | 0.160 | 0.227 | 0.046 | 0.154 | 0.096 | 0.222 |
| 0.117 | 0.259 | 0.261 | 0.130 | 0.202 | 0.161 | 0.456 | 0.317 | 0.223 |
| 0.005 | 0.203 | 0.029 | 0.309 | 0.241 | 0.019 | 0.235 | 0.163 | 0.106 |
| 0.216 | 0.172 | 0.269 | 0.211 | 0.231 | 0.200 | 0.401 | 0.298 | 0.273 |
| 0.259 | 0.348 | 0.130 | 0.207 | 0.210 | 0.124 | 0.577 | 0.218 | 0.352 |
| 0.112 | 0.018 | -0.045 | 0.158 | 0.118 | 0.000 | -0.010 | 0.010 | 0.008 |
| 0.300 | 0.257 | 0.349 | 0.378 | 0.325 | 0.350 | 0.412 | 0.403 | 0.392 |
| 0.269 | 0.315 | 0.211 | 0.222 | 0.209 | 0.167 | 0.252 | 0.286 | 0.160 |
| 0.221 | 0.100 | 0.258 | 0.070 | 0.292 | 0.240 | 0.333 | 0.407 | 0.283 |
| 0.115 | 0.081 | 0.144 | 0.124 | 0.089 | 0.169 | 0.112 | 0.078 | 0.177 |
| 0.319 | 0.295 | 0.312 | 0.298 | 0.430 | 0.195 | 0.382 | 0.355 | 0.371 |
| 0.320 | 0.048 | 0.220 | 0.130 | 0.040 | 0.262 | 0.193 | 0.324 | 0.194 |
| 0.045 | 0.145 | 0.121 | 0.237 | 0.259 | -0.081 | 0.152 | 0.035 | 0.169 |

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| -0.155 | -0.024 |
| 0.127 | 0.117 |
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| 0.063 | 0.081 |
| 0.142 | 0.189 |
| -0.111 | -0.105 |
| -0.018 | 0.059 |
| 0.016 | 0.084 |
| 0.127 | 0.088 |
| 0.152 | 0.030 |
| 0.047 | 0.121 |
| 0.048 | -0.089 |
| -0.153 | -0.008 |
| 0.036 | -0.063 |
| 0.061 | 0.058 |
| 0.131 | -0.050 |
| -0.179 | -0.104 |
| 1.000 | 0.150 |
| 0.150 | 1.000 |

**Correlation Matrix[a]**

| Q28_2 | Q29_2 | Q30_2 | Q31_2 | Q32_2 | Q33_2 | Q34_2 | Q35_2 | Q36_2 |
|---|---|---|---|---|---|---|---|---|
| 0.242 | 0.303 | 0.175 | 0.314 | 0.113 | 0.330 | 0.178 | 0.167 | 0.249 |
| 0.086 | 0.504 | -0.014 | 0.238 | 0.116 | 0.299 | 0.373 | 0.121 | 0.066 |
| 0.376 | 0.029 | 0.308 | 0.146 | 0.234 | 0.219 | 0.085 | 0.400 | 0.180 |
| 0.168 | 0.281 | 0.190 | 0.145 | 0.113 | 0.201 | 0.114 | 0.229 | 0.347 |
| 0.152 | 0.335 | 0.329 | 0.106 | 0.175 | 0.279 | 0.120 | 0.181 | 0.004 |
| 0.093 | 0.295 | 0.070 | 0.300 | 0.158 | 0.171 | 0.168 | 0.030 | 0.172 |
| 0.251 | 0.466 | 0.039 | 0.231 | 0.033 | 0.291 | 0.223 | 0.289 | 0.145 |
| 0.291 | 0.134 | 0.327 | 0.128 | 0.226 | 0.302 | 0.122 | 0.482 | 0.304 |
| 0.188 | 0.127 | 0.167 | 0.151 | 0.049 | 0.244 | 0.153 | 0.234 | 0.461 |
| 0.223 | 0.258 | 0.204 | 0.247 | 0.232 | 0.235 | 0.173 | 0.168 | 0.128 |
| 0.459 | 0.108 | 0.132 | 0.100 | 0.152 | 0.370 | 0.204 | 0.502 | 0.284 |
| 0.183 | 0.526 | 0.158 | 0.238 | 0.068 | 0.314 | 0.262 | 0.246 | 0.123 |
| 0.359 | 0.189 | 0.374 | 0.074 | 0.325 | 0.505 | 0.123 | 0.636 | 0.192 |
| 0.339 | 0.509 | 0.197 | 0.341 | 0.182 | 0.295 | 0.257 | 0.277 | 0.302 |
| 0.223 | 0.275 | 0.042 | 0.059 | 0.186 | 0.352 | 0.318 | 0.208 | 0.103 |
| 0.315 | 0.151 | 0.287 | 0.178 | 0.057 | 0.312 | 0.201 | 0.294 | 0.424 |
| 0.201 | 0.324 | 0.098 | 0.123 | -0.061 | 0.246 | 0.318 | 0.048 | 0.078 |
| 0.388 | 0.177 | 0.312 | 0.204 | 0.138 | 0.313 | 0.079 | 0.353 | 0.154 |
| 0.157 | 0.149 | 0.237 | 0.060 | -0.106 | 0.224 | 0.103 | 0.201 | 0.252 |
| 0.137 | 0.230 | 0.161 | 0.142 | 0.147 | 0.055 | 0.028 | 0.166 | 0.120 |
| 0.227 | 0.265 | 0.380 | 0.049 | 0.160 | 0.375 | 0.136 | 0.291 | 0.252 |
| 0.243 | 0.576 | 0.153 | 0.168 | 0.028 | 0.318 | 0.278 | 0.151 | 0.092 |
| 0.481 | 0.185 | 0.318 | 0.202 | 0.280 | 0.458 | 0.139 | 0.509 | 0.218 |
| 0.112 | 0.054 | 0.309 | 0.051 | 0.121 | 0.017 | 0.003 | -0.014 | 0.243 |
| 0.343 | 0.192 | 0.366 | 0.195 | 0.238 | 0.191 | 0.052 | 0.285 | 0.259 |
| 0.319 | 0.235 | 0.361 | 0.247 | 0.141 | 0.369 | 0.127 | 0.388 | 0.361 |
| 0.339 | 0.180 | 0.460 | 0.195 | 0.257 | 0.346 | 0.107 | 0.260 | 0.333 |
| 1.000 | 0.145 | 0.351 | 0.168 | 0.216 | 0.342 | 0.222 | 0.353 | 0.281 |
| 0.145 | 1.000 | 0.139 | 0.289 | 0.072 | 0.329 | 0.325 | 0.143 | 0.094 |
| 0.351 | 0.139 | 1.000 | 0.098 | 0.193 | 0.435 | 0.003 | 0.271 | 0.295 |
| 0.168 | 0.289 | 0.098 | 1.000 | 0.142 | 0.251 | 0.105 | 0.037 | 0.279 |
| 0.216 | 0.072 | 0.193 | 0.142 | 1.000 | 0.218 | 0.198 | 0.270 | 0.146 |
| 0.342 | 0.329 | 0.435 | 0.251 | 0.218 | 1.000 | 0.267 | 0.422 | 0.342 |
| 0.222 | 0.325 | 0.003 | 0.105 | 0.198 | 0.267 | 1.000 | 0.163 | 0.047 |
| 0.353 | 0.143 | 0.271 | 0.037 | 0.270 | 0.422 | 0.163 | 1.000 | 0.291 |
| 0.281 | 0.094 | 0.295 | 0.279 | 0.146 | 0.342 | 0.047 | 0.291 | 1.000 |
| 0.028 | 0.237 | 0.146 | 0.009 | 0.050 | 0.144 | 0.267 | 0.181 | 0.040 |
| 0.478 | 0.426 | 0.322 | 0.199 | 0.151 | 0.505 | 0.391 | 0.352 | 0.299 |

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|---|---|---|---|---|---|---|---|---|
| 0.120 | 0.489 | 0.048 | 0.220 | 0.103 | 0.342 | 0.367 | 0.117 | 0.060 |
| 0.498 | 0.195 | 0.442 | 0.183 | 0.350 | 0.398 | 0.151 | 0.350 | 0.237 |
| 0.264 | 0.134 | 0.380 | 0.047 | -0.037 | 0.213 | 0.071 | 0.237 | 0.234 |
| 0.093 | 0.091 | -0.007 | 0.107 | 0.490 | 0.020 | 0.172 | 0.056 | -0.038 |
| 0.270 | 0.259 | 0.296 | 0.160 | 0.056 | 0.229 | 0.087 | 0.247 | 0.367 |
| 0.217 | 0.042 | 0.252 | 0.098 | 0.082 | 0.347 | 0.116 | 0.305 | 0.188 |
| 0.440 | 0.121 | 0.430 | 0.118 | 0.126 | 0.336 | 0.140 | 0.337 | 0.266 |
| 0.152 | 0.224 | 0.316 | 0.165 | 0.012 | 0.201 | -0.041 | 0.054 | 0.216 |
| 0.140 | 0.343 | 0.185 | 0.074 | 0.113 | 0.178 | 0.243 | 0.201 | -0.012 |
| 0.117 | -0.008 | 0.299 | 0.356 | 0.110 | 0.220 | 0.069 | 0.154 | 0.475 |
| 0.061 | 0.276 | 0.044 | 0.167 | 0.247 | 0.343 | 0.188 | 0.146 | 0.058 |
| 0.184 | -0.046 | 0.327 | -0.108 | 0.017 | 0.037 | 0.004 | 0.198 | 0.189 |
| 0.110 | -0.007 | 0.228 | 0.169 | 0.056 | 0.128 | -0.040 | 0.091 | 0.198 |
| 0.311 | 0.517 | 0.228 | 0.243 | 0.240 | 0.346 | 0.330 | 0.249 | 0.196 |
| 0.052 | 0.017 | 0.050 | 0.058 | 0.022 | 0.067 | 0.016 | -0.049 | 0.035 |
| 0.229 | 0.190 | 0.399 | 0.120 | 0.109 | 0.291 | 0.093 | 0.147 | 0.386 |
| 0.399 | 0.025 | 0.365 | 0.093 | 0.174 | 0.206 | 0.104 | 0.204 | 0.201 |
| -0.019 | 0.212 | -0.087 | 0.045 | 0.002 | 0.090 | 0.154 | 0.139 | 0.241 |
| 0.230 | 0.184 | 0.369 | 0.193 | 0.094 | 0.298 | 0.013 | 0.198 | 0.188 |
| 0.002 | -0.154 | 0.011 | 0.035 | -0.005 | 0.014 | -0.071 | -0.061 | 0.148 |
| 0.191 | 0.332 | 0.251 | 0.163 | 0.264 | 0.437 | 0.233 | 0.439 | 0.190 |
| 0.104 | 0.064 | 0.224 | -0.008 | 0.044 | 0.165 | -0.034 | 0.219 | 0.146 |
| 0.006 | 0.343 | -0.096 | 0.111 | -0.076 | 0.200 | 0.318 | 0.049 | -0.054 |
| 0.255 | 0.183 | 0.179 | 0.203 | 0.063 | 0.288 | 0.186 | 0.324 | 0.268 |
| 0.212 | 0.215 | 0.303 | 0.108 | 0.086 | 0.188 | 0.118 | 0.235 | 0.345 |
| 0.351 | 0.201 | 0.119 | 0.077 | 0.277 | 0.266 | 0.406 | 0.189 | 0.053 |
| 0.246 | 0.207 | 0.233 | 0.077 | 0.055 | 0.043 | 0.231 | 0.180 | 0.059 |
| 0.179 | 0.404 | 0.049 | 0.249 | 0.292 | 0.173 | 0.266 | 0.172 | -0.008 |
| 0.228 | 0.267 | 0.305 | 0.208 | 0.026 | 0.136 | 0.147 | 0.281 | 0.262 |
| 0.362 | 0.176 | 0.300 | 0.108 | 0.104 | 0.153 | 0.158 | 0.165 | 0.239 |
| 0.051 | 0.182 | 0.107 | 0.024 | 0.040 | 0.106 | 0.333 | -0.002 | 0.117 |
| 0.372 | 0.319 | 0.413 | 0.253 | 0.180 | 0.331 | 0.128 | 0.224 | 0.302 |
| 0.269 | 0.312 | 0.138 | 0.048 | 0.164 | 0.291 | 0.297 | 0.231 | 0.252 |
| 0.383 | 0.115 | 0.470 | 0.172 | 0.141 | 0.325 | 0.095 | 0.301 | 0.311 |
| 0.051 | 0.134 | 0.193 | 0.121 | -0.044 | 0.076 | -0.010 | -0.067 | 0.144 |
| 0.373 | 0.294 | 0.482 | 0.306 | 0.193 | 0.422 | 0.224 | 0.335 | 0.278 |
| 0.096 | 0.129 | 0.230 | 0.177 | -0.061 | 0.254 | 0.035 | 0.115 | 0.325 |
| 0.219 | 0.324 | 0.011 | 0.100 | 0.143 | 0.212 | 0.393 | 0.250 | 0.128 |

| Q37_2 | Q38_2 | Q39_2 | Q40_2 | Q41_2 | Q42_2 | Q43_2 | Q44_2 | Q45_2 |
|---|---|---|---|---|---|---|---|---|
| 0.087 | 0.369 | 0.239 | 0.315 | 0.172 | 0.070 | 0.450 | 0.190 | 0.302 |
| 0.225 | 0.282 | 0.553 | 0.160 | 0.089 | 0.168 | 0.261 | 0.044 | 0.064 |
| 0.126 | 0.156 | 0.052 | 0.379 | 0.226 | 0.029 | 0.171 | 0.211 | 0.232 |
| 0.129 | 0.228 | 0.101 | 0.242 | 0.120 | 0.173 | 0.539 | -0.010 | 0.256 |
| 0.283 | 0.356 | 0.200 | 0.310 | 0.166 | 0.269 | 0.148 | 0.138 | 0.244 |
| 0.008 | 0.241 | 0.286 | 0.227 | 0.000 | 0.126 | 0.170 | 0.068 | 0.168 |
| 0.119 | 0.407 | 0.504 | 0.233 | 0.178 | 0.054 | 0.240 | 0.126 | 0.104 |
| 0.015 | 0.246 | 0.048 | 0.400 | 0.313 | 0.068 | 0.312 | 0.154 | 0.415 |
| 0.130 | 0.236 | 0.164 | 0.222 | 0.092 | 0.018 | 0.298 | 0.185 | 0.112 |
| 0.010 | 0.189 | 0.291 | 0.205 | 0.176 | 0.113 | 0.035 | 0.244 | 0.156 |
| -0.065 | 0.314 | 0.164 | 0.267 | 0.140 | 0.100 | 0.080 | 0.271 | 0.243 |
| 0.301 | 0.347 | 0.374 | 0.215 | 0.212 | 0.065 | 0.221 | 0.059 | 0.110 |
| 0.161 | 0.359 | 0.091 | 0.432 | 0.129 | 0.056 | 0.203 | 0.365 | 0.282 |
| 0.141 | 0.426 | 0.483 | 0.270 | 0.154 | 0.019 | 0.351 | 0.133 | 0.317 |
| 0.164 | 0.360 | 0.322 | 0.287 | 0.075 | 0.224 | 0.201 | 0.100 | 0.165 |
| 0.095 | 0.380 | 0.086 | 0.299 | 0.152 | 0.075 | 0.296 | 0.093 | 0.225 |
| 0.037 | 0.413 | 0.249 | 0.194 | 0.030 | 0.146 | 0.132 | 0.044 | 0.094 |
| 0.103 | 0.298 | 0.194 | 0.372 | 0.215 | 0.039 | 0.229 | 0.319 | 0.357 |
| 0.063 | 0.160 | 0.126 | 0.110 | 0.247 | 0.017 | 0.310 | 0.096 | 0.216 |
| 0.308 | 0.239 | 0.232 | 0.320 | 0.116 | 0.091 | 0.263 | 0.138 | 0.132 |
| 0.134 | 0.303 | 0.130 | 0.419 | 0.176 | 0.055 | 0.277 | 0.353 | 0.277 |
| 0.173 | 0.320 | 0.453 | 0.238 | 0.188 | 0.069 | 0.202 | 0.109 | 0.145 |
| 0.283 | 0.392 | 0.139 | 0.468 | 0.107 | 0.026 | 0.245 | 0.341 | 0.295 |
| -0.004 | 0.004 | 0.064 | 0.175 | 0.212 | 0.078 | 0.109 | 0.128 | 0.261 |
| 0.124 | 0.273 | 0.094 | 0.366 | 0.323 | 0.152 | 0.330 | 0.092 | 0.306 |
| 0.077 | 0.249 | 0.199 | 0.295 | 0.228 | 0.016 | 0.302 | 0.159 | 0.402 |
| 0.121 | 0.300 | 0.111 | 0.458 | 0.188 | 0.110 | 0.304 | 0.260 | 0.290 |
| 0.028 | 0.478 | 0.120 | 0.498 | 0.264 | 0.093 | 0.270 | 0.217 | 0.440 |
| 0.237 | 0.426 | 0.489 | 0.195 | 0.134 | 0.091 | 0.259 | 0.042 | 0.121 |
| 0.146 | 0.322 | 0.048 | 0.442 | 0.380 | -0.007 | 0.296 | 0.252 | 0.430 |
| 0.009 | 0.199 | 0.220 | 0.183 | 0.047 | 0.107 | 0.160 | 0.098 | 0.118 |
| 0.050 | 0.151 | 0.103 | 0.350 | -0.037 | 0.490 | 0.056 | 0.082 | 0.126 |
| 0.144 | 0.505 | 0.342 | 0.398 | 0.213 | 0.020 | 0.229 | 0.347 | 0.336 |
| 0.267 | 0.391 | 0.367 | 0.151 | 0.071 | 0.172 | 0.087 | 0.116 | 0.140 |
| 0.181 | 0.352 | 0.117 | 0.350 | 0.237 | 0.056 | 0.247 | 0.305 | 0.337 |
| 0.040 | 0.299 | 0.060 | 0.237 | 0.234 | -0.038 | 0.367 | 0.188 | 0.266 |
| 1.000 | 0.226 | 0.128 | 0.149 | 0.030 | 0.174 | 0.142 | 0.184 | -0.032 |
| 0.226 | 1.000 | 0.331 | 0.388 | 0.128 | 0.100 | 0.278 | 0.216 | 0.378 |

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|---|---|---|---|---|---|---|---|---|
| 0.128 | 0.331 | 1.000 | 0.182 | 0.090 | 0.060 | 0.159 | 0.058 | 0.091 |
| 0.149 | 0.388 | 0.182 | 1.000 | 0.207 | 0.255 | 0.373 | 0.250 | 0.341 |
| 0.030 | 0.128 | 0.090 | 0.207 | 1.000 | 0.043 | 0.193 | 0.215 | 0.235 |
| 0.174 | 0.100 | 0.060 | 0.255 | 0.043 | 1.000 | 0.116 | -0.123 | 0.026 |
| 0.142 | 0.278 | 0.159 | 0.373 | 0.193 | 0.116 | 1.000 | 0.083 | 0.246 |
| 0.184 | 0.216 | 0.058 | 0.250 | 0.215 | -0.123 | 0.083 | 1.000 | 0.170 |
| -0.032 | 0.378 | 0.091 | 0.341 | 0.235 | 0.026 | 0.246 | 0.170 | 1.000 |
| 0.096 | 0.019 | 0.172 | 0.338 | 0.237 | -0.007 | 0.313 | 0.176 | 0.201 |
| 0.485 | 0.249 | 0.214 | 0.214 | 0.164 | 0.168 | 0.081 | 0.128 | 0.101 |
| 0.076 | 0.242 | 0.004 | 0.195 | 0.016 | 0.014 | 0.278 | 0.230 | 0.169 |
| 0.101 | 0.205 | 0.351 | 0.190 | 0.029 | 0.247 | 0.031 | 0.070 | 0.131 |
| -0.017 | 0.216 | -0.043 | 0.186 | 0.345 | -0.068 | 0.165 | 0.139 | 0.282 |
| -0.008 | 0.104 | 0.095 | 0.247 | 0.255 | 0.114 | 0.289 | 0.075 | 0.110 |
| 0.379 | 0.407 | 0.389 | 0.333 | 0.156 | 0.201 | 0.265 | 0.120 | 0.217 |
| 0.055 | -0.073 | -0.041 | 0.143 | 0.072 | 0.002 | 0.116 | 0.078 | -0.041 |
| -0.076 | 0.196 | 0.100 | 0.293 | 0.263 | -0.029 | 0.272 | 0.259 | 0.255 |
| 0.101 | 0.199 | 0.027 | 0.461 | 0.250 | 0.021 | 0.184 | 0.308 | 0.280 |
| 0.123 | 0.195 | 0.117 | 0.074 | -0.072 | 0.093 | 0.116 | 0.013 | -0.097 |
| 0.037 | 0.222 | 0.121 | 0.329 | 0.294 | 0.036 | 0.200 | 0.215 | 0.297 |
| -0.038 | -0.096 | -0.103 | -0.024 | 0.180 | -0.002 | 0.040 | 0.013 | 0.171 |
| 0.330 | 0.456 | 0.309 | 0.360 | 0.096 | 0.121 | 0.183 | 0.145 | 0.287 |
| 0.006 | 0.110 | 0.043 | 0.174 | 0.196 | 0.071 | 0.138 | 0.100 | 0.216 |
| 0.029 | 0.235 | 0.263 | 0.058 | 0.027 | 0.008 | 0.207 | 0.056 | -0.021 |
| 0.209 | 0.253 | 0.230 | 0.218 | 0.209 | 0.127 | 0.195 | 0.220 | 0.226 |
| 0.164 | 0.237 | 0.003 | 0.308 | 0.214 | 0.072 | 0.511 | 0.051 | 0.278 |
| 0.288 | 0.312 | 0.117 | 0.352 | 0.087 | 0.428 | -0.018 | 0.083 | 0.192 |
| 0.234 | 0.197 | 0.148 | 0.188 | 0.266 | 0.077 | 0.099 | 0.021 | 0.279 |
| 0.202 | 0.277 | 0.267 | 0.359 | 0.176 | 0.333 | 0.172 | 0.104 | 0.065 |
| 0.166 | 0.219 | 0.142 | 0.358 | 0.361 | 0.147 | 0.403 | 0.046 | 0.238 |
| 0.225 | 0.294 | 0.128 | 0.344 | 0.224 | 0.104 | 0.320 | 0.001 | 0.191 |
| 0.212 | 0.213 | 0.359 | 0.074 | -0.013 | 0.016 | -0.027 | 0.031 | 0.031 |
| 0.057 | 0.333 | 0.281 | 0.417 | 0.349 | 0.047 | 0.355 | 0.132 | 0.433 |
| 0.268 | 0.312 | 0.334 | 0.193 | 0.144 | 0.155 | 0.147 | 0.077 | 0.225 |
| -0.028 | 0.270 | 0.052 | 0.353 | 0.393 | 0.017 | 0.207 | 0.193 | 0.373 |
| 0.071 | 0.065 | 0.065 | 0.158 | 0.201 | 0.069 | 0.216 | -0.011 | 0.110 |
| 0.283 | 0.435 | 0.297 | 0.573 | 0.296 | 0.049 | 0.378 | 0.272 | 0.432 |
| -0.069 | 0.136 | 0.187 | 0.054 | 0.235 | -0.077 | 0.187 | 0.209 | 0.173 |
| 0.206 | 0.503 | 0.213 | 0.160 | 0.087 | 0.056 | 0.172 | 0.116 | 0.143 |

| Q46_2 | Q47_2 | Q48_2 | Q49_2 | Q50_2 | Q51_2 | Q52_2 | Q53_2 | Q54_2 |
|---|---|---|---|---|---|---|---|---|
| 0.229 | 0.137 | 0.399 | 0.149 | 0.128 | 0.111 | 0.258 | 0.081 | 0.250 |
| 0.114 | 0.256 | 0.059 | 0.279 | -0.044 | 0.076 | 0.410 | -0.027 | 0.056 |
| 0.131 | 0.196 | 0.035 | 0.015 | 0.143 | 0.025 | 0.223 | 0.034 | 0.046 |
| 0.313 | 0.086 | 0.275 | 0.081 | 0.132 | 0.141 | 0.248 | 0.115 | 0.195 |
| 0.149 | 0.437 | 0.070 | 0.230 | 0.082 | 0.026 | 0.357 | 0.022 | 0.189 |
| 0.260 | 0.143 | 0.206 | 0.164 | 0.056 | 0.145 | 0.257 | -0.001 | 0.203 |
| 0.106 | 0.196 | 0.058 | 0.391 | 0.125 | 0.034 | 0.474 | -0.038 | 0.157 |
| 0.199 | 0.095 | 0.219 | 0.084 | 0.237 | 0.244 | 0.178 | 0.039 | 0.301 |
| 0.207 | -0.067 | 0.382 | 0.212 | 0.134 | 0.226 | 0.219 | -0.035 | 0.324 |
| 0.152 | 0.089 | 0.135 | 0.236 | 0.104 | 0.113 | 0.257 | -0.076 | 0.150 |
| 0.012 | -0.024 | 0.116 | 0.211 | 0.076 | 0.013 | 0.105 | -0.044 | 0.195 |
| 0.156 | 0.427 | -0.018 | 0.076 | 0.034 | 0.015 | 0.523 | 0.088 | 0.124 |
| 0.113 | 0.129 | 0.260 | 0.183 | 0.116 | 0.049 | 0.197 | -0.010 | 0.181 |
| 0.318 | 0.222 | 0.158 | 0.137 | 0.072 | 0.201 | 0.486 | 0.014 | 0.225 |
| 0.019 | 0.171 | -0.031 | 0.274 | 0.006 | -0.006 | 0.314 | -0.078 | 0.141 |
| 0.066 | 0.055 | 0.516 | 0.208 | 0.136 | 0.198 | 0.101 | -0.023 | 0.295 |
| -0.016 | 0.118 | 0.141 | 0.203 | -0.110 | -0.004 | 0.148 | -0.111 | 0.062 |
| 0.333 | 0.172 | 0.184 | 0.213 | 0.314 | 0.315 | 0.258 | 0.092 | 0.198 |
| 0.322 | 0.124 | 0.071 | 0.062 | 0.164 | 0.252 | 0.025 | 0.084 | 0.398 |
| 0.218 | 0.121 | 0.078 | 0.100 | 0.159 | 0.081 | 0.410 | -0.095 | 0.090 |
| 0.245 | 0.179 | 0.202 | 0.068 | 0.143 | 0.279 | 0.257 | 0.143 | 0.341 |
| 0.268 | 0.212 | 0.013 | 0.253 | 0.049 | 0.024 | 0.505 | 0.030 | 0.148 |
| 0.231 | 0.246 | 0.184 | 0.191 | 0.184 | 0.132 | 0.287 | 0.091 | 0.110 |
| 0.439 | 0.004 | 0.127 | 0.125 | 0.322 | 0.217 | 0.063 | 0.057 | 0.332 |
| 0.193 | 0.125 | 0.204 | 0.024 | 0.192 | 0.239 | 0.465 | 0.085 | 0.170 |
| 0.350 | 0.136 | 0.327 | 0.104 | 0.203 | 0.212 | 0.269 | 0.111 | 0.345 |
| 0.308 | 0.198 | 0.288 | 0.142 | 0.296 | 0.144 | 0.307 | 0.078 | 0.293 |
| 0.152 | 0.140 | 0.117 | 0.061 | 0.184 | 0.110 | 0.311 | 0.052 | 0.229 |
| 0.224 | 0.343 | -0.008 | 0.276 | -0.046 | -0.007 | 0.517 | 0.017 | 0.190 |
| 0.316 | 0.185 | 0.299 | 0.044 | 0.327 | 0.228 | 0.228 | 0.050 | 0.399 |
| 0.165 | 0.074 | 0.356 | 0.167 | -0.108 | 0.169 | 0.243 | 0.058 | 0.120 |
| 0.012 | 0.113 | 0.110 | 0.247 | 0.017 | 0.056 | 0.240 | 0.022 | 0.109 |
| 0.201 | 0.178 | 0.220 | 0.343 | 0.037 | 0.128 | 0.346 | 0.067 | 0.291 |
| -0.041 | 0.243 | 0.069 | 0.188 | 0.004 | -0.040 | 0.330 | 0.016 | 0.093 |
| 0.054 | 0.201 | 0.154 | 0.146 | 0.198 | 0.091 | 0.249 | -0.049 | 0.147 |
| 0.216 | -0.012 | 0.475 | 0.058 | 0.189 | 0.198 | 0.196 | 0.035 | 0.386 |
| 0.096 | 0.485 | 0.076 | 0.101 | -0.017 | -0.008 | 0.379 | 0.055 | -0.076 |
| 0.019 | 0.249 | 0.242 | 0.205 | 0.216 | 0.104 | 0.407 | -0.073 | 0.196 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 0.172 | 0.214 | 0.004 | 0.351 | -0.043 | 0.095 | 0.389 | -0.041 | 0.100 |
| 0.338 | 0.214 | 0.195 | 0.190 | 0.186 | 0.247 | 0.333 | 0.143 | 0.293 |
| 0.237 | 0.164 | 0.016 | 0.029 | 0.345 | 0.255 | 0.156 | 0.072 | 0.263 |
| -0.007 | 0.168 | 0.014 | 0.247 | -0.068 | 0.114 | 0.201 | 0.002 | -0.029 |
| 0.313 | 0.081 | 0.278 | 0.031 | 0.165 | 0.289 | 0.265 | 0.116 | 0.272 |
| 0.176 | 0.128 | 0.230 | 0.070 | 0.139 | 0.075 | 0.120 | 0.078 | 0.259 |
| 0.201 | 0.101 | 0.169 | 0.131 | 0.282 | 0.110 | 0.217 | -0.041 | 0.255 |
| 1.000 | 0.069 | 0.121 | 0.096 | 0.204 | 0.241 | 0.222 | 0.158 | 0.306 |
| 0.069 | 1.000 | -0.027 | 0.084 | -0.010 | 0.004 | 0.348 | 0.101 | 0.023 |
| 0.121 | -0.027 | 1.000 | 0.081 | 0.144 | 0.146 | 0.029 | 0.030 | 0.292 |
| 0.096 | 0.084 | 0.081 | 1.000 | 0.045 | 0.067 | 0.202 | 0.053 | 0.156 |
| 0.204 | -0.010 | 0.144 | 0.045 | 1.000 | 0.329 | 0.073 | 0.014 | 0.148 |
| 0.241 | 0.004 | 0.146 | 0.067 | 0.329 | 1.000 | 0.090 | 0.146 | 0.158 |
| 0.222 | 0.348 | 0.029 | 0.202 | 0.073 | 0.090 | 1.000 | 0.027 | 0.087 |
| 0.158 | 0.101 | 0.030 | 0.053 | 0.014 | 0.146 | 0.027 | 1.000 | 0.147 |
| 0.306 | 0.023 | 0.292 | 0.156 | 0.148 | 0.158 | 0.087 | 0.147 | 1.000 |
| 0.280 | 0.177 | 0.135 | -0.013 | 0.185 | 0.168 | 0.186 | 0.184 | 0.172 |
| 0.041 | 0.019 | 0.103 | 0.292 | -0.038 | -0.162 | 0.115 | -0.105 | 0.264 |
| 0.271 | 0.031 | 0.177 | 0.186 | 0.268 | 0.306 | 0.192 | 0.105 | 0.348 |
| 0.212 | -0.069 | 0.043 | 0.035 | 0.227 | 0.213 | -0.026 | 0.055 | 0.175 |
| 0.137 | 0.396 | 0.103 | 0.318 | 0.120 | 0.094 | 0.390 | -0.024 | 0.140 |
| 0.134 | 0.037 | 0.127 | 0.082 | 0.099 | 0.132 | -0.039 | 0.041 | 0.347 |
| -0.011 | 0.115 | -0.042 | 0.164 | -0.130 | -0.111 | 0.117 | 0.100 | 0.108 |
| 0.163 | 0.214 | 0.218 | 0.113 | 0.098 | 0.206 | 0.164 | 0.074 | 0.211 |
| 0.266 | 0.144 | 0.205 | 0.067 | 0.204 | 0.247 | 0.186 | 0.050 | 0.265 |
| -0.019 | 0.314 | -0.032 | 0.286 | 0.042 | -0.044 | 0.387 | 0.075 | 0.077 |
| 0.170 | 0.154 | 0.096 | 0.029 | 0.122 | 0.229 | 0.313 | 0.041 | 0.130 |
| 0.109 | 0.332 | -0.059 | 0.209 | 0.014 | 0.110 | 0.441 | 0.081 | 0.070 |
| 0.248 | 0.151 | 0.149 | 0.010 | 0.290 | 0.237 | 0.292 | 0.079 | 0.145 |
| 0.147 | 0.192 | 0.089 | 0.031 | 0.193 | 0.160 | 0.508 | 0.090 | 0.226 |
| 0.048 | 0.212 | -0.009 | 0.004 | -0.010 | -0.108 | 0.111 | -0.092 | 0.022 |
| 0.475 | 0.130 | 0.169 | 0.223 | 0.202 | 0.301 | 0.359 | 0.140 | 0.373 |
| 0.144 | 0.301 | 0.018 | 0.068 | -0.019 | 0.081 | 0.346 | -0.163 | 0.182 |
| 0.199 | 0.170 | 0.316 | 0.011 | 0.294 | 0.233 | 0.113 | -0.002 | 0.252 |
| 0.220 | 0.150 | 0.101 | 0.207 | 0.075 | 0.090 | 0.043 | 0.182 | 0.093 |
| 0.326 | 0.415 | 0.240 | 0.190 | 0.281 | 0.257 | 0.383 | 0.144 | 0.303 |
| 0.347 | -0.005 | 0.274 | 0.176 | 0.166 | 0.245 | 0.116 | 0.039 | 0.427 |
| 0.008 | 0.251 | 0.109 | 0.110 | 0.097 | -0.035 | 0.278 | -0.162 | -0.076 |

| Q55_2 | Q56_2 | Q57_2 | Q58_2 | Q59_2 | Q60_2 | Q61_2 | Q62_2 | Q63_2 |
|---|---|---|---|---|---|---|---|---|
| 0.264 | 0.054 | 0.194 | -0.057 | 0.237 | 0.090 | 0.180 | 0.226 | 0.285 |
| -0.056 | 0.141 | 0.033 | -0.059 | 0.282 | -0.008 | 0.257 | 0.197 | 0.073 |
| 0.357 | 0.008 | 0.189 | -0.119 | 0.167 | 0.119 | -0.047 | 0.133 | 0.089 |
| 0.139 | 0.160 | 0.105 | 0.032 | 0.112 | 0.016 | 0.084 | 0.260 | 0.528 |
| 0.179 | 0.008 | 0.201 | -0.032 | 0.408 | 0.087 | 0.137 | 0.152 | 0.158 |
| 0.078 | -0.047 | 0.116 | 0.074 | 0.247 | 0.065 | 0.007 | 0.116 | 0.249 |
| 0.038 | 0.322 | 0.216 | -0.130 | 0.323 | -0.053 | 0.275 | 0.118 | 0.026 |
| 0.347 | 0.045 | 0.332 | 0.066 | 0.260 | 0.326 | -0.003 | 0.339 | 0.358 |
| 0.159 | 0.322 | 0.125 | 0.072 | 0.167 | 0.136 | 0.071 | 0.213 | 0.252 |
| 0.139 | 0.112 | 0.282 | -0.056 | 0.149 | 0.061 | 0.071 | 0.090 | -0.043 |
| 0.199 | 0.104 | 0.193 | 0.038 | 0.193 | 0.146 | 0.065 | 0.216 | 0.122 |
| 0.057 | 0.064 | 0.004 | -0.047 | 0.392 | -0.077 | 0.182 | 0.227 | 0.203 |
| 0.344 | 0.017 | 0.215 | -0.047 | 0.326 | 0.256 | 0.015 | 0.269 | 0.167 |
| 0.220 | 0.099 | 0.201 | -0.056 | 0.346 | 0.067 | 0.179 | 0.285 | 0.293 |
| 0.066 | 0.186 | 0.055 | -0.076 | 0.245 | 0.008 | 0.167 | 0.205 | 0.174 |
| 0.137 | 0.098 | 0.284 | 0.001 | 0.171 | 0.189 | 0.071 | 0.209 | 0.194 |
| 0.046 | 0.220 | 0.030 | -0.117 | 0.095 | 0.084 | 0.318 | -0.020 | 0.017 |
| 0.304 | -0.055 | 0.355 | 0.051 | 0.335 | 0.190 | -0.024 | 0.266 | 0.190 |
| 0.109 | 0.009 | 0.149 | 0.156 | 0.119 | 0.230 | -0.077 | 0.174 | 0.255 |
| 0.179 | 0.050 | 0.188 | 0.007 | 0.275 | 0.055 | -0.028 | 0.075 | 0.237 |
| 0.392 | -0.019 | 0.321 | 0.084 | 0.276 | 0.233 | 0.134 | 0.160 | 0.184 |
| 0.060 | 0.171 | 0.166 | -0.066 | 0.185 | -0.066 | 0.291 | 0.177 | 0.081 |
| 0.364 | -0.025 | 0.264 | -0.103 | 0.411 | 0.077 | 0.050 | 0.301 | 0.162 |
| 0.313 | 0.009 | 0.259 | 0.227 | 0.042 | 0.238 | -0.251 | 0.136 | 0.177 |
| 0.238 | -0.100 | 0.277 | -0.013 | 0.267 | 0.107 | -0.049 | 0.151 | 0.337 |
| 0.361 | 0.047 | 0.414 | 0.160 | 0.260 | 0.292 | -0.010 | 0.295 | 0.316 |
| 0.344 | 0.023 | 0.216 | 0.029 | 0.331 | 0.198 | 0.100 | 0.345 | 0.303 |
| 0.399 | -0.019 | 0.230 | 0.002 | 0.191 | 0.104 | 0.006 | 0.255 | 0.212 |
| 0.025 | 0.212 | 0.184 | -0.154 | 0.332 | 0.064 | 0.343 | 0.183 | 0.215 |
| 0.365 | -0.087 | 0.369 | 0.011 | 0.251 | 0.224 | -0.096 | 0.179 | 0.303 |
| 0.093 | 0.045 | 0.193 | 0.035 | 0.163 | -0.008 | 0.111 | 0.203 | 0.108 |
| 0.174 | 0.002 | 0.094 | -0.005 | 0.264 | 0.044 | -0.076 | 0.063 | 0.086 |
| 0.206 | 0.090 | 0.298 | 0.014 | 0.437 | 0.165 | 0.200 | 0.288 | 0.188 |
| 0.104 | 0.154 | 0.013 | -0.071 | 0.233 | -0.034 | 0.318 | 0.186 | 0.118 |
| 0.204 | 0.139 | 0.198 | -0.061 | 0.439 | 0.219 | 0.049 | 0.324 | 0.235 |
| 0.201 | 0.241 | 0.188 | 0.148 | 0.190 | 0.146 | -0.054 | 0.268 | 0.345 |
| 0.101 | 0.123 | 0.037 | -0.038 | 0.330 | 0.006 | 0.029 | 0.209 | 0.164 |
| 0.199 | 0.195 | 0.222 | -0.096 | 0.456 | 0.110 | 0.235 | 0.253 | 0.237 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 0.027 | 0.117 | 0.121 | -0.103 | 0.309 | 0.043 | 0.263 | 0.230 | 0.003 |
| 0.461 | 0.074 | 0.329 | -0.024 | 0.360 | 0.174 | 0.058 | 0.218 | 0.308 |
| 0.250 | -0.072 | 0.294 | 0.180 | 0.096 | 0.196 | 0.027 | 0.209 | 0.214 |
| 0.021 | 0.093 | 0.036 | -0.002 | 0.121 | 0.071 | 0.008 | 0.127 | 0.072 |
| 0.184 | 0.116 | 0.200 | 0.040 | 0.183 | 0.138 | 0.207 | 0.195 | 0.511 |
| 0.308 | 0.013 | 0.215 | 0.013 | 0.145 | 0.100 | 0.056 | 0.220 | 0.051 |
| 0.280 | -0.097 | 0.297 | 0.171 | 0.287 | 0.216 | -0.021 | 0.226 | 0.278 |
| 0.280 | 0.041 | 0.271 | 0.212 | 0.137 | 0.134 | -0.011 | 0.163 | 0.266 |
| 0.177 | 0.019 | 0.031 | -0.069 | 0.396 | 0.037 | 0.115 | 0.214 | 0.144 |
| 0.135 | 0.103 | 0.177 | 0.043 | 0.103 | 0.127 | -0.042 | 0.218 | 0.205 |
| -0.013 | 0.292 | 0.186 | 0.035 | 0.318 | 0.082 | 0.164 | 0.113 | 0.067 |
| 0.185 | -0.038 | 0.268 | 0.227 | 0.120 | 0.099 | -0.130 | 0.098 | 0.204 |
| 0.168 | -0.162 | 0.306 | 0.213 | 0.094 | 0.132 | -0.111 | 0.206 | 0.247 |
| 0.186 | 0.115 | 0.192 | -0.026 | 0.390 | -0.039 | 0.117 | 0.164 | 0.186 |
| 0.184 | -0.105 | 0.105 | 0.055 | -0.024 | 0.041 | 0.100 | 0.074 | 0.050 |
| 0.172 | 0.264 | 0.348 | 0.175 | 0.140 | 0.347 | 0.108 | 0.211 | 0.265 |
| 1.000 | -0.046 | 0.308 | 0.065 | 0.132 | 0.346 | 0.013 | 0.179 | 0.201 |
| -0.046 | 1.000 | 0.015 | -0.183 | 0.106 | 0.073 | 0.228 | 0.113 | 0.038 |
| 0.308 | 0.015 | 1.000 | 0.206 | 0.218 | 0.254 | 0.027 | 0.125 | 0.125 |
| 0.065 | -0.183 | 0.206 | 1.000 | -0.017 | 0.147 | -0.096 | 0.114 | 0.113 |
| 0.132 | 0.106 | 0.218 | -0.017 | 1.000 | 0.180 | 0.064 | 0.355 | 0.201 |
| 0.346 | 0.073 | 0.254 | 0.147 | 0.180 | 1.000 | 0.075 | 0.078 | 0.126 |
| 0.013 | 0.228 | 0.027 | -0.096 | 0.064 | 0.075 | 1.000 | 0.079 | 0.023 |
| 0.179 | 0.113 | 0.125 | 0.114 | 0.355 | 0.078 | 0.079 | 1.000 | 0.257 |
| 0.201 | 0.038 | 0.125 | 0.113 | 0.201 | 0.126 | 0.023 | 0.257 | 1.000 |
| 0.104 | 0.115 | 0.130 | -0.040 | 0.318 | -0.022 | 0.029 | 0.146 | 0.037 |
| 0.274 | -0.089 | 0.249 | 0.019 | 0.199 | 0.181 | 0.045 | 0.249 | 0.247 |
| 0.186 | 0.139 | 0.133 | -0.109 | 0.287 | -0.087 | 0.057 | 0.222 | 0.173 |
| 0.251 | 0.019 | 0.313 | 0.108 | 0.180 | 0.072 | 0.097 | 0.363 | 0.327 |
| 0.249 | 0.019 | 0.087 | 0.004 | 0.257 | 0.096 | -0.025 | 0.146 | 0.333 |
| 0.064 | 0.060 | -0.117 | -0.233 | 0.148 | -0.148 | 0.143 | 0.131 | 0.040 |
| 0.383 | 0.022 | 0.353 | 0.104 | 0.327 | 0.156 | 0.037 | 0.363 | 0.373 |
| 0.171 | 0.102 | 0.228 | 0.061 | 0.284 | 0.127 | 0.053 | 0.170 | 0.191 |
| 0.360 | -0.140 | 0.236 | 0.168 | 0.202 | 0.247 | -0.144 | 0.337 | 0.266 |
| 0.208 | 0.043 | 0.196 | 0.096 | 0.159 | 0.068 | 0.118 | 0.157 | 0.101 |
| 0.343 | 0.006 | 0.442 | 0.055 | 0.468 | 0.147 | 0.074 | 0.336 | 0.320 |
| 0.151 | 0.002 | 0.251 | 0.274 | 0.101 | 0.165 | 0.080 | 0.202 | 0.220 |
| 0.089 | 0.184 | 0.012 | -0.144 | 0.351 | -0.078 | 0.228 | 0.218 | 0.050 |

| Q64_2 | Q65_2 | Q66_2 | Q67_2 | Q68_2 | Q69_2 | Q70_2 | Q71_2 | Q72_2 |
|---|---|---|---|---|---|---|---|---|
| 0.036 | 0.188 | 0.248 | 0.206 | 0.244 | 0.021 | 0.383 | 0.106 | 0.174 |
| 0.189 | 0.037 | 0.323 | 0.085 | 0.175 | 0.149 | 0.231 | 0.206 | 0.008 |
| 0.131 | 0.221 | 0.234 | 0.229 | 0.153 | 0.069 | 0.209 | 0.104 | 0.263 |
| 0.063 | 0.187 | 0.099 | 0.324 | 0.302 | 0.024 | 0.391 | 0.120 | 0.164 |
| 0.224 | 0.130 | 0.257 | 0.154 | 0.176 | 0.083 | 0.230 | 0.168 | 0.124 |
| 0.150 | 0.086 | 0.181 | 0.157 | 0.148 | 0.087 | 0.344 | 0.211 | 0.181 |
| 0.161 | 0.043 | 0.413 | 0.171 | 0.249 | 0.045 | 0.271 | 0.172 | -0.016 |
| 0.105 | 0.247 | 0.164 | 0.421 | 0.224 | -0.057 | 0.355 | 0.221 | 0.473 |
| 0.025 | 0.108 | 0.040 | 0.115 | 0.232 | 0.008 | 0.201 | 0.109 | 0.096 |
| 0.205 | 0.219 | 0.232 | 0.264 | 0.091 | 0.091 | 0.175 | 0.176 | 0.250 |
| 0.238 | 0.019 | 0.058 | 0.120 | 0.153 | 0.044 | 0.098 | 0.264 | 0.184 |
| 0.233 | 0.146 | 0.400 | 0.203 | 0.336 | 0.207 | 0.304 | 0.197 | 0.089 |
| 0.233 | 0.159 | 0.114 | 0.209 | 0.160 | -0.042 | 0.254 | 0.227 | 0.310 |
| 0.043 | 0.303 | 0.293 | 0.300 | 0.274 | 0.162 | 0.475 | 0.291 | 0.304 |
| 0.440 | 0.032 | 0.151 | 0.104 | 0.243 | 0.194 | 0.229 | 0.419 | 0.156 |
| 0.126 | 0.155 | -0.005 | 0.194 | 0.224 | 0.024 | 0.328 | 0.166 | 0.269 |
| 0.253 | 0.100 | 0.058 | 0.111 | -0.008 | 0.163 | 0.092 | 0.103 | 0.141 |
| 0.188 | 0.279 | 0.186 | 0.226 | 0.243 | -0.071 | 0.394 | 0.259 | 0.329 |
| 0.069 | 0.117 | 0.005 | 0.216 | 0.259 | 0.112 | 0.300 | 0.269 | 0.221 |
| 0.099 | 0.259 | 0.203 | 0.172 | 0.348 | 0.018 | 0.257 | 0.315 | 0.100 |
| 0.120 | 0.261 | 0.029 | 0.269 | 0.130 | -0.045 | 0.349 | 0.211 | 0.258 |
| 0.160 | 0.130 | 0.309 | 0.211 | 0.207 | 0.158 | 0.378 | 0.222 | 0.070 |
| 0.227 | 0.202 | 0.241 | 0.231 | 0.210 | 0.118 | 0.325 | 0.209 | 0.292 |
| 0.046 | 0.161 | 0.019 | 0.200 | 0.124 | 0.000 | 0.350 | 0.167 | 0.240 |
| 0.154 | 0.456 | 0.235 | 0.401 | 0.577 | -0.010 | 0.412 | 0.252 | 0.333 |
| 0.096 | 0.317 | 0.163 | 0.298 | 0.218 | 0.010 | 0.403 | 0.286 | 0.407 |
| 0.222 | 0.223 | 0.106 | 0.273 | 0.352 | 0.008 | 0.392 | 0.160 | 0.283 |
| 0.351 | 0.246 | 0.179 | 0.228 | 0.362 | 0.051 | 0.372 | 0.269 | 0.383 |
| 0.201 | 0.207 | 0.404 | 0.267 | 0.176 | 0.182 | 0.319 | 0.312 | 0.115 |
| 0.119 | 0.233 | 0.049 | 0.305 | 0.300 | 0.107 | 0.413 | 0.138 | 0.470 |
| 0.077 | 0.077 | 0.249 | 0.208 | 0.108 | 0.024 | 0.253 | 0.048 | 0.172 |
| 0.277 | 0.055 | 0.292 | 0.026 | 0.104 | 0.040 | 0.180 | 0.164 | 0.141 |
| 0.266 | 0.043 | 0.173 | 0.136 | 0.153 | 0.106 | 0.331 | 0.291 | 0.325 |
| 0.406 | 0.231 | 0.266 | 0.147 | 0.158 | 0.333 | 0.128 | 0.297 | 0.095 |
| 0.189 | 0.180 | 0.172 | 0.281 | 0.165 | -0.002 | 0.224 | 0.231 | 0.301 |
| 0.053 | 0.059 | -0.008 | 0.262 | 0.239 | 0.117 | 0.302 | 0.252 | 0.311 |
| 0.288 | 0.234 | 0.202 | 0.166 | 0.225 | 0.212 | 0.057 | 0.268 | -0.028 |
| 0.312 | 0.197 | 0.277 | 0.219 | 0.294 | 0.213 | 0.333 | 0.312 | 0.270 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 0.117 | 0.148 | 0.267 | 0.142 | 0.128 | 0.359 | 0.281 | 0.334 | 0.052 |
| 0.352 | 0.188 | 0.359 | 0.358 | 0.344 | 0.074 | 0.417 | 0.193 | 0.353 |
| 0.087 | 0.266 | 0.176 | 0.361 | 0.224 | -0.013 | 0.349 | 0.144 | 0.393 |
| 0.428 | 0.077 | 0.333 | 0.147 | 0.104 | 0.016 | 0.047 | 0.155 | 0.017 |
| -0.018 | 0.099 | 0.172 | 0.403 | 0.320 | -0.027 | 0.355 | 0.147 | 0.207 |
| 0.083 | 0.021 | 0.104 | 0.046 | 0.001 | 0.031 | 0.132 | 0.077 | 0.193 |
| 0.192 | 0.279 | 0.065 | 0.238 | 0.191 | 0.031 | 0.433 | 0.225 | 0.373 |
| -0.019 | 0.170 | 0.109 | 0.248 | 0.147 | 0.048 | 0.475 | 0.144 | 0.199 |
| 0.314 | 0.154 | 0.332 | 0.151 | 0.192 | 0.212 | 0.130 | 0.301 | 0.170 |
| -0.032 | 0.096 | -0.059 | 0.149 | 0.089 | -0.009 | 0.169 | 0.018 | 0.316 |
| 0.286 | 0.029 | 0.209 | 0.010 | 0.031 | 0.004 | 0.223 | 0.068 | 0.011 |
| 0.042 | 0.122 | 0.014 | 0.290 | 0.193 | -0.010 | 0.202 | -0.019 | 0.294 |
| -0.044 | 0.229 | 0.110 | 0.237 | 0.160 | -0.108 | 0.301 | 0.081 | 0.233 |
| 0.387 | 0.313 | 0.441 | 0.292 | 0.508 | 0.111 | 0.359 | 0.346 | 0.113 |
| 0.075 | 0.041 | 0.081 | 0.079 | 0.090 | -0.092 | 0.140 | -0.163 | -0.002 |
| 0.077 | 0.130 | 0.070 | 0.145 | 0.226 | 0.022 | 0.373 | 0.182 | 0.252 |
| 0.104 | 0.274 | 0.186 | 0.251 | 0.249 | 0.064 | 0.383 | 0.171 | 0.360 |
| 0.115 | -0.089 | 0.139 | 0.019 | 0.019 | 0.060 | 0.022 | 0.102 | -0.140 |
| 0.130 | 0.249 | 0.133 | 0.313 | 0.087 | -0.117 | 0.353 | 0.228 | 0.236 |
| -0.040 | 0.019 | -0.109 | 0.108 | 0.004 | -0.233 | 0.104 | 0.061 | 0.168 |
| 0.318 | 0.199 | 0.287 | 0.180 | 0.257 | 0.148 | 0.327 | 0.284 | 0.202 |
| -0.022 | 0.181 | -0.087 | 0.072 | 0.096 | -0.148 | 0.156 | 0.127 | 0.247 |
| 0.029 | 0.045 | 0.057 | 0.097 | -0.025 | 0.143 | 0.037 | 0.053 | -0.144 |
| 0.146 | 0.249 | 0.222 | 0.363 | 0.146 | 0.131 | 0.363 | 0.170 | 0.337 |
| 0.037 | 0.247 | 0.173 | 0.327 | 0.333 | 0.040 | 0.373 | 0.191 | 0.266 |
| 1.000 | 0.153 | 0.285 | 0.068 | 0.291 | 0.197 | 0.093 | 0.361 | 0.143 |
| 0.153 | 1.000 | 0.131 | 0.322 | 0.411 | 0.137 | 0.362 | 0.139 | 0.190 |
| 0.285 | 0.131 | 1.000 | 0.218 | 0.234 | 0.126 | 0.219 | 0.193 | 0.119 |
| 0.068 | 0.322 | 0.218 | 1.000 | 0.266 | -0.010 | 0.282 | 0.145 | 0.326 |
| 0.291 | 0.411 | 0.234 | 0.266 | 1.000 | 0.093 | 0.343 | 0.235 | 0.128 |
| 0.197 | 0.137 | 0.126 | -0.010 | 0.093 | 1.000 | 0.108 | 0.134 | 0.099 |
| 0.093 | 0.362 | 0.219 | 0.282 | 0.343 | 0.108 | 1.000 | 0.232 | 0.410 |
| 0.361 | 0.139 | 0.193 | 0.145 | 0.235 | 0.134 | 0.232 | 1.000 | 0.221 |
| 0.143 | 0.190 | 0.119 | 0.326 | 0.128 | 0.099 | 0.410 | 0.221 | 1.000 |
| 0.107 | 0.127 | 0.048 | 0.138 | 0.089 | 0.046 | 0.336 | -0.046 | 0.219 |
| 0.274 | 0.272 | 0.313 | 0.394 | 0.332 | 0.191 | 0.593 | 0.323 | 0.447 |
| -0.064 | 0.083 | -0.094 | 0.249 | 0.144 | 0.006 | 0.304 | 0.157 | 0.283 |
| 0.297 | 0.132 | 0.251 | 0.122 | 0.181 | 0.305 | 0.176 | 0.268 | 0.112 |

| Q73_2 | Q74_2 | Q75_2 | Q76_2 |
|---|---|---|---|
| 0.164 | 0.370 | 0.243 | 0.219 |
| 0.081 | 0.230 | 0.031 | 0.292 |
| 0.110 | 0.360 | -0.113 | 0.138 |
| 0.230 | 0.276 | 0.258 | 0.279 |
| 0.109 | 0.303 | 0.062 | 0.152 |
| 0.136 | 0.254 | 0.321 | 0.101 |
| 0.112 | 0.255 | 0.066 | 0.290 |
| 0.031 | 0.422 | 0.191 | 0.042 |
| 0.023 | 0.137 | 0.306 | 0.160 |
| 0.086 | 0.233 | 0.252 | 0.129 |
| -0.087 | 0.123 | 0.210 | 0.146 |
| 0.157 | 0.327 | 0.049 | 0.294 |
| -0.031 | 0.380 | 0.141 | 0.209 |
| 0.088 | 0.385 | 0.320 | 0.269 |
| 0.094 | 0.301 | 0.112 | 0.263 |
| 0.105 | 0.291 | 0.216 | 0.171 |
| 0.071 | 0.173 | 0.158 | 0.168 |
| 0.102 | 0.388 | 0.176 | 0.217 |
| 0.115 | 0.319 | 0.320 | 0.045 |
| 0.081 | 0.295 | 0.048 | 0.145 |
| 0.144 | 0.312 | 0.220 | 0.121 |
| 0.124 | 0.298 | 0.130 | 0.237 |
| 0.089 | 0.430 | 0.040 | 0.259 |
| 0.169 | 0.195 | 0.262 | -0.081 |
| 0.112 | 0.382 | 0.193 | 0.152 |
| 0.078 | 0.355 | 0.324 | 0.035 |
| 0.177 | 0.371 | 0.194 | 0.169 |
| 0.051 | 0.373 | 0.096 | 0.219 |
| 0.134 | 0.294 | 0.129 | 0.324 |
| 0.193 | 0.482 | 0.230 | 0.011 |
| 0.121 | 0.306 | 0.177 | 0.100 |
| -0.044 | 0.193 | -0.061 | 0.143 |
| 0.076 | 0.422 | 0.254 | 0.212 |
| -0.010 | 0.224 | 0.035 | 0.393 |
| -0.067 | 0.335 | 0.115 | 0.250 |
| 0.144 | 0.278 | 0.325 | 0.128 |
| 0.071 | 0.283 | -0.069 | 0.206 |
| 0.065 | 0.435 | 0.136 | 0.503 |

| | | | |
|---|---|---|---|
| 0.065 | 0.297 | 0.187 | 0.213 |
| 0.158 | 0.573 | 0.054 | 0.160 |
| 0.201 | 0.296 | 0.235 | 0.087 |
| 0.069 | 0.049 | -0.077 | 0.056 |
| 0.216 | 0.378 | 0.187 | 0.172 |
| -0.011 | 0.272 | 0.209 | 0.116 |
| 0.110 | 0.432 | 0.173 | 0.143 |
| 0.220 | 0.326 | 0.347 | 0.008 |
| 0.150 | 0.415 | -0.005 | 0.251 |
| 0.101 | 0.240 | 0.274 | 0.109 |
| 0.207 | 0.190 | 0.176 | 0.110 |
| 0.075 | 0.281 | 0.166 | 0.097 |
| 0.090 | 0.257 | 0.245 | -0.035 |
| 0.043 | 0.383 | 0.116 | 0.278 |
| 0.182 | 0.144 | 0.039 | -0.162 |
| 0.093 | 0.303 | 0.427 | -0.076 |
| 0.208 | 0.343 | 0.151 | 0.089 |
| 0.043 | 0.006 | 0.002 | 0.184 |
| 0.196 | 0.442 | 0.251 | 0.012 |
| 0.096 | 0.055 | 0.274 | -0.144 |
| 0.159 | 0.468 | 0.101 | 0.351 |
| 0.068 | 0.147 | 0.165 | -0.078 |
| 0.118 | 0.074 | 0.080 | 0.228 |
| 0.157 | 0.336 | 0.202 | 0.218 |
| 0.101 | 0.320 | 0.220 | 0.050 |
| 0.107 | 0.274 | -0.064 | 0.297 |
| 0.127 | 0.272 | 0.083 | 0.132 |
| 0.048 | 0.313 | -0.094 | 0.251 |
| 0.138 | 0.394 | 0.249 | 0.122 |
| 0.089 | 0.332 | 0.144 | 0.181 |
| 0.046 | 0.191 | 0.006 | 0.305 |
| 0.336 | 0.593 | 0.304 | 0.176 |
| -0.046 | 0.323 | 0.157 | 0.268 |
| 0.219 | 0.447 | 0.283 | 0.112 |
| 1.000 | 0.273 | 0.090 | 0.197 |
| 0.273 | 1.000 | 0.290 | 0.260 |
| 0.090 | 0.290 | 1.000 | -0.041 |
| 0.197 | 0.260 | -0.041 | 1.000 |

```
USE ALL.
COMPUTE filter_$=(GRADE = 2).
VARIABLE LABELS filter_$ 'GRADE = 2 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
FACTOR
  /VARIABLES Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12 Q13 Q14 Q15 Q16 Q17 Q18
    Q25 Q26 Q27 Q28 Q29 Q30 Q31 Q32 Q33 Q34 Q35 Q36 Q37 Q38 Q39 Q40 Q41 Q42
    Q50 Q51 Q52 Q53 Q54 Q55 Q56 Q57 Q58 Q59 Q60 Q61 Q62 Q63 Q64 Q65 Q66 Q67
    Q75 Q76
  /MISSING LISTWISE
  /ANALYSIS Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12 Q13 Q14 Q15 Q16 Q17 Q18 Q
    Q25 Q26 Q27 Q28 Q29 Q30 Q31 Q32 Q33 Q34 Q35 Q36 Q37 Q38 Q39 Q40 Q41 Q42
    Q50 Q51 Q52 Q53 Q54 Q55 Q56 Q57 Q58 Q59 Q60 Q61 Q62 Q63 Q64 Q65 Q66 Q67
    Q75 Q76
  /PRINT INITIAL CORRELATION DET KMO EXTRACTION ROTATION
  /FORMAT SORT BLANK(.316)
  /CRITERIA MINEIGEN(1) ITERATE(500)
  /EXTRACTION PAF
  /CRITERIA ITERATE(500) DELTA(0)
  /ROTATION OBLIMIN
  /METHOD=CORRELATION.
```

## Factor Analysis

**Notes**

| | | |
|---|---|---|
| Output Created | | 15-AUG-2017 09:58:43 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\PRE_POST_2016 (Fixed).sav |
| | Active Dataset | DataSet1 |
| | Filter | GRADE = 2 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 97 |
| Missing Value Handling | Definition of Missing | MISSING=EXCLUDE: User-defined missing values are treated as missing. |
| | Cases Used | LISTWISE: Statistics are based on cases with no missing values for any variable used. |

| | | |
|---|---|---|
| Syntax | | FACTOR<br>/VARIABLES Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12 Q13 Q14 Q15 Q16 Q17 Q18 Q19 Q20 Q21 Q22 Q23 Q24<br>Q25 Q26 Q27 Q28 Q29 Q30 Q31 Q32 Q33 Q34 Q35 Q36 Q37 Q38 Q39 Q40 Q41 Q42 Q43 Q44 Q45 Q46 Q47 Q48 Q49<br>Q50 Q51 Q52 Q53 Q54 Q55 Q56 Q57 Q58 Q59 Q60 Q61 Q62 Q63 Q64 Q65 Q66 Q67 Q68 Q69 Q70 Q71 Q72 Q73 Q74<br>Q75 Q76<br>/MISSING LISTWISE<br>/ANALYSIS Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12 Q13 Q14 Q15 Q16 Q17 Q18 Q19 Q20 Q21 Q22 Q23 Q24<br>Q25 Q26 Q27 Q28 Q29 Q30 Q31 Q32 Q33 Q34 Q35 Q36 Q37 Q38 Q39 Q40 Q41 Q42 Q43 Q44 Q45 Q46 Q47 Q48 Q49<br>Q50 Q51 Q52 Q53 Q54 Q55 Q56 Q57 Q58 Q59 Q60 Q61 Q62 Q63 Q64 Q65 Q66 Q67 Q68 Q69 Q70 Q71 Q72 Q73 Q74<br>Q75 Q76<br>/PRINT INITIAL CORRELATION DET KMO |
| Resources | Processor Time | 00:00:00.22 |
| | Elapsed Time | 00:00:00.21 |
| | Maximum Memory Required | 644384 (629.281K) bytes |

| | | Q1 | Q2 |
|---|---|---|---|
| Correlation | Q1 | 1.000 | 0.184 |
| | Q2 | 0.184 | 1.000 |
| | Q3 | 0.251 | 0.050 |
| | Q4 | 0.425 | 0.161 |
| | Q5 | 0.160 | 0.214 |
| | Q6 | 0.270 | 0.167 |
| | Q7 | 0.282 | 0.383 |
| | Q8 | 0.216 | 0.222 |
| | Q9 | 0.205 | 0.223 |
| | Q10 | -0.034 | -0.012 |
| | Q11 | 0.263 | 0.029 |
| | Q12 | 0.102 | 0.345 |
| | Q13 | 0.232 | -0.077 |
| | Q14 | 0.286 | 0.240 |

| | | |
|---|---|---|
| Q15 | 0.150 | 0.483 |
| Q16 | 0.417 | 0.084 |
| Q17 | 0.114 | 0.197 |
| Q18 | 0.168 | 0.019 |
| Q19 | 0.193 | 0.063 |
| Q20 | 0.183 | 0.324 |
| Q21 | 0.300 | 0.112 |
| Q22 | 0.273 | 0.358 |
| Q23 | 0.325 | 0.097 |
| Q24 | 0.211 | 0.056 |
| Q25 | 0.194 | 0.231 |
| Q26 | 0.307 | 0.031 |
| Q27 | 0.199 | 0.207 |
| Q28 | 0.419 | 0.021 |
| Q29 | 0.304 | 0.504 |
| Q30 | 0.285 | -0.102 |
| Q31 | 0.188 | -0.066 |
| Q32 | 0.305 | 0.104 |
| Q33 | 0.329 | 0.128 |
| Q34 | 0.163 | 0.328 |
| Q35 | 0.127 | -0.035 |
| Q36 | 0.144 | 0.131 |
| Q37 | 0.122 | 0.133 |
| Q38 | 0.418 | 0.302 |
| Q39 | 0.294 | 0.584 |
| Q40 | 0.301 | 0.214 |
| Q41 | 0.128 | 0.223 |
| Q42 | 0.019 | 0.170 |
| Q43 | 0.435 | 0.244 |
| Q44 | 0.076 | 0.141 |
| Q45 | 0.271 | 0.236 |
| Q46 | 0.040 | 0.045 |
| Q47 | 0.160 | 0.313 |
| Q48 | 0.212 | -0.019 |
| Q49 | 0.133 | 0.099 |
| Q50 | -0.002 | 0.288 |
| Q51 | 0.080 | 0.135 |
| Q52 | -0.021 | 0.430 |
| Q53 | 0.123 | -0.065 |
| Q54 | 0.303 | 0.157 |
| Q55 | 0.470 | -0.028 |
| Q56 | 0.159 | 0.123 |
| Q57 | 0.243 | 0.122 |
| Q58 | -0.110 | -0.263 |
| Q59 | 0.011 | 0.290 |

| | | | |
|---|---|---|---|
| | Q60 | 0.115 | 0.225 |
| | Q61 | 0.366 | 0.102 |
| | Q62 | 0.167 | 0.318 |
| | Q63 | 0.265 | 0.155 |
| | Q64 | 0.217 | 0.268 |
| | Q65 | -0.070 | 0.127 |
| | Q66 | 0.264 | 0.271 |
| | Q67 | 0.349 | 0.350 |
| | Q68 | 0.248 | 0.233 |
| | Q69 | 0.034 | 0.273 |
| | Q70 | 0.215 | 0.465 |
| | Q71 | 0.377 | 0.352 |
| | Q72 | 0.192 | 0.197 |
| | Q73 | 0.177 | 0.172 |
| | Q74 | 0.287 | 0.237 |
| | Q75 | 0.187 | -0.033 |
| | Q76 | 0.309 | 0.423 |

a. Determinant = 1.276E-44

## KMO and Bartlett's Test

| | | | |
|---|---|---|---|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | 0.226 | **Don't use KMO t** |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 5137.729 | |
| | df | 2850 | |
| | Sig. | 0.000 | |

## Communalities

| | Initial | Extraction |
|---|---|---|
| Q1 | 0.988 | 0.798 |
| Q2 | 0.980 | 0.675 |
| Q3 | 0.984 | 0.772 |
| Q4 | 0.985 | 0.687 |
| Q5 | 0.987 | 0.735 |
| Q6 | 0.992 | 0.688 |
| Q7 | 0.982 | 0.857 |
| Q8 | 0.991 | 0.760 |
| Q9 | 0.952 | 0.652 |
| Q10 | 0.980 | 0.845 |
| Q11 | 0.989 | 0.749 |
| Q12 | 0.990 | 0.737 |
| Q13 | 0.988 | 0.789 |
| Q14 | 0.989 | 0.676 |
| Q15 | 0.995 | 0.895 |
| Q16 | 0.983 | 0.696 |
| Q17 | 0.981 | 0.633 |

| | | |
|---|---|---|
| Q18 | 0.961 | 0.658 |
| Q19 | 0.951 | 0.608 |
| Q20 | 0.981 | 0.637 |
| Q21 | 0.957 | 0.763 |
| Q22 | 0.977 | 0.788 |
| Q23 | 0.991 | 0.735 |
| Q24 | 0.983 | 0.673 |
| Q25 | 0.989 | 0.795 |
| Q26 | 0.954 | 0.740 |
| Q27 | 0.972 | 0.643 |
| Q28 | 0.986 | 0.809 |
| Q29 | 0.956 | 0.648 |
| Q30 | 0.983 | 0.649 |
| Q31 | 0.983 | 0.459 |
| Q32 | 0.992 | 0.619 |
| Q33 | 0.997 | 0.712 |
| Q34 | 0.996 | 0.888 |
| Q35 | 0.982 | 0.916 |
| Q36 | 0.985 | 0.703 |
| Q37 | 0.974 | 0.650 |
| Q38 | 0.990 | 0.631 |
| Q39 | 0.984 | 0.625 |
| Q40 | 0.993 | 0.757 |
| Q41 | 0.974 | 0.675 |
| Q42 | 0.973 | 0.677 |
| Q43 | 0.975 | 0.706 |
| Q44 | 0.964 | 0.527 |
| Q45 | 0.987 | 0.618 |
| Q46 | 0.971 | 0.629 |
| Q47 | 0.980 | 0.710 |
| Q48 | 0.959 | 0.700 |
| Q49 | 0.998 | 0.848 |
| Q50 | 0.956 | 0.625 |
| Q51 | 0.971 | 0.679 |
| Q52 | 0.954 | 0.701 |
| Q53 | 0.994 | 0.611 |
| Q54 | 0.964 | 0.720 |
| Q55 | 0.986 | 0.687 |
| Q56 | 0.978 | 0.469 |
| Q57 | 0.925 | 0.653 |
| Q58 | 0.969 | 0.582 |
| Q59 | 0.964 | 0.561 |
| Q60 | 0.979 | 0.760 |
| Q61 | 0.974 | 0.654 |
| Q62 | 0.969 | 0.655 |

| | | |
|---|---|---|
| Q63 | 0.960 | 0.552 |
| Q64 | 0.956 | 0.797 |
| Q65 | 0.982 | 0.593 |
| Q66 | 0.951 | 0.616 |
| Q67 | 0.979 | 0.683 |
| Q68 | 0.984 | 0.758 |
| Q69 | 0.969 | 0.764 |
| Q70 | 0.957 | 0.725 |
| Q71 | 0.972 | 0.755 |
| Q72 | 0.991 | 0.644 |
| Q73 | 0.926 | 0.398 |
| Q74 | 0.982 | 0.642 |
| Q75 | 0.998 | 0.851 |
| Q76 | 0.989 | 0.766 |

Extraction Method: Principal Axis Factoring.

**Total Variance Explained**

| | Initial Eigenvalues | | |
|---|---|---|---|
| Factor | Total | % of Variance | Cumulative % |
| 1 | 16.097 | 21.181 | 21.181 |
| 2 | 5.959 | 7.841 | 29.022 |
| 3 | 4.432 | 5.832 | 34.854 |
| 4 | 2.848 | 3.748 | 38.601 |
| 5 | 2.762 | 3.634 | 42.236 |
| 6 | 2.585 | 3.401 | 45.636 |
| 7 | 2.451 | 3.225 | 48.861 |
| 8 | 2.163 | 2.847 | 51.708 |
| 9 | 2.067 | 2.720 | 54.428 |
| 10 | 2.003 | 2.636 | 57.063 |
| 11 | 1.899 | 2.498 | 59.562 |
| 12 | 1.772 | 2.332 | 61.893 |
| 13 | 1.730 | 2.276 | 64.169 |
| 14 | 1.594 | 2.097 | 66.267 |
| 15 | 1.531 | 2.015 | 68.281 |
| 16 | 1.381 | 1.818 | 70.099 |
| 17 | 1.261 | 1.660 | 71.759 |
| 18 | 1.223 | 1.610 | 73.369 |
| 19 | 1.174 | 1.545 | 74.913 |
| 20 | 1.071 | 1.409 | 76.322 |
| 21 | 1.054 | 1.387 | 77.709 |
| 22 | 0.996 | 1.311 | 79.020 |
| 23 | 0.957 | 1.259 | 80.279 |

| | | | |
|---|---|---|---|
| 24 | 0.929 | 1.222 | 81.501 |
| 25 | 0.871 | 1.146 | 82.647 |
| 26 | 0.828 | 1.090 | 83.737 |
| 27 | 0.818 | 1.077 | 84.814 |
| 28 | 0.788 | 1.037 | 85.851 |
| 29 | 0.758 | 0.998 | 86.848 |
| 30 | 0.685 | 0.902 | 87.750 |
| 31 | 0.666 | 0.876 | 88.627 |
| 32 | 0.619 | 0.815 | 89.442 |
| 33 | 0.596 | 0.784 | 90.226 |
| 34 | 0.576 | 0.758 | 90.983 |
| 35 | 0.557 | 0.733 | 91.716 |
| 36 | 0.507 | 0.667 | 92.384 |
| 37 | 0.473 | 0.623 | 93.006 |
| 38 | 0.440 | 0.579 | 93.586 |
| 39 | 0.428 | 0.563 | 94.148 |
| 40 | 0.389 | 0.512 | 94.661 |
| 41 | 0.372 | 0.490 | 95.151 |
| 42 | 0.329 | 0.432 | 95.583 |
| 43 | 0.323 | 0.424 | 96.007 |
| 44 | 0.283 | 0.373 | 96.380 |
| 45 | 0.263 | 0.346 | 96.727 |
| 46 | 0.249 | 0.327 | 97.054 |
| 47 | 0.217 | 0.286 | 97.340 |
| 48 | 0.207 | 0.273 | 97.613 |
| 49 | 0.187 | 0.246 | 97.859 |
| 50 | 0.183 | 0.241 | 98.100 |
| 51 | 0.174 | 0.229 | 98.330 |
| 52 | 0.151 | 0.198 | 98.528 |
| 53 | 0.139 | 0.183 | 98.711 |
| 54 | 0.124 | 0.164 | 98.874 |
| 55 | 0.105 | 0.138 | 99.013 |
| 56 | 0.100 | 0.132 | 99.145 |
| 57 | 0.087 | 0.115 | 99.260 |
| 58 | 0.083 | 0.110 | 99.369 |
| 59 | 0.078 | 0.103 | 99.473 |
| 60 | 0.064 | 0.085 | 99.557 |
| 61 | 0.056 | 0.074 | 99.631 |
| 62 | 0.051 | 0.067 | 99.698 |
| 63 | 0.042 | 0.056 | 99.754 |
| 64 | 0.040 | 0.053 | 99.807 |
| 65 | 0.034 | 0.044 | 99.851 |
| 66 | 0.028 | 0.037 | 99.888 |
| 67 | 0.023 | 0.030 | 99.918 |
| 68 | 0.019 | 0.025 | 99.942 |

| | | | |
|---|---|---|---|
| 69 | 0.014 | 0.019 | 99.961 |
| 70 | 0.011 | 0.014 | 99.975 |
| 71 | 0.007 | 0.009 | 99.984 |
| 72 | 0.005 | 0.007 | 99.991 |
| 73 | 0.003 | 0.004 | 99.995 |
| 74 | 0.002 | 0.003 | 99.998 |
| 75 | 0.001 | 0.002 | 100.000 |
| 76 | 0.000 | 0.000 | 100.000 |

Extraction Method: Principal Axis Factoring.

a. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.

| | 1 | 2 | 3 |
|---|---|---|---|
| Q40 | 0.729 | | |
| Q67 | 0.668 | | |
| Q70 | 0.659 | | 0.334 |
| Q74 | 0.620 | | |
| Q28 | 0.619 | | -0.524 |
| Q7 | 0.617 | | |
| Q43 | 0.594 | | |
| Q68 | 0.593 | | |
| Q55 | 0.579 | | -0.359 |
| Q29 | 0.564 | -0.437 | |
| Q15 | 0.561 | -0.498 | |
| Q20 | 0.559 | | |
| Q71 | 0.557 | | |
| Q57 | 0.551 | 0.319 | |
| Q3 | 0.549 | | -0.396 |
| Q38 | 0.546 | | |
| Q25 | 0.540 | | 0.426 |
| Q23 | 0.535 | | -0.331 |
| Q5 | 0.530 | | |
| Q30 | 0.528 | | -0.322 |
| Q8 | 0.527 | | |
| Q16 | 0.521 | | |
| Q26 | 0.518 | 0.491 | |
| Q39 | 0.501 | | 0.349 |
| Q1 | 0.500 | | |
| Q45 | 0.495 | | |
| Q14 | 0.492 | | 0.372 |
| Q33 | 0.490 | | -0.388 |
| Q54 | 0.486 | 0.344 | |
| Q12 | 0.481 | | |
| Q52 | 0.470 | | |

| | | | |
|---|---|---|---|
| Q63 | 0.465 | | |
| Q72 | 0.463 | | |
| Q47 | 0.459 | | |
| Q27 | 0.458 | | |
| Q9 | 0.448 | | |
| Q66 | 0.437 | | |
| Q2 | 0.432 | | 0.419 |
| Q36 | 0.421 | 0.406 | |
| Q46 | 0.421 | 0.390 | |
| Q22 | 0.416 | | |
| Q18 | 0.412 | 0.343 | |
| Q65 | 0.398 | | |
| Q50 | 0.398 | | |
| Q4 | 0.395 | | |
| Q59 | 0.387 | | |
| Q17 | 0.350 | | |
| Q73 | | | |
| Q75 | | 0.603 | |
| Q19 | 0.346 | 0.531 | |
| Q76 | 0.397 | -0.491 | |
| Q64 | | -0.488 | |
| Q24 | | 0.424 | |
| Q31 | | 0.414 | |
| Q51 | 0.354 | 0.411 | |
| Q58 | | 0.394 | |
| Q32 | | -0.375 | |
| Q56 | | -0.348 | |
| Q13 | 0.467 | | -0.645 |
| Q11 | 0.417 | | -0.500 |
| Q35 | 0.438 | | -0.483 |
| Q62 | 0.468 | | |
| Q49 | 0.357 | | |
| Q21 | 0.467 | | |
| Q42 | | | |
| Q61 | 0.362 | -0.331 | |
| Q10 | 0.399 | 0.352 | |
| Q41 | 0.328 | | |
| Q6 | 0.343 | | |
| Q60 | | | |
| Q44 | 0.356 | | |
| Q69 | | | |
| Q34 | 0.414 | -0.394 | |
| Q53 | | | |
| Q37 | 0.339 | | |
| Q48 | 0.391 | | |

Extraction Method: Principal Axis Factoring.
a. 21 factors extracted. 20 iterations required.

| | 1 | 2 | 3 |
|---|---|---|---|
| Q7 | 0.833 | | |
| Q20 | 0.664 | | |
| Q57 | 0.507 | | |
| Q14 | 0.436 | | |
| Q40 | 0.333 | | |
| Q42 | | 0.700 | |
| Q37 | | 0.480 | |
| Q46 | | 0.360 | |
| Q56 | | | |
| Q44 | | | |
| Q35 | | | -0.887 |
| Q13 | | | -0.520 |
| Q30 | | | -0.489 |
| Q28 | | | -0.419 |
| Q67 | | | -0.339 |
| Q33 | | | |
| Q41 | | | |
| Q8 | | | |
| Q62 | | | |
| Q21 | | | |
| Q23 | | | |
| Q75 | | | |
| Q3 | | | |
| Q17 | | | |
| Q55 | | | |
| Q72 | | | |
| Q31 | | | |
| Q4 | | | |
| Q63 | | | |
| Q51 | | | |
| Q36 | | | |
| Q61 | | | |
| Q19 | | | |
| Q24 | | | |
| Q54 | | | |
| Q74 | | | |
| Q32 | | | |
| Q64 | | | |
| Q1 | | | |

| | | | |
|---|---|---|---|
| Q71 | | | |
| Q38 | | | |
| Q60 | | | |
| Q27 | | | |
| Q47 | | | |
| Q6 | | | |
| Q69 | | | |
| Q39 | | | |
| Q59 | | | |
| Q29 | | | |
| Q34 | | | |
| Q76 | | | |
| Q48 | | | |
| Q18 | | | |
| Q65 | | | |
| Q50 | | | |
| Q70 | | | |
| Q12 | 0.328 | | |
| Q25 | | | |
| Q5 | | | |
| Q68 | | | |
| Q73 | | | |
| Q16 | | | |
| Q11 | | | |
| Q52 | | | |
| Q15 | | | |
| Q26 | | | |
| Q2 | | | |
| Q58 | | | |
| Q10 | | | |
| Q66 | | | |
| Q49 | | | |
| Q9 | | | |
| Q43 | | | |
| Q22 | 0.352 | | |
| Q45 | | | |
| Q53 | | | |

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.
a. Rotation converged in 107 iterations.

| | 1 | 2 | 3 |
|---|---|---|---|
| Q7 | 0.857 | | |

| | | | |
|---|---|---|---|
| Q20 | 0.742 | | |
| Q57 | 0.598 | | |
| Q14 | 0.591 | | |
| Q40 | 0.549 | 0.401 | -0.334 |
| Q42 | | 0.703 | |
| Q37 | | 0.509 | |
| Q46 | 0.364 | 0.436 | |
| Q31 | | | |
| Q35 | | | -0.886 |
| Q13 | | | -0.696 |
| Q28 | | | -0.639 |
| Q30 | | | -0.570 |
| Q67 | | | -0.475 |
| Q33 | | | -0.468 |
| Q55 | 0.358 | | -0.424 |
| Q41 | | | |
| Q8 | | | |
| Q62 | | | |
| Q21 | | | |
| Q23 | | | -0.348 |
| Q3 | | | -0.494 |
| Q75 | | | |
| Q44 | | | |
| Q17 | | | |
| Q72 | 0.324 | | -0.336 |
| Q4 | | | |
| Q63 | | | |
| Q36 | | | |
| Q51 | 0.332 | | |
| Q19 | | | |
| Q54 | | | |
| Q24 | | | |
| Q74 | 0.425 | | |
| Q32 | | | |
| Q64 | | | |
| Q1 | | | |
| Q38 | 0.330 | | -0.369 |
| Q71 | 0.401 | | |
| Q56 | | | |
| Q60 | | | |
| Q27 | | | |
| Q26 | 0.343 | | -0.341 |
| Q6 | | | |
| Q47 | | | |
| Q69 | | | |

| | | | |
|---|---|---|---|
| Q39 | 0.382 | | |
| Q59 | 0.333 | | |
| Q29 | 0.402 | | |
| Q34 | | | |
| Q76 | | | |
| Q48 | | | |
| Q18 | | | |
| Q25 | 0.454 | | |
| Q10 | 0.454 | | |
| Q65 | | | |
| Q70 | 0.370 | | |
| Q50 | | | |
| Q12 | 0.485 | | |
| Q5 | | | |
| Q68 | 0.404 | | |
| Q73 | | | |
| Q11 | | | -0.499 |
| Q16 | 0.364 | | -0.336 |
| Q22 | 0.431 | | |
| Q52 | | | |
| Q15 | 0.334 | | |
| Q2 | 0.349 | | |
| Q58 | | | |
| Q66 | 0.330 | | |
| Q49 | | | |
| Q61 | | | |
| Q9 | | | |
| Q43 | | | |
| Q45 | | | |
| Q53 | | | |

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.

| Factor | 1 | 2 | 3 |
|---|---|---|---|
| 1 | 1.000 | 0.126 | -0.128 |
| 2 | 0.126 | 1.000 | -0.034 |
| 3 | -0.128 | -0.034 | 1.000 |
| 4 | -0.109 | -0.080 | 0.019 |
| 5 | -0.073 | -0.112 | 0.201 |
| 6 | 0.136 | -0.036 | -0.078 |
| 7 | -0.302 | -0.137 | 0.094 |
| 8 | 0.176 | 0.098 | -0.079 |
| 9 | 0.218 | 0.004 | -0.199 |
| 10 | -0.237 | -0.099 | 0.164 |

| | | | |
|---|---|---|---|
| 11 | 0.155 | 0.106 | -0.048 |
| 12 | 0.082 | -0.002 | -0.044 |
| 13 | -0.197 | -0.153 | 0.065 |
| 14 | -0.232 | 0.006 | 0.075 |
| 15 | 0.175 | 0.095 | -0.167 |
| 16 | -0.087 | 0.009 | 0.243 |
| 17 | 0.178 | -0.030 | -0.013 |
| 18 | -0.035 | 0.044 | 0.002 |
| 19 | 0.165 | -0.063 | -0.141 |
| 20 | 0.162 | 0.025 | -0.145 |
| 21 | -0.059 | -0.051 | -0.045 |

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.

Q19 Q20 Q21 Q22 Q23 Q24
Q43 Q44 Q45 Q46 Q47 Q48 Q49
Q68 Q69 Q70 Q71 Q72 Q73 Q74

Q19 Q20 Q21 Q22 Q23 Q24
Q43 Q44 Q45 Q46 Q47 Q48 Q49
Q68 Q69 Q70 Q71 Q72 Q73 Q74

| Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 |
|---|---|---|---|---|---|---|
| 0.251 | 0.425 | 0.160 | 0.270 | 0.282 | 0.216 | 0.205 |
| 0.050 | 0.161 | 0.214 | 0.167 | 0.383 | 0.222 | 0.223 |
| 1.000 | 0.159 | 0.349 | 0.101 | 0.313 | 0.268 | 0.294 |
| 0.159 | 1.000 | 0.112 | 0.088 | 0.167 | 0.330 | 0.090 |
| 0.349 | 0.112 | 1.000 | -0.070 | 0.435 | 0.344 | 0.180 |
| 0.101 | 0.088 | -0.070 | 1.000 | 0.209 | 0.096 | 0.215 |
| 0.313 | 0.167 | 0.435 | 0.209 | 1.000 | 0.189 | 0.183 |
| 0.268 | 0.330 | 0.344 | 0.096 | 0.189 | 1.000 | 0.317 |
| 0.294 | 0.090 | 0.180 | 0.215 | 0.183 | 0.317 | 1.000 |
| 0.128 | 0.186 | 0.278 | 0.264 | 0.248 | 0.275 | 0.099 |
| 0.336 | 0.037 | 0.412 | 0.130 | 0.284 | 0.064 | 0.161 |
| 0.167 | 0.099 | 0.194 | 0.018 | 0.474 | 0.078 | 0.165 |
| 0.539 | 0.032 | 0.298 | 0.250 | 0.127 | 0.256 | 0.126 |
| 0.153 | 0.338 | 0.233 | 0.218 | 0.479 | 0.160 | 0.421 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 0.334 | -0.002 | 0.251 | -0.023 | 0.412 | 0.082 | 0.214 |
| 0.365 | 0.150 | 0.239 | 0.342 | 0.319 | 0.216 | 0.265 |
| 0.178 | 0.103 | 0.232 | 0.246 | 0.190 | 0.188 | 0.219 |
| 0.227 | 0.208 | 0.157 | 0.202 | 0.166 | 0.382 | 0.109 |
| 0.055 | 0.324 | 0.169 | 0.157 | 0.082 | 0.244 | 0.224 |
| 0.275 | 0.301 | 0.211 | 0.110 | 0.644 | 0.215 | 0.244 |
| 0.411 | 0.135 | 0.221 | 0.219 | 0.342 | 0.318 | 0.168 |
| 0.033 | 0.188 | 0.238 | 0.224 | 0.504 | 0.156 | -0.131 |
| 0.620 | 0.164 | 0.348 | 0.224 | 0.319 | 0.380 | 0.180 |
| -0.190 | 0.189 | 0.000 | 0.257 | 0.125 | 0.250 | -0.003 |
| 0.123 | 0.310 | 0.149 | 0.161 | 0.298 | 0.253 | 0.327 |
| 0.290 | 0.365 | 0.240 | 0.262 | 0.201 | 0.535 | 0.302 |
| 0.287 | 0.339 | 0.442 | 0.291 | 0.235 | 0.235 | 0.118 |
| 0.570 | 0.213 | 0.371 | 0.194 | 0.323 | 0.246 | 0.205 |
| 0.209 | 0.133 | 0.266 | 0.121 | 0.428 | 0.184 | 0.094 |
| 0.377 | 0.242 | 0.305 | 0.163 | 0.190 | 0.429 | 0.200 |
| 0.092 | 0.194 | 0.163 | 0.159 | 0.113 | 0.371 | 0.120 |
| 0.313 | 0.059 | 0.241 | 0.015 | 0.079 | -0.120 | 0.037 |
| 0.379 | 0.170 | 0.344 | 0.062 | 0.173 | 0.169 | 0.166 |
| 0.268 | 0.139 | 0.124 | 0.128 | 0.310 | 0.175 | 0.117 |
| 0.407 | -0.093 | 0.320 | 0.018 | 0.125 | 0.298 | 0.060 |
| 0.040 | 0.469 | 0.172 | 0.179 | 0.141 | 0.275 | 0.368 |
| 0.117 | 0.003 | 0.271 | 0.083 | 0.211 | 0.130 | -0.095 |
| 0.400 | 0.114 | 0.370 | 0.165 | 0.353 | 0.190 | 0.177 |
| 0.033 | 0.151 | 0.181 | 0.140 | 0.405 | 0.242 | 0.241 |
| 0.474 | 0.256 | 0.439 | 0.310 | 0.528 | 0.386 | 0.305 |
| 0.101 | 0.233 | 0.235 | -0.011 | 0.071 | 0.446 | 0.096 |
| 0.205 | 0.149 | 0.003 | 0.327 | 0.157 | 0.176 | 0.094 |
| 0.314 | 0.407 | 0.331 | 0.139 | 0.295 | 0.291 | 0.445 |
| 0.219 | 0.008 | 0.329 | 0.079 | 0.263 | 0.015 | 0.211 |
| 0.334 | 0.219 | 0.154 | 0.005 | 0.220 | 0.344 | 0.447 |
| 0.206 | 0.215 | 0.246 | 0.134 | 0.253 | 0.315 | 0.267 |
| 0.234 | 0.014 | 0.433 | 0.121 | 0.163 | 0.216 | 0.207 |
| 0.023 | 0.091 | 0.137 | 0.243 | 0.199 | 0.204 | 0.347 |
| 0.236 | -0.031 | 0.380 | -0.056 | 0.212 | 0.040 | 0.320 |
| 0.097 | 0.267 | 0.070 | 0.177 | 0.195 | 0.203 | 0.100 |
| 0.173 | 0.351 | 0.103 | 0.257 | 0.230 | 0.170 | 0.231 |
| 0.249 | 0.017 | 0.261 | 0.056 | 0.298 | 0.093 | 0.257 |
| 0.058 | 0.031 | -0.150 | 0.206 | -0.079 | 0.063 | 0.176 |
| 0.167 | 0.147 | 0.156 | 0.261 | 0.235 | 0.427 | 0.331 |
| 0.495 | 0.285 | 0.331 | 0.138 | 0.275 | 0.233 | 0.124 |
| 0.214 | -0.069 | 0.099 | -0.093 | 0.246 | -0.056 | 0.187 |
| 0.261 | 0.316 | 0.222 | 0.317 | 0.479 | 0.366 | 0.161 |
| -0.040 | -0.106 | -0.132 | 0.118 | -0.301 | 0.009 | -0.028 |
| 0.112 | 0.127 | 0.281 | 0.018 | 0.324 | 0.083 | 0.211 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 0.055 | -0.029 | 0.162 | 0.336 | 0.023 | 0.268 | 0.153 |
| 0.266 | 0.254 | 0.139 | 0.120 | 0.282 | -0.029 | 0.147 |
| 0.186 | 0.090 | 0.141 | 0.138 | 0.188 | 0.446 | 0.357 |
| 0.234 | 0.424 | 0.272 | 0.014 | 0.309 | 0.189 | 0.173 |
| 0.263 | 0.073 | 0.048 | 0.173 | 0.178 | 0.023 | -0.017 |
| 0.172 | 0.083 | 0.075 | 0.094 | 0.179 | 0.264 | 0.205 |
| 0.386 | 0.111 | 0.147 | 0.113 | 0.351 | 0.184 | 0.324 |
| 0.404 | 0.095 | 0.239 | 0.252 | 0.287 | 0.419 | 0.320 |
| 0.160 | 0.273 | 0.285 | 0.120 | 0.350 | 0.278 | 0.148 |
| 0.103 | 0.019 | 0.066 | -0.091 | 0.105 | 0.117 | 0.133 |
| 0.254 | 0.286 | 0.348 | 0.178 | 0.305 | 0.459 | 0.335 |
| 0.258 | 0.131 | 0.233 | 0.245 | 0.383 | 0.216 | 0.317 |
| 0.229 | 0.135 | 0.206 | 0.326 | 0.225 | 0.331 | 0.181 |
| 0.123 | 0.105 | 0.139 | 0.199 | 0.099 | 0.108 | 0.019 |
| 0.289 | 0.193 | 0.337 | 0.228 | 0.373 | 0.326 | 0.175 |
| -0.227 | 0.323 | 0.190 | 0.179 | 0.072 | 0.199 | 0.050 |
| 0.283 | 0.229 | 0.339 | 0.031 | 0.415 | 0.077 | 0.177 |

**too low**

| Extraction Sums of Squared Loadings | | | Rotation Sums of Squared Loadings[a] |
|---|---|---|---|
| Total | % of Variance | Cumulative % | Total |
| 15.805 | 20.796 | 20.796 | 7.525 |
| 5.666 | 7.455 | 28.251 | 2.683 |
| 4.161 | 5.475 | 33.726 | 5.315 |
| 2.538 | 3.339 | 37.065 | 3.959 |
| 2.465 | 3.243 | 40.308 | 3.409 |
| 2.280 | 3.000 | 43.308 | 2.946 |
| 2.161 | 2.843 | 46.151 | 5.779 |
| 1.866 | 2.455 | 48.606 | 4.744 |
| 1.759 | 2.315 | 50.921 | 4.933 |
| 1.678 | 2.208 | 53.129 | 4.866 |
| 1.603 | 2.109 | 55.238 | 3.833 |
| 1.482 | 1.950 | 57.188 | 2.885 |
| 1.434 | 1.887 | 59.075 | 3.956 |
| 1.289 | 1.696 | 60.771 | 4.373 |
| 1.227 | 1.615 | 62.386 | 3.416 |
| 1.083 | 1.425 | 63.811 | 3.837 |
| 0.954 | 1.255 | 65.066 | 3.872 |
| 0.893 | 1.175 | 66.241 | 2.819 |
| 0.873 | 1.149 | 67.390 | 3.196 |
| 0.784 | 1.032 | 68.422 | 3.953 |
| 0.741 | 0.975 | 69.397 | 1.810 |
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**Factor Matrix[a]**

| Factor | | | | | | |
|---|---|---|---|---|---|---|
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
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| | | | -0.392 | | | |
| | | | 0.351 | | | |
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| | | | | 0.366 | | |
| -0.409 | | | | | | |
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| | 0.327 | | | | | |
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| | 0.379 | | | | | |
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| | 0.323 | | | | | |
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| | -0.321 | | | | | |
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| -0.481 | | | | | | |
| -0.390 | | | | | | -0.338 |
| | -0.510 | | | | | |
| | -0.391 | | | | | |
| | | -0.385 | | | | |
| 0.316 | | | 0.423 | | | |
| | | | | | -0.393 | |
| | | | | | 0.384 | |
| | | | | | | -0.394 |
| | | | | | | |
| | | 0.323 | | | | |
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## Pattern Matrix[a]

| Factor | | | | | | |
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| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
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| | -0.327 | | | | | |
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| -0.640 | | | | | | |
| -0.617 | | | | | | |
| -0.502 | | | | | | |
| | -0.628 | | | 0.318 | | |
| | -0.487 | | | | 0.385 | |
| | 0.482 | | | 0.336 | | |
| | -0.405 | | | | | |
| | | 0.695 | | | | |
| | | -0.348 | | | | |
| | | 0.342 | | | | |
| | | | | | | |
| | | | -0.746 | | | |
| | | | -0.620 | | | |
| | | | -0.471 | | | |
| | | | -0.455 | | | |
| | | | -0.380 | | | |
| | | | -0.317 | | | |
| | | | | 0.726 | | |
| | | | | 0.690 | | |
| | | | | 0.354 | | |
| | | | | | 0.665 | |
| | | | | | 0.597 | |
| | | | | | 0.521 | |

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| | | | | | 0.381 | |
| | | | | | 0.349 | |
| | | | | | | -0.862 |
| | | | | | | -0.440 |
| | | | | | | -0.350 |
| | | | | | | -0.344 |
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| | -0.358 | | | | | |
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| | | | -0.356 | | | |
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## Structure Matrix

| | | | | | Factor | |
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| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
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| | | | | | | |
| -0.324 | | | | 0.349 | | |
| | | | -0.461 | | | |
| | -0.478 | | | 0.342 | | |
| | | | | | | |
| | | | | | | |
| | | | -0.331 | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | -0.338 | | | | 0.391 | |
| | -0.393 | | -0.323 | 0.384 | | |
| -0.380 | | | | | | -0.399 |
| | | 0.331 | | | 0.352 | |
| | -0.341 | | -0.377 | | 0.356 | -0.363 |
| -0.697 | | | | 0.332 | | |
| -0.686 | | | | | | -0.331 |
| -0.624 | | | | 0.339 | | |
| | -0.692 | | | 0.428 | | |
| | -0.592 | | | | 0.510 | |
| | -0.536 | | | | 0.388 | |
| | 0.439 | | -0.358 | 0.432 | | |
| | -0.326 | | | | | |
| | | 0.719 | | | | |
| | | 0.429 | | | | -0.424 |
| | | | -0.764 | | | |
| | | | -0.658 | | | |
| | | | -0.579 | | | |
| | | | -0.529 | | | |
| | | | -0.460 | | | |
| -0.325 | | | | 0.760 | | |
| | | | | 0.758 | | |
| | | | | 0.474 | 0.384 | |
| | | | | | 0.674 | |
| | | | | | 0.669 | |
| | | | -0.429 | 0.390 | 0.572 | |
| | | | | | 0.497 | |
| | | 0.409 | | | 0.486 | |
| | | | | | 0.340 | |
| | | | | | | -0.828 |
| | | | -0.436 | | | -0.541 |
| -0.358 | | | -0.393 | 0.329 | | -0.471 |
| | | | | 0.330 | | -0.470 |
| | -0.331 | 0.357 | | | | -0.422 |
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| | | 0.387 | | | | |
| | | | | | | |
| | | | | | 0.422 | |
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| | | | | | 0.426 | |
| | | | | | | |
| | -0.410 | | | | | |
| | | | -0.354 | | | |
| | | | | | | -0.424 |
| | | | | | | |
| -0.483 | | | | | | -0.326 |
| | | | -0.339 | | | -0.450 |
| | | | | | | |
| | | | | | | |
| | | | | 0.361 | 0.324 | |
| | | | | | | |
| | | | | | | |
| | | | | | | -0.318 |
| | | 0.443 | | | | |
| | | | | | | |
| | | | | | 0.464 | |
| | | | | | | -0.328 |
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| | | | | | | |
| | | | | | | |
| | | | -0.382 | | 0.353 | |
| | | | | | | |
| | | | -0.545 | 0.318 | | |
| -0.399 | | | | 0.344 | | |
| | | | | | | |

## Factor Correlation Matrix

| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|
| -0.109 | -0.073 | 0.136 | -0.302 | 0.176 | 0.218 | -0.237 |
| -0.080 | -0.112 | -0.036 | -0.137 | 0.098 | 0.004 | -0.099 |
| 0.019 | 0.201 | -0.078 | 0.094 | -0.079 | -0.199 | 0.164 |
| 1.000 | 0.094 | -0.006 | 0.133 | -0.243 | 0.025 | 0.177 |
| 0.094 | 1.000 | 0.008 | 0.002 | -0.101 | -0.141 | 0.070 |
| -0.006 | 0.008 | 1.000 | -0.033 | -0.022 | 0.140 | -0.146 |
| 0.133 | 0.002 | -0.033 | 1.000 | -0.232 | -0.125 | 0.177 |
| -0.243 | -0.101 | -0.022 | -0.232 | 1.000 | 0.042 | -0.158 |
| 0.025 | -0.141 | 0.140 | -0.125 | 0.042 | 1.000 | -0.089 |
| 0.177 | 0.070 | -0.146 | 0.177 | -0.158 | -0.089 | 1.000 |

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|---|---|---|---|---|---|---|
| -0.066 | -0.052 | 0.174 | -0.098 | 0.021 | 0.131 | -0.044 |
| 0.012 | -0.090 | 0.109 | -0.031 | 0.011 | 0.189 | 0.014 |
| 0.129 | 0.049 | -0.057 | 0.174 | -0.206 | 0.050 | 0.185 |
| 0.128 | 0.041 | -0.070 | 0.091 | -0.111 | -0.125 | 0.149 |
| -0.087 | -0.058 | 0.040 | -0.183 | 0.133 | 0.078 | -0.066 |
| 0.099 | 0.087 | -0.107 | 0.123 | -0.125 | -0.130 | 0.179 |
| -0.109 | -0.037 | 0.165 | -0.057 | 0.022 | 0.120 | -0.004 |
| -0.064 | 0.021 | -0.041 | -0.044 | 0.025 | -0.159 | -0.058 |
| -0.038 | -0.091 | 0.024 | -0.057 | 0.033 | 0.071 | -0.080 |
| -0.145 | -0.085 | 0.041 | -0.203 | 0.128 | 0.078 | -0.126 |
| 0.021 | -0.106 | 0.077 | -0.046 | -0.065 | -0.045 | 0.035 |

| Q10 | Q11 | Q12 | Q13 | Q14 | Q15 | Q16 | Q17 | Q18 |
|---|---|---|---|---|---|---|---|---|
| -0.034 | 0.263 | 0.102 | 0.232 | 0.286 | 0.150 | 0.417 | 0.114 | 0.168 |
| -0.012 | 0.029 | 0.345 | -0.077 | 0.240 | 0.483 | 0.084 | 0.197 | 0.019 |
| 0.128 | 0.336 | 0.167 | 0.539 | 0.153 | 0.334 | 0.365 | 0.178 | 0.227 |
| 0.186 | 0.037 | 0.099 | 0.032 | 0.338 | -0.002 | 0.150 | 0.103 | 0.208 |
| 0.278 | 0.412 | 0.194 | 0.298 | 0.233 | 0.251 | 0.239 | 0.232 | 0.157 |
| 0.264 | 0.130 | 0.018 | 0.250 | 0.218 | -0.023 | 0.342 | 0.246 | 0.202 |
| 0.248 | 0.284 | 0.474 | 0.127 | 0.479 | 0.412 | 0.319 | 0.190 | 0.166 |
| 0.275 | 0.064 | 0.078 | 0.256 | 0.160 | 0.082 | 0.216 | 0.188 | 0.382 |
| 0.099 | 0.161 | 0.165 | 0.126 | 0.421 | 0.214 | 0.265 | 0.219 | 0.109 |
| 1.000 | 0.061 | 0.105 | 0.138 | 0.331 | -0.031 | 0.218 | 0.260 | 0.319 |
| 0.061 | 1.000 | 0.044 | 0.584 | 0.000 | 0.140 | 0.336 | 0.267 | 0.038 |
| 0.105 | 0.044 | 1.000 | 0.041 | 0.298 | 0.662 | 0.139 | 0.145 | 0.051 |
| 0.138 | 0.584 | 0.041 | 1.000 | 0.006 | 0.161 | 0.522 | 0.202 | 0.298 |
| 0.331 | 0.000 | 0.298 | 0.006 | 1.000 | 0.223 | 0.257 | 0.187 | 0.031 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| -0.031 | 0.140 | 0.662 | 0.161 | 0.223 | 1.000 | 0.095 | 0.114 | 0.159 |
| 0.218 | 0.336 | 0.139 | 0.522 | 0.257 | 0.095 | 1.000 | 0.202 | 0.323 |
| 0.260 | 0.267 | 0.145 | 0.202 | 0.187 | 0.114 | 0.202 | 1.000 | 0.072 |
| 0.319 | 0.038 | 0.051 | 0.298 | 0.031 | 0.159 | 0.323 | 0.072 | 1.000 |
| 0.177 | -0.015 | -0.022 | 0.092 | 0.341 | 0.020 | 0.369 | 0.072 | 0.318 |
| 0.377 | 0.136 | 0.381 | 0.085 | 0.465 | 0.358 | 0.267 | 0.132 | 0.129 |
| 0.052 | 0.128 | 0.188 | 0.211 | -0.010 | 0.168 | 0.338 | 0.290 | 0.427 |
| 0.067 | 0.401 | 0.324 | 0.267 | 0.270 | 0.313 | 0.215 | 0.299 | 0.012 |
| 0.181 | 0.259 | 0.300 | 0.470 | 0.075 | 0.312 | 0.288 | 0.197 | 0.348 |
| 0.162 | -0.113 | 0.049 | -0.035 | 0.091 | -0.009 | 0.078 | -0.098 | 0.253 |
| 0.407 | -0.007 | 0.287 | 0.051 | 0.458 | 0.360 | 0.198 | 0.068 | 0.395 |
| 0.417 | 0.144 | 0.083 | 0.318 | 0.277 | -0.095 | 0.405 | 0.130 | 0.242 |
| 0.312 | 0.272 | 0.156 | 0.286 | 0.273 | 0.006 | 0.299 | 0.269 | 0.144 |
| 0.231 | 0.636 | 0.225 | 0.570 | 0.090 | 0.268 | 0.420 | 0.102 | 0.289 |
| 0.151 | 0.232 | 0.462 | 0.195 | 0.259 | 0.612 | 0.172 | 0.222 | 0.067 |
| 0.298 | 0.227 | 0.219 | 0.353 | 0.116 | 0.090 | 0.395 | 0.166 | 0.361 |
| 0.198 | -0.092 | -0.053 | -0.017 | 0.073 | -0.051 | 0.258 | -0.027 | 0.324 |
| -0.015 | 0.246 | 0.017 | 0.179 | 0.076 | 0.307 | 0.067 | 0.135 | 0.016 |
| -0.003 | 0.547 | 0.223 | 0.475 | 0.007 | 0.366 | 0.275 | 0.378 | 0.117 |
| 0.066 | 0.307 | 0.016 | 0.143 | 0.035 | 0.323 | 0.003 | 0.161 | 0.079 |
| 0.189 | 0.423 | 0.160 | 0.695 | -0.012 | 0.276 | 0.270 | 0.259 | 0.256 |
| 0.187 | 0.091 | 0.152 | 0.110 | 0.357 | 0.085 | 0.397 | 0.159 | 0.243 |
| 0.129 | 0.134 | 0.106 | 0.133 | 0.009 | 0.349 | 0.050 | 0.176 | 0.171 |
| 0.072 | 0.437 | 0.313 | 0.490 | 0.260 | 0.399 | 0.415 | 0.271 | 0.142 |
| 0.109 | 0.114 | 0.363 | 0.031 | 0.447 | 0.417 | 0.192 | 0.273 | 0.103 |
| 0.412 | 0.251 | 0.274 | 0.376 | 0.246 | 0.360 | 0.474 | 0.234 | 0.466 |
| 0.162 | -0.044 | -0.009 | 0.021 | 0.039 | 0.070 | 0.083 | -0.013 | 0.206 |
| 0.147 | -0.068 | 0.095 | 0.019 | 0.069 | 0.217 | 0.081 | 0.285 | 0.092 |
| 0.063 | 0.285 | 0.135 | 0.153 | 0.360 | 0.278 | 0.304 | 0.197 | 0.125 |
| 0.120 | 0.153 | 0.178 | 0.182 | 0.133 | 0.232 | 0.152 | 0.251 | 0.155 |
| -0.015 | 0.178 | 0.208 | 0.138 | 0.225 | 0.331 | 0.164 | -0.008 | 0.073 |
| 0.294 | -0.020 | 0.184 | -0.069 | 0.340 | 0.025 | 0.236 | 0.097 | 0.184 |
| 0.117 | 0.146 | 0.421 | 0.260 | 0.116 | 0.407 | 0.118 | 0.276 | 0.180 |
| 0.316 | 0.182 | 0.139 | 0.175 | 0.165 | 0.154 | 0.316 | 0.192 | 0.371 |
| 0.193 | 0.378 | 0.187 | 0.179 | 0.142 | 0.204 | 0.115 | 0.180 | -0.065 |
| 0.377 | -0.003 | 0.286 | 0.112 | 0.230 | 0.148 | 0.197 | 0.001 | 0.178 |
| 0.392 | -0.127 | 0.102 | 0.008 | 0.300 | 0.051 | 0.262 | 0.038 | 0.408 |
| 0.086 | 0.126 | 0.285 | 0.077 | 0.329 | 0.487 | 0.176 | 0.233 | 0.138 |
| -0.037 | 0.089 | 0.071 | 0.120 | 0.093 | 0.069 | -0.102 | -0.146 | 0.118 |
| 0.114 | 0.089 | 0.212 | 0.177 | 0.161 | 0.185 | 0.209 | 0.008 | 0.220 |
| 0.289 | 0.352 | 0.139 | 0.413 | 0.193 | 0.140 | 0.400 | 0.002 | 0.262 |
| 0.065 | 0.171 | 0.250 | 0.084 | 0.232 | 0.318 | 0.118 | 0.145 | -0.087 |
| 0.466 | 0.125 | 0.197 | 0.221 | 0.290 | 0.173 | 0.295 | 0.172 | 0.303 |
| 0.153 | -0.155 | -0.218 | 0.122 | -0.021 | -0.222 | 0.026 | -0.017 | 0.006 |
| 0.163 | 0.210 | 0.373 | 0.046 | 0.331 | 0.299 | 0.150 | 0.223 | -0.025 |

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|---|---|---|---|---|---|---|---|---|
| 0.278 | 0.114 | -0.092 | 0.235 | 0.046 | -0.029 | 0.226 | 0.071 | 0.129 |
| 0.091 | 0.347 | 0.240 | 0.165 | 0.225 | 0.273 | 0.071 | 0.062 | -0.099 |
| -0.044 | 0.053 | 0.140 | 0.208 | 0.207 | 0.260 | 0.202 | 0.126 | 0.223 |
| 0.093 | 0.209 | 0.215 | 0.206 | 0.376 | 0.257 | 0.221 | 0.235 | 0.125 |
| 0.155 | 0.100 | 0.244 | 0.008 | 0.120 | 0.459 | -0.148 | 0.111 | -0.041 |
| 0.120 | -0.020 | 0.355 | 0.112 | 0.170 | 0.482 | 0.061 | 0.004 | 0.244 |
| -0.131 | 0.186 | 0.372 | 0.199 | 0.159 | 0.406 | 0.223 | -0.072 | -0.008 |
| 0.221 | 0.346 | 0.290 | 0.459 | 0.212 | 0.364 | 0.453 | 0.310 | 0.336 |
| 0.306 | 0.147 | 0.436 | 0.075 | 0.354 | 0.460 | 0.149 | -0.015 | 0.359 |
| -0.026 | 0.006 | 0.206 | 0.026 | 0.036 | 0.258 | 0.086 | 0.135 | 0.043 |
| 0.211 | 0.028 | 0.411 | 0.196 | 0.468 | 0.525 | 0.287 | 0.131 | 0.199 |
| 0.204 | 0.163 | 0.357 | 0.127 | 0.355 | 0.469 | 0.198 | 0.386 | 0.157 |
| 0.415 | 0.163 | 0.153 | 0.353 | 0.349 | 0.077 | 0.216 | 0.337 | 0.300 |
| -0.026 | 0.314 | 0.039 | 0.324 | 0.017 | 0.080 | 0.302 | 0.060 | 0.171 |
| 0.273 | 0.270 | 0.324 | 0.221 | 0.235 | 0.389 | 0.173 | 0.054 | 0.232 |
| 0.353 | 0.003 | 0.024 | 0.045 | 0.388 | -0.106 | 0.098 | -0.038 | 0.227 |
| -0.056 | 0.264 | 0.299 | -0.008 | 0.243 | 0.349 | -0.061 | 0.183 | -0.118 |

| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
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| | 0.434 | | -0.396 | | | | | |
| | 0.356 | | | | | | | |
| | 0.347 | | | | | | | |
| | | -0.477 | | | | | | |

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| 0.894 | | | | | | | | |
| 0.423 | | | | | | | | |
| 0.412 | | | | | | | | |
| | | | | | | | | |
| | 0.854 | | | | | | | |
| | 0.321 | | | | | | | |
| | | -0.727 | | | | | | |
| | | -0.472 | | | | | | |
| | | | -0.675 | | | | | |
| | | | -0.511 | | | | | |
| | | | -0.433 | | | | | |
| | | | -0.414 | | | | | |
| | | -0.338 | -0.359 | | | | | |
| | | | | 0.615 | | | | |
| | | | -0.321 | 0.408 | | | | |
| | | | | | -0.576 | | | |
| | | | | | -0.451 | | | |
| | | | | | -0.445 | | | |
| | | | | | | 0.645 | | |
| | | | -0.414 | | | 0.521 | | |
| | | | | | | -0.391 | | |
| | | | | | | 0.321 | | |
| | | | | | | | 0.677 | |
| | | -0.356 | | | | | 0.394 | |
| | | | | | | | -0.342 | |
| | | | | | | | | 0.825 |
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| | | | | | -0.358 | | | |
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| | -0.318 | -0.344 | | 0.342 | | | | |
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| | -0.321 | -0.365 | | | | | | |
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| | | | -0.319 | 0.365 | | | | |
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| | 0.382 | | | | | | | |
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| 0.389 | | | | | -0.460 | | | |
| | | -0.336 | | | | 0.338 | -0.321 | |
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| 0.554 | | | | | | 0.333 | | |
| 0.514 | | | | | | | | 0.381 |
| 0.461 | 0.387 | | -0.361 | | | 0.426 | | |
| | 0.877 | | | | | | | |
| 0.418 | 0.468 | | | | | | | |
| | | -0.749 | | | | | | |
| | | -0.566 | | | | | | |
| | | -0.504 | -0.500 | 0.383 | | | | |
| | | -0.476 | | 0.380 | | | 0.432 | |
| | | | -0.721 | | | | | |
| | | | -0.583 | | | 0.338 | | |
| | | | -0.572 | | | | | |
| 0.398 | | | -0.540 | | | 0.379 | | |
| | | | | 0.689 | | | | 0.362 |
| | | | -0.496 | 0.507 | | | | |
| | | | | | -0.590 | | | |
| | | | | | -0.569 | | | 0.347 |
| | | -0.388 | | | -0.538 | | | |
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| | | | | | | 0.737 | | |
| 0.427 | | | -0.563 | | | 0.668 | | |
| 0.434 | | | | | | 0.477 | | |
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| | | | -0.385 | | | | -0.421 | |
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| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
|---|---|---|---|---|---|---|---|---|
| 0.155 | 0.082 | -0.197 | -0.232 | 0.175 | -0.087 | 0.178 | -0.035 | 0.165 |
| 0.106 | -0.002 | -0.153 | 0.006 | 0.095 | 0.009 | -0.030 | 0.044 | -0.063 |
| -0.048 | -0.044 | 0.065 | 0.075 | -0.167 | 0.243 | -0.013 | 0.002 | -0.141 |
| -0.066 | 0.012 | 0.129 | 0.128 | -0.087 | 0.099 | -0.109 | -0.064 | -0.038 |
| -0.052 | -0.090 | 0.049 | 0.041 | -0.058 | 0.087 | -0.037 | 0.021 | -0.091 |
| 0.174 | 0.109 | -0.057 | -0.070 | 0.040 | -0.107 | 0.165 | -0.041 | 0.024 |
| -0.098 | -0.031 | 0.174 | 0.091 | -0.183 | 0.123 | -0.057 | -0.044 | -0.057 |
| 0.021 | 0.011 | -0.206 | -0.111 | 0.133 | -0.125 | 0.022 | 0.025 | 0.033 |
| 0.131 | 0.189 | 0.050 | -0.125 | 0.078 | -0.130 | 0.120 | -0.159 | 0.071 |
| -0.044 | 0.014 | 0.185 | 0.149 | -0.066 | 0.179 | -0.004 | -0.058 | -0.080 |

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| 1.000 | 0.099 | 0.040 | -0.123 | 0.050 | -0.048 | 0.226 | -0.244 | 0.075 |
| 0.099 | 1.000 | 0.080 | -0.073 | 0.006 | -0.047 | 0.145 | -0.131 | 0.117 |
| 0.040 | 0.080 | 1.000 | 0.132 | -0.086 | 0.043 | -0.043 | -0.104 | 0.031 |
| -0.123 | -0.073 | 0.132 | 1.000 | -0.103 | 0.021 | -0.166 | 0.060 | -0.077 |
| 0.050 | 0.006 | -0.086 | -0.103 | 1.000 | -0.066 | 0.084 | 0.081 | 0.133 |
| -0.048 | -0.047 | 0.043 | 0.021 | -0.066 | 1.000 | -0.044 | 0.006 | -0.110 |
| 0.226 | 0.145 | -0.043 | -0.166 | 0.084 | -0.044 | 1.000 | -0.113 | 0.100 |
| -0.244 | -0.131 | -0.104 | 0.060 | 0.081 | 0.006 | -0.113 | 1.000 | -0.123 |
| 0.075 | 0.117 | 0.031 | -0.077 | 0.133 | -0.110 | 0.100 | -0.123 | 1.000 |
| 0.002 | -0.032 | -0.146 | -0.065 | 0.055 | -0.079 | 0.109 | -0.027 | 0.109 |
| -0.050 | -0.029 | 0.058 | 0.125 | 0.002 | -0.026 | -0.089 | 0.035 | -0.077 |

| Q19 | Q20 | Q21 | Q22 | Q23 | Q24 | Q25 | Q26 | Q27 |
|---|---|---|---|---|---|---|---|---|
| 0.193 | 0.183 | 0.300 | 0.273 | 0.325 | 0.211 | 0.194 | 0.307 | 0.199 |
| 0.063 | 0.324 | 0.112 | 0.358 | 0.097 | 0.056 | 0.231 | 0.031 | 0.207 |
| 0.055 | 0.275 | 0.411 | 0.033 | 0.620 | -0.190 | 0.123 | 0.290 | 0.287 |
| 0.324 | 0.301 | 0.135 | 0.188 | 0.164 | 0.189 | 0.310 | 0.365 | 0.339 |
| 0.169 | 0.211 | 0.221 | 0.238 | 0.348 | 0.000 | 0.149 | 0.240 | 0.442 |
| 0.157 | 0.110 | 0.219 | 0.224 | 0.224 | 0.257 | 0.161 | 0.262 | 0.291 |
| 0.082 | 0.644 | 0.342 | 0.504 | 0.319 | 0.125 | 0.298 | 0.201 | 0.235 |
| 0.244 | 0.215 | 0.318 | 0.156 | 0.380 | 0.250 | 0.253 | 0.535 | 0.235 |
| 0.224 | 0.244 | 0.168 | -0.131 | 0.180 | -0.003 | 0.327 | 0.302 | 0.118 |
| 0.177 | 0.377 | 0.052 | 0.067 | 0.181 | 0.162 | 0.407 | 0.417 | 0.312 |
| -0.015 | 0.136 | 0.128 | 0.401 | 0.259 | -0.113 | -0.007 | 0.144 | 0.272 |
| -0.022 | 0.381 | 0.188 | 0.324 | 0.300 | 0.049 | 0.287 | 0.083 | 0.156 |
| 0.092 | 0.085 | 0.211 | 0.267 | 0.470 | -0.035 | 0.051 | 0.318 | 0.286 |
| 0.341 | 0.465 | -0.010 | 0.270 | 0.075 | 0.091 | 0.458 | 0.277 | 0.273 |

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| 0.020 | 0.358 | 0.168 | 0.313 | 0.312 | -0.009 | 0.360 | -0.095 | 0.006 |
| 0.369 | 0.267 | 0.338 | 0.215 | 0.288 | 0.078 | 0.198 | 0.405 | 0.299 |
| 0.072 | 0.132 | 0.290 | 0.299 | 0.197 | -0.098 | 0.068 | 0.130 | 0.269 |
| 0.318 | 0.129 | 0.427 | 0.012 | 0.348 | 0.253 | 0.395 | 0.242 | 0.144 |
| 1.000 | 0.223 | 0.018 | -0.042 | 0.011 | 0.297 | 0.415 | 0.360 | 0.342 |
| 0.223 | 1.000 | 0.131 | 0.230 | 0.238 | 0.109 | 0.568 | 0.209 | 0.142 |
| 0.018 | 0.131 | 1.000 | 0.038 | 0.458 | 0.283 | 0.093 | 0.253 | 0.093 |
| -0.042 | 0.230 | 0.038 | 1.000 | 0.183 | -0.020 | 0.082 | 0.129 | 0.234 |
| 0.011 | 0.238 | 0.458 | 0.183 | 1.000 | 0.079 | 0.176 | 0.229 | 0.144 |
| 0.297 | 0.109 | 0.283 | -0.020 | 0.079 | 1.000 | 0.206 | 0.175 | 0.032 |
| 0.415 | 0.568 | 0.093 | 0.082 | 0.176 | 0.206 | 1.000 | 0.282 | 0.179 |
| 0.360 | 0.209 | 0.253 | 0.129 | 0.229 | 0.175 | 0.282 | 1.000 | 0.462 |
| 0.342 | 0.142 | 0.093 | 0.234 | 0.144 | 0.032 | 0.179 | 0.462 | 1.000 |
| 0.111 | 0.236 | 0.258 | 0.182 | 0.528 | 0.100 | 0.159 | 0.379 | 0.414 |
| -0.018 | 0.410 | 0.166 | 0.476 | 0.264 | 0.055 | 0.257 | 0.014 | 0.048 |
| 0.330 | 0.261 | 0.460 | 0.057 | 0.316 | 0.178 | 0.191 | 0.538 | 0.312 |
| 0.325 | 0.065 | 0.207 | -0.206 | 0.148 | 0.317 | 0.125 | 0.238 | 0.165 |
| -0.092 | 0.042 | 0.063 | 0.191 | 0.320 | -0.102 | 0.094 | -0.052 | -0.028 |
| -0.076 | 0.085 | 0.352 | 0.283 | 0.378 | 0.022 | 0.092 | 0.236 | 0.237 |
| -0.127 | 0.294 | 0.196 | 0.282 | 0.080 | -0.024 | 0.147 | -0.011 | 0.041 |
| -0.010 | 0.057 | 0.144 | 0.305 | 0.295 | -0.097 | 0.046 | 0.195 | 0.251 |
| 0.454 | 0.163 | 0.111 | 0.091 | 0.017 | 0.272 | 0.415 | 0.291 | 0.241 |
| 0.151 | 0.295 | 0.206 | 0.157 | 0.158 | 0.058 | 0.236 | 0.047 | 0.062 |
| 0.100 | 0.276 | 0.199 | 0.397 | 0.437 | -0.045 | 0.146 | 0.222 | 0.258 |
| 0.117 | 0.340 | 0.282 | 0.378 | 0.093 | 0.190 | 0.328 | 0.128 | 0.152 |
| 0.266 | 0.496 | 0.546 | 0.133 | 0.415 | 0.165 | 0.355 | 0.446 | 0.305 |
| 0.111 | 0.109 | 0.224 | 0.015 | 0.073 | 0.281 | 0.156 | 0.257 | 0.091 |
| 0.068 | 0.263 | 0.333 | 0.107 | 0.262 | 0.057 | 0.262 | 0.065 | 0.073 |
| 0.265 | 0.236 | 0.312 | 0.118 | 0.118 | 0.143 | 0.351 | 0.298 | 0.260 |
| -0.039 | 0.138 | 0.238 | 0.034 | 0.194 | 0.129 | 0.061 | 0.002 | 0.155 |
| 0.259 | 0.374 | 0.151 | -0.007 | 0.170 | 0.228 | 0.180 | 0.222 | 0.111 |
| 0.493 | 0.365 | 0.106 | -0.016 | 0.122 | 0.214 | 0.403 | 0.390 | 0.342 |
| 0.009 | 0.104 | 0.262 | 0.280 | 0.412 | -0.003 | 0.082 | 0.166 | 0.136 |
| 0.227 | 0.198 | 0.183 | 0.026 | 0.152 | 0.319 | 0.380 | 0.241 | 0.130 |
| 0.017 | 0.258 | 0.026 | 0.065 | 0.176 | -0.100 | 0.019 | 0.169 | 0.181 |
| 0.202 | 0.295 | 0.078 | 0.134 | 0.221 | 0.242 | 0.384 | 0.294 | 0.222 |
| 0.395 | 0.262 | 0.124 | -0.052 | 0.103 | 0.146 | 0.310 | 0.305 | 0.284 |
| 0.149 | 0.311 | 0.119 | 0.207 | 0.037 | -0.039 | 0.403 | -0.075 | 0.178 |
| 0.076 | 0.052 | -0.053 | -0.059 | 0.007 | 0.119 | 0.185 | -0.017 | -0.062 |
| 0.284 | 0.239 | 0.397 | 0.006 | 0.162 | 0.562 | 0.256 | 0.489 | 0.287 |
| 0.220 | 0.250 | 0.300 | 0.131 | 0.453 | 0.107 | 0.160 | 0.436 | 0.355 |
| -0.077 | 0.133 | -0.004 | 0.156 | 0.147 | -0.148 | 0.115 | -0.116 | -0.031 |
| 0.294 | 0.416 | 0.236 | 0.250 | 0.245 | 0.258 | 0.372 | 0.535 | 0.323 |
| 0.234 | -0.166 | -0.199 | -0.102 | -0.019 | 0.147 | -0.060 | 0.143 | 0.122 |
| 0.128 | 0.317 | 0.127 | 0.247 | 0.012 | 0.000 | 0.180 | 0.126 | 0.149 |

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| 0.205 | 0.000 | 0.015 | 0.147 | 0.050 | 0.046 | 0.031 | 0.371 | 0.391 |
| 0.008 | 0.133 | 0.013 | 0.261 | 0.178 | -0.042 | 0.034 | 0.110 | 0.166 |
| 0.271 | 0.232 | 0.274 | 0.090 | 0.102 | 0.330 | 0.156 | 0.187 | 0.106 |
| 0.309 | 0.188 | 0.241 | 0.349 | 0.259 | 0.121 | 0.230 | 0.208 | 0.308 |
| -0.136 | 0.154 | 0.112 | 0.175 | 0.327 | -0.025 | 0.178 | -0.115 | 0.009 |
| 0.060 | 0.187 | 0.105 | 0.147 | 0.231 | 0.177 | 0.428 | 0.151 | 0.025 |
| -0.013 | 0.300 | 0.092 | 0.219 | 0.305 | -0.070 | 0.142 | 0.224 | 0.016 |
| 0.217 | 0.148 | 0.298 | 0.286 | 0.361 | 0.104 | 0.246 | 0.446 | 0.343 |
| 0.236 | 0.385 | 0.263 | 0.214 | 0.278 | 0.219 | 0.691 | 0.198 | 0.226 |
| 0.008 | 0.057 | 0.218 | 0.105 | 0.221 | -0.047 | -0.011 | 0.047 | -0.084 |
| 0.245 | 0.379 | 0.207 | 0.262 | 0.261 | 0.232 | 0.507 | 0.359 | 0.250 |
| 0.065 | 0.423 | 0.289 | 0.316 | 0.263 | 0.004 | 0.267 | 0.084 | 0.100 |
| 0.186 | 0.184 | 0.030 | 0.326 | 0.212 | 0.068 | 0.377 | 0.387 | 0.402 |
| 0.173 | 0.037 | 0.186 | 0.305 | 0.199 | 0.135 | 0.061 | 0.182 | 0.134 |
| 0.116 | 0.341 | 0.278 | 0.268 | 0.368 | 0.331 | 0.330 | 0.233 | 0.162 |
| 0.470 | 0.096 | -0.132 | 0.142 | -0.056 | 0.408 | 0.473 | 0.415 | 0.401 |
| -0.109 | 0.320 | 0.272 | 0.158 | 0.207 | 0.023 | 0.107 | -0.065 | 0.109 |

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| 0.162 | -0.059 |
| 0.025 | -0.051 |
| -0.145 | -0.045 |
| -0.145 | 0.021 |
| -0.085 | -0.106 |
| 0.041 | 0.077 |
| -0.203 | -0.046 |
| 0.128 | -0.065 |
| 0.078 | -0.045 |
| -0.126 | 0.035 |

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| 0.002 | -0.050 |
| -0.032 | -0.029 |
| -0.146 | 0.058 |
| -0.065 | 0.125 |
| 0.055 | 0.002 |
| -0.079 | -0.026 |
| 0.109 | -0.089 |
| -0.027 | 0.035 |
| 0.109 | -0.077 |
| 1.000 | -0.050 |
| -0.050 | 1.000 |

**Correlation Matrix[a]**

| Q28 | Q29 | Q30 | Q31 | Q32 | Q33 | Q34 | Q35 | Q36 |
|---|---|---|---|---|---|---|---|---|
| 0.419 | 0.304 | 0.285 | 0.188 | 0.305 | 0.329 | 0.163 | 0.127 | 0.144 |
| 0.021 | 0.504 | -0.102 | -0.066 | 0.104 | 0.128 | 0.328 | -0.035 | 0.131 |
| 0.570 | 0.209 | 0.377 | 0.092 | 0.313 | 0.379 | 0.268 | 0.407 | 0.040 |
| 0.213 | 0.133 | 0.242 | 0.194 | 0.059 | 0.170 | 0.139 | -0.093 | 0.469 |
| 0.371 | 0.266 | 0.305 | 0.163 | 0.241 | 0.344 | 0.124 | 0.320 | 0.172 |
| 0.194 | 0.121 | 0.163 | 0.159 | 0.015 | 0.062 | 0.128 | 0.018 | 0.179 |
| 0.323 | 0.428 | 0.190 | 0.113 | 0.079 | 0.173 | 0.310 | 0.125 | 0.141 |
| 0.246 | 0.184 | 0.429 | 0.371 | -0.120 | 0.169 | 0.175 | 0.298 | 0.275 |
| 0.205 | 0.094 | 0.200 | 0.120 | 0.037 | 0.166 | 0.117 | 0.060 | 0.368 |
| 0.231 | 0.151 | 0.298 | 0.198 | -0.015 | -0.003 | 0.066 | 0.189 | 0.187 |
| 0.636 | 0.232 | 0.227 | -0.092 | 0.246 | 0.547 | 0.307 | 0.423 | 0.091 |
| 0.225 | 0.462 | 0.219 | -0.053 | 0.017 | 0.223 | 0.016 | 0.160 | 0.152 |
| 0.570 | 0.195 | 0.353 | -0.017 | 0.179 | 0.475 | 0.143 | 0.695 | 0.110 |
| 0.090 | 0.259 | 0.116 | 0.073 | 0.076 | 0.007 | 0.035 | -0.012 | 0.357 |

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|---|---|---|---|---|---|---|---|---|
| 0.268 | 0.612 | 0.090 | -0.051 | 0.307 | 0.366 | 0.323 | 0.276 | 0.085 |
| 0.420 | 0.172 | 0.395 | 0.258 | 0.067 | 0.275 | 0.003 | 0.270 | 0.397 |
| 0.102 | 0.222 | 0.166 | -0.027 | 0.135 | 0.378 | 0.161 | 0.259 | 0.159 |
| 0.289 | 0.067 | 0.361 | 0.324 | 0.016 | 0.117 | 0.079 | 0.256 | 0.243 |
| 0.111 | -0.018 | 0.330 | 0.325 | -0.092 | -0.076 | -0.127 | -0.010 | 0.454 |
| 0.236 | 0.410 | 0.261 | 0.065 | 0.042 | 0.085 | 0.294 | 0.057 | 0.163 |
| 0.258 | 0.166 | 0.460 | 0.207 | 0.063 | 0.352 | 0.196 | 0.144 | 0.111 |
| 0.182 | 0.476 | 0.057 | -0.206 | 0.191 | 0.283 | 0.282 | 0.305 | 0.091 |
| 0.528 | 0.264 | 0.316 | 0.148 | 0.320 | 0.378 | 0.080 | 0.295 | 0.017 |
| 0.100 | 0.055 | 0.178 | 0.317 | -0.102 | 0.022 | -0.024 | -0.097 | 0.272 |
| 0.159 | 0.257 | 0.191 | 0.125 | 0.094 | 0.092 | 0.147 | 0.046 | 0.415 |
| 0.379 | 0.014 | 0.538 | 0.238 | -0.052 | 0.236 | -0.011 | 0.195 | 0.291 |
| 0.414 | 0.048 | 0.312 | 0.165 | -0.028 | 0.237 | 0.041 | 0.251 | 0.241 |
| 1.000 | 0.249 | 0.489 | 0.239 | 0.258 | 0.587 | 0.229 | 0.475 | 0.186 |
| 0.249 | 1.000 | 0.114 | -0.045 | 0.221 | 0.304 | 0.483 | 0.288 | 0.051 |
| 0.489 | 0.114 | 1.000 | 0.303 | -0.025 | 0.305 | 0.093 | 0.449 | 0.215 |
| 0.239 | -0.045 | 0.303 | 1.000 | -0.196 | -0.044 | -0.093 | -0.061 | 0.295 |
| 0.258 | 0.221 | -0.025 | -0.196 | 1.000 | 0.347 | 0.174 | 0.137 | -0.079 |
| 0.587 | 0.304 | 0.305 | -0.044 | 0.347 | 1.000 | 0.319 | 0.440 | 0.082 |
| 0.229 | 0.483 | 0.093 | -0.093 | 0.174 | 0.319 | 1.000 | 0.336 | 0.074 |
| 0.475 | 0.288 | 0.449 | -0.061 | 0.137 | 0.440 | 0.336 | 1.000 | 0.068 |
| 0.186 | 0.051 | 0.215 | 0.295 | -0.079 | 0.082 | 0.074 | 0.068 | 1.000 |
| 0.147 | 0.286 | 0.251 | 0.014 | 0.152 | 0.220 | 0.282 | 0.308 | -0.022 |
| 0.439 | 0.365 | 0.247 | 0.014 | 0.442 | 0.322 | 0.178 | 0.351 | 0.143 |
| 0.059 | 0.324 | 0.117 | 0.003 | -0.048 | 0.175 | 0.372 | 0.170 | 0.234 |
| 0.511 | 0.336 | 0.520 | 0.260 | 0.147 | 0.281 | 0.259 | 0.298 | 0.293 |
| 0.065 | 0.126 | 0.167 | 0.103 | 0.030 | 0.093 | 0.178 | 0.068 | 0.242 |
| 0.040 | 0.138 | 0.127 | 0.247 | 0.155 | 0.100 | 0.294 | 0.000 | 0.083 |
| 0.349 | 0.274 | 0.222 | 0.270 | 0.129 | 0.323 | 0.330 | 0.048 | 0.510 |
| 0.242 | 0.134 | 0.247 | 0.032 | 0.202 | 0.283 | 0.296 | 0.296 | 0.190 |
| 0.317 | 0.261 | 0.278 | 0.094 | 0.137 | 0.120 | 0.165 | 0.146 | 0.228 |
| 0.225 | -0.069 | 0.282 | 0.324 | -0.040 | -0.043 | -0.035 | 0.063 | 0.436 |
| 0.167 | 0.356 | 0.216 | 0.015 | 0.108 | 0.300 | 0.066 | 0.223 | -0.032 |
| 0.109 | 0.118 | 0.127 | 0.170 | -0.173 | 0.102 | 0.100 | 0.142 | 0.420 |
| 0.236 | 0.141 | 0.093 | -0.060 | 0.084 | 0.307 | 0.106 | 0.201 | -0.067 |
| 0.159 | 0.250 | 0.157 | 0.010 | -0.076 | 0.072 | 0.132 | -0.029 | 0.287 |
| 0.145 | 0.057 | 0.244 | 0.270 | -0.024 | 0.009 | 0.103 | -0.020 | 0.365 |
| 0.114 | 0.419 | 0.024 | -0.066 | 0.139 | 0.112 | 0.355 | 0.225 | 0.288 |
| 0.064 | -0.002 | 0.100 | -0.035 | 0.045 | -0.148 | 0.000 | 0.138 | 0.057 |
| 0.345 | 0.131 | 0.447 | 0.250 | -0.135 | 0.231 | 0.020 | 0.189 | 0.219 |
| 0.660 | 0.280 | 0.510 | 0.184 | 0.170 | 0.307 | 0.230 | 0.256 | 0.081 |
| 0.151 | 0.255 | 0.009 | -0.094 | 0.237 | 0.097 | 0.035 | 0.214 | -0.020 |
| 0.339 | 0.146 | 0.334 | 0.226 | 0.098 | 0.155 | 0.166 | 0.129 | 0.187 |
| -0.037 | -0.152 | 0.073 | 0.033 | -0.011 | -0.174 | -0.197 | 0.076 | 0.091 |
| 0.047 | 0.424 | 0.070 | -0.041 | 0.053 | 0.066 | 0.156 | 0.136 | 0.178 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 0.181 | 0.121 | 0.176 | 0.145 | -0.080 | -0.011 | 0.078 | 0.159 | 0.019 |
| 0.313 | 0.332 | 0.225 | -0.150 | 0.208 | 0.258 | 0.304 | 0.266 | 0.077 |
| 0.128 | 0.278 | 0.165 | 0.106 | -0.041 | 0.134 | 0.236 | 0.155 | 0.174 |
| 0.337 | 0.341 | 0.198 | 0.073 | 0.120 | 0.387 | 0.220 | 0.192 | 0.405 |
| 0.193 | 0.411 | -0.003 | -0.042 | 0.371 | 0.146 | 0.381 | 0.106 | -0.173 |
| 0.126 | 0.318 | 0.115 | 0.013 | 0.004 | 0.141 | 0.210 | 0.208 | 0.166 |
| 0.265 | 0.333 | 0.137 | -0.027 | 0.105 | 0.243 | 0.370 | 0.105 | 0.068 |
| 0.459 | 0.308 | 0.364 | 0.172 | 0.128 | 0.364 | 0.229 | 0.417 | 0.267 |
| 0.322 | 0.455 | 0.327 | 0.180 | 0.171 | 0.141 | 0.225 | 0.205 | 0.297 |
| 0.078 | 0.245 | 0.035 | 0.011 | -0.009 | 0.150 | 0.218 | 0.206 | 0.043 |
| 0.158 | 0.437 | 0.204 | 0.127 | 0.039 | 0.260 | 0.135 | 0.115 | 0.344 |
| 0.134 | 0.456 | 0.219 | 0.104 | 0.227 | 0.256 | 0.377 | 0.131 | 0.076 |
| 0.297 | 0.198 | 0.215 | 0.073 | 0.112 | 0.207 | 0.168 | 0.334 | 0.217 |
| 0.214 | 0.170 | 0.036 | -0.035 | 0.109 | 0.161 | 0.099 | 0.091 | 0.182 |
| 0.507 | 0.430 | 0.371 | 0.153 | 0.308 | 0.327 | 0.305 | 0.296 | 0.247 |
| 0.096 | -0.095 | 0.159 | 0.104 | -0.014 | -0.016 | -0.256 | 0.010 | 0.320 |
| 0.213 | 0.526 | 0.061 | -0.080 | 0.347 | 0.349 | 0.449 | 0.033 | -0.019 |

| Q37 | Q38 | Q39 | Q40 | Q41 | Q42 | Q43 | Q44 | Q45 |
|---|---|---|---|---|---|---|---|---|
| 0.122 | 0.418 | 0.294 | 0.301 | 0.128 | 0.019 | 0.435 | 0.076 | 0.271 |
| 0.133 | 0.302 | 0.584 | 0.214 | 0.223 | 0.170 | 0.244 | 0.141 | 0.236 |
| 0.117 | 0.400 | 0.033 | 0.474 | 0.101 | 0.205 | 0.314 | 0.219 | 0.334 |
| 0.003 | 0.114 | 0.151 | 0.256 | 0.233 | 0.149 | 0.407 | 0.008 | 0.219 |
| 0.271 | 0.370 | 0.181 | 0.439 | 0.235 | 0.003 | 0.331 | 0.329 | 0.154 |
| 0.083 | 0.165 | 0.140 | 0.310 | -0.011 | 0.327 | 0.139 | 0.079 | 0.005 |
| 0.211 | 0.353 | 0.405 | 0.528 | 0.071 | 0.157 | 0.295 | 0.263 | 0.220 |
| 0.130 | 0.190 | 0.242 | 0.386 | 0.446 | 0.176 | 0.291 | 0.015 | 0.344 |
| -0.095 | 0.177 | 0.241 | 0.305 | 0.096 | 0.094 | 0.445 | 0.211 | 0.447 |
| 0.129 | 0.072 | 0.109 | 0.412 | 0.162 | 0.147 | 0.063 | 0.120 | -0.015 |
| 0.134 | 0.437 | 0.114 | 0.251 | -0.044 | -0.068 | 0.285 | 0.153 | 0.178 |
| 0.106 | 0.313 | 0.363 | 0.274 | -0.009 | 0.095 | 0.135 | 0.178 | 0.208 |
| 0.133 | 0.490 | 0.031 | 0.376 | 0.021 | 0.019 | 0.153 | 0.182 | 0.138 |
| 0.009 | 0.260 | 0.447 | 0.246 | 0.039 | 0.069 | 0.360 | 0.133 | 0.225 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 0.349 | 0.399 | 0.417 | 0.360 | 0.070 | 0.217 | 0.278 | 0.232 | 0.331 |
| 0.050 | 0.415 | 0.192 | 0.474 | 0.083 | 0.081 | 0.304 | 0.152 | 0.164 |
| 0.176 | 0.271 | 0.273 | 0.234 | -0.013 | 0.285 | 0.197 | 0.251 | -0.008 |
| 0.171 | 0.142 | 0.103 | 0.466 | 0.206 | 0.092 | 0.125 | 0.155 | 0.073 |
| 0.151 | 0.100 | 0.117 | 0.266 | 0.111 | 0.068 | 0.265 | -0.039 | 0.259 |
| 0.295 | 0.276 | 0.340 | 0.496 | 0.109 | 0.263 | 0.236 | 0.138 | 0.374 |
| 0.206 | 0.199 | 0.282 | 0.546 | 0.224 | 0.333 | 0.312 | 0.238 | 0.151 |
| 0.157 | 0.397 | 0.378 | 0.133 | 0.015 | 0.107 | 0.118 | 0.034 | -0.007 |
| 0.158 | 0.437 | 0.093 | 0.415 | 0.073 | 0.262 | 0.118 | 0.194 | 0.170 |
| 0.058 | -0.045 | 0.190 | 0.165 | 0.281 | 0.057 | 0.143 | 0.129 | 0.228 |
| 0.236 | 0.146 | 0.328 | 0.355 | 0.156 | 0.262 | 0.351 | 0.061 | 0.180 |
| 0.047 | 0.222 | 0.128 | 0.446 | 0.257 | 0.065 | 0.298 | 0.002 | 0.222 |
| 0.062 | 0.258 | 0.152 | 0.305 | 0.091 | 0.073 | 0.260 | 0.155 | 0.111 |
| 0.147 | 0.439 | 0.059 | 0.511 | 0.065 | 0.040 | 0.349 | 0.242 | 0.317 |
| 0.286 | 0.365 | 0.324 | 0.336 | 0.126 | 0.138 | 0.274 | 0.134 | 0.261 |
| 0.251 | 0.247 | 0.117 | 0.520 | 0.167 | 0.127 | 0.222 | 0.247 | 0.278 |
| 0.014 | 0.014 | 0.003 | 0.260 | 0.103 | 0.247 | 0.270 | 0.032 | 0.094 |
| 0.152 | 0.442 | -0.048 | 0.147 | 0.030 | 0.155 | 0.129 | 0.202 | 0.137 |
| 0.220 | 0.322 | 0.175 | 0.281 | 0.093 | 0.100 | 0.323 | 0.283 | 0.120 |
| 0.282 | 0.178 | 0.372 | 0.259 | 0.178 | 0.294 | 0.330 | 0.296 | 0.165 |
| 0.308 | 0.351 | 0.170 | 0.298 | 0.068 | 0.000 | 0.048 | 0.296 | 0.146 |
| -0.022 | 0.143 | 0.234 | 0.293 | 0.242 | 0.083 | 0.510 | 0.190 | 0.228 |
| 1.000 | 0.295 | 0.271 | 0.444 | 0.042 | 0.352 | 0.053 | 0.008 | 0.098 |
| 0.295 | 1.000 | 0.310 | 0.311 | -0.002 | 0.138 | 0.239 | 0.148 | 0.222 |
| 0.271 | 0.310 | 1.000 | 0.271 | 0.188 | 0.263 | 0.314 | 0.131 | 0.092 |
| 0.444 | 0.311 | 0.271 | 1.000 | 0.277 | 0.276 | 0.423 | 0.291 | 0.307 |
| 0.042 | -0.002 | 0.188 | 0.277 | 1.000 | -0.050 | 0.240 | 0.213 | 0.369 |
| 0.352 | 0.138 | 0.263 | 0.276 | -0.050 | 1.000 | 0.205 | -0.063 | 0.034 |
| 0.053 | 0.239 | 0.314 | 0.423 | 0.240 | 0.205 | 1.000 | 0.155 | 0.351 |
| 0.008 | 0.148 | 0.131 | 0.291 | 0.213 | -0.063 | 0.155 | 1.000 | 0.232 |
| 0.098 | 0.222 | 0.092 | 0.307 | 0.369 | 0.034 | 0.351 | 0.232 | 1.000 |
| 0.196 | 0.094 | 0.124 | 0.337 | 0.306 | 0.251 | 0.289 | 0.010 | 0.344 |
| 0.152 | 0.389 | 0.302 | 0.278 | 0.116 | 0.094 | 0.184 | 0.200 | 0.171 |
| 0.065 | 0.161 | 0.254 | 0.252 | 0.121 | -0.021 | 0.246 | 0.206 | 0.183 |
| 0.127 | 0.162 | 0.114 | 0.231 | 0.178 | -0.132 | 0.183 | 0.270 | 0.347 |
| -0.025 | 0.001 | 0.186 | 0.194 | 0.182 | 0.003 | 0.175 | 0.229 | 0.162 |
| 0.031 | -0.033 | 0.116 | 0.386 | 0.272 | 0.129 | 0.208 | 0.134 | 0.112 |
| 0.294 | 0.290 | 0.344 | 0.336 | 0.202 | 0.168 | 0.299 | 0.229 | 0.332 |
| 0.171 | 0.080 | 0.055 | 0.034 | 0.023 | 0.000 | -0.009 | -0.023 | 0.209 |
| 0.172 | 0.103 | 0.182 | 0.423 | 0.295 | 0.051 | 0.312 | 0.176 | 0.450 |
| 0.271 | 0.282 | 0.074 | 0.573 | 0.222 | 0.110 | 0.343 | 0.159 | 0.304 |
| -0.045 | 0.143 | 0.095 | 0.055 | -0.239 | -0.074 | 0.114 | 0.337 | 0.209 |
| 0.141 | 0.221 | 0.190 | 0.526 | 0.382 | 0.118 | 0.203 | 0.284 | 0.245 |
| -0.219 | 0.020 | -0.196 | -0.056 | 0.124 | -0.134 | -0.105 | 0.023 | -0.157 |
| 0.335 | 0.262 | 0.366 | 0.292 | 0.061 | 0.121 | 0.218 | -0.016 | 0.253 |

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|---|---|---|---|---|---|---|---|---|
| 0.085 | 0.160 | 0.091 | 0.157 | 0.070 | -0.002 | 0.065 | 0.063 | 0.073 |
| 0.204 | 0.290 | 0.172 | 0.077 | -0.083 | 0.060 | 0.251 | 0.096 | 0.267 |
| -0.009 | 0.163 | 0.328 | 0.219 | 0.419 | 0.066 | 0.376 | 0.233 | 0.512 |
| 0.109 | 0.226 | 0.224 | 0.290 | 0.070 | 0.172 | 0.512 | 0.057 | 0.153 |
| 0.301 | 0.236 | 0.234 | 0.130 | -0.167 | 0.422 | 0.188 | -0.060 | 0.086 |
| 0.109 | 0.015 | 0.142 | 0.238 | 0.076 | 0.103 | 0.170 | 0.165 | 0.187 |
| 0.063 | 0.257 | 0.173 | 0.194 | 0.038 | 0.079 | 0.379 | 0.146 | 0.283 |
| 0.051 | 0.419 | 0.397 | 0.439 | 0.264 | 0.106 | 0.432 | 0.281 | 0.392 |
| 0.219 | 0.264 | 0.260 | 0.393 | 0.189 | 0.251 | 0.366 | 0.165 | 0.240 |
| 0.184 | 0.244 | 0.436 | 0.094 | 0.007 | 0.199 | 0.068 | -0.067 | -0.033 |
| 0.160 | 0.223 | 0.430 | 0.424 | 0.357 | 0.199 | 0.431 | 0.215 | 0.390 |
| 0.151 | 0.341 | 0.458 | 0.342 | 0.054 | 0.360 | 0.392 | 0.097 | 0.281 |
| 0.008 | 0.258 | 0.251 | 0.238 | 0.140 | 0.106 | 0.254 | 0.223 | 0.069 |
| 0.176 | 0.237 | 0.172 | 0.214 | 0.206 | 0.044 | 0.088 | 0.082 | 0.174 |
| 0.234 | 0.267 | 0.218 | 0.533 | 0.355 | 0.076 | 0.326 | 0.346 | 0.388 |
| -0.110 | -0.092 | 0.074 | 0.066 | 0.202 | -0.107 | 0.198 | -0.024 | 0.054 |
| 0.194 | 0.379 | 0.269 | 0.208 | 0.164 | 0.073 | 0.332 | 0.210 | 0.286 |

| Q46 | Q47 | Q48 | Q49 | Q50 | Q51 | Q52 | Q53 | Q54 |
|---|---|---|---|---|---|---|---|---|
| 0.040 | 0.160 | 0.212 | 0.133 | -0.002 | 0.080 | -0.021 | 0.123 | 0.303 |
| 0.045 | 0.313 | -0.019 | 0.099 | 0.288 | 0.135 | 0.430 | -0.065 | 0.157 |
| 0.206 | 0.234 | 0.023 | 0.236 | 0.097 | 0.173 | 0.249 | 0.058 | 0.167 |
| 0.215 | 0.014 | 0.091 | -0.031 | 0.267 | 0.351 | 0.017 | 0.031 | 0.147 |
| 0.246 | 0.433 | 0.137 | 0.380 | 0.070 | 0.103 | 0.261 | -0.150 | 0.156 |
| 0.134 | 0.121 | 0.243 | -0.056 | 0.177 | 0.257 | 0.056 | 0.206 | 0.261 |
| 0.253 | 0.163 | 0.199 | 0.212 | 0.195 | 0.230 | 0.298 | -0.079 | 0.235 |
| 0.315 | 0.216 | 0.204 | 0.040 | 0.203 | 0.170 | 0.093 | 0.063 | 0.427 |
| 0.267 | 0.207 | 0.347 | 0.320 | 0.100 | 0.231 | 0.257 | 0.176 | 0.331 |
| 0.294 | 0.117 | 0.316 | 0.193 | 0.377 | 0.392 | 0.086 | -0.037 | 0.114 |
| -0.020 | 0.146 | 0.182 | 0.378 | -0.003 | -0.127 | 0.126 | 0.089 | 0.089 |
| 0.184 | 0.421 | 0.139 | 0.187 | 0.286 | 0.102 | 0.285 | 0.071 | 0.212 |
| -0.069 | 0.260 | 0.175 | 0.179 | 0.112 | 0.008 | 0.077 | 0.120 | 0.177 |
| 0.340 | 0.116 | 0.165 | 0.142 | 0.230 | 0.300 | 0.329 | 0.093 | 0.161 |

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|---|---|---|---|---|---|---|---|---|
| 0.025 | 0.407 | 0.154 | 0.204 | 0.148 | 0.051 | 0.487 | 0.069 | 0.185 |
| 0.236 | 0.118 | 0.316 | 0.115 | 0.197 | 0.262 | 0.176 | -0.102 | 0.209 |
| 0.097 | 0.276 | 0.192 | 0.180 | 0.001 | 0.038 | 0.233 | -0.146 | 0.008 |
| 0.184 | 0.180 | 0.371 | -0.065 | 0.178 | 0.408 | 0.138 | 0.118 | 0.220 |
| 0.493 | 0.009 | 0.227 | 0.017 | 0.202 | 0.395 | 0.149 | 0.076 | 0.284 |
| 0.365 | 0.104 | 0.198 | 0.258 | 0.295 | 0.262 | 0.311 | 0.052 | 0.239 |
| 0.106 | 0.262 | 0.183 | 0.026 | 0.078 | 0.124 | 0.119 | -0.053 | 0.397 |
| -0.016 | 0.280 | 0.026 | 0.065 | 0.134 | -0.052 | 0.207 | -0.059 | 0.006 |
| 0.122 | 0.412 | 0.152 | 0.176 | 0.221 | 0.103 | 0.037 | 0.007 | 0.162 |
| 0.214 | -0.003 | 0.319 | -0.100 | 0.242 | 0.146 | -0.039 | 0.119 | 0.562 |
| 0.403 | 0.082 | 0.380 | 0.019 | 0.384 | 0.310 | 0.403 | 0.185 | 0.256 |
| 0.390 | 0.166 | 0.241 | 0.169 | 0.294 | 0.305 | -0.075 | -0.017 | 0.489 |
| 0.342 | 0.136 | 0.130 | 0.181 | 0.222 | 0.284 | 0.178 | -0.062 | 0.287 |
| 0.225 | 0.167 | 0.109 | 0.236 | 0.159 | 0.145 | 0.114 | 0.064 | 0.345 |
| -0.069 | 0.356 | 0.118 | 0.141 | 0.250 | 0.057 | 0.419 | -0.002 | 0.131 |
| 0.282 | 0.216 | 0.127 | 0.093 | 0.157 | 0.244 | 0.024 | 0.100 | 0.447 |
| 0.324 | 0.015 | 0.170 | -0.060 | 0.010 | 0.270 | -0.066 | -0.035 | 0.250 |
| -0.040 | 0.108 | -0.173 | 0.084 | -0.076 | -0.024 | 0.139 | 0.045 | -0.135 |
| -0.043 | 0.300 | 0.102 | 0.307 | 0.072 | 0.009 | 0.112 | -0.148 | 0.231 |
| -0.035 | 0.066 | 0.100 | 0.106 | 0.132 | 0.103 | 0.355 | 0.000 | 0.020 |
| 0.063 | 0.223 | 0.142 | 0.201 | -0.029 | -0.020 | 0.225 | 0.138 | 0.189 |
| 0.436 | -0.032 | 0.420 | -0.067 | 0.287 | 0.365 | 0.288 | 0.057 | 0.219 |
| 0.196 | 0.152 | 0.065 | 0.127 | -0.025 | 0.031 | 0.294 | 0.171 | 0.172 |
| 0.094 | 0.389 | 0.161 | 0.162 | 0.001 | -0.033 | 0.290 | 0.080 | 0.103 |
| 0.124 | 0.302 | 0.254 | 0.114 | 0.186 | 0.116 | 0.344 | 0.055 | 0.182 |
| 0.337 | 0.278 | 0.252 | 0.231 | 0.194 | 0.386 | 0.336 | 0.034 | 0.423 |
| 0.306 | 0.116 | 0.121 | 0.178 | 0.182 | 0.272 | 0.202 | 0.023 | 0.295 |
| 0.251 | 0.094 | -0.021 | -0.132 | 0.003 | 0.129 | 0.168 | 0.000 | 0.051 |
| 0.289 | 0.184 | 0.246 | 0.183 | 0.175 | 0.208 | 0.299 | -0.009 | 0.312 |
| 0.010 | 0.200 | 0.206 | 0.270 | 0.229 | 0.134 | 0.229 | -0.023 | 0.176 |
| 0.344 | 0.171 | 0.183 | 0.347 | 0.162 | 0.112 | 0.332 | 0.209 | 0.450 |
| 1.000 | 0.040 | 0.190 | 0.212 | 0.142 | 0.344 | 0.284 | 0.183 | 0.292 |
| 0.040 | 1.000 | 0.117 | 0.350 | 0.242 | -0.025 | 0.338 | 0.114 | 0.110 |
| 0.190 | 0.117 | 1.000 | 0.309 | 0.193 | 0.241 | 0.159 | 0.021 | 0.332 |
| 0.212 | 0.350 | 0.309 | 1.000 | 0.162 | 0.005 | 0.154 | 0.165 | 0.145 |
| 0.142 | 0.242 | 0.193 | 0.162 | 1.000 | 0.251 | 0.166 | 0.019 | 0.161 |
| 0.344 | -0.025 | 0.241 | 0.005 | 0.251 | 1.000 | 0.152 | -0.003 | 0.136 |
| 0.284 | 0.338 | 0.159 | 0.154 | 0.166 | 0.152 | 1.000 | 0.098 | 0.072 |
| 0.183 | 0.114 | 0.021 | 0.165 | 0.019 | -0.003 | 0.098 | 1.000 | 0.187 |
| 0.292 | 0.110 | 0.332 | 0.145 | 0.161 | 0.136 | 0.072 | 0.187 | 1.000 |
| 0.225 | 0.192 | 0.048 | 0.272 | 0.209 | 0.274 | 0.065 | 0.054 | 0.268 |
| -0.039 | 0.172 | 0.111 | 0.155 | 0.042 | -0.197 | 0.300 | 0.056 | -0.049 |
| 0.352 | 0.020 | 0.233 | 0.264 | 0.290 | 0.373 | 0.042 | 0.069 | 0.297 |
| 0.003 | -0.105 | -0.028 | -0.191 | -0.038 | 0.094 | -0.114 | -0.040 | 0.004 |
| 0.324 | 0.228 | 0.155 | 0.323 | 0.159 | 0.050 | 0.230 | 0.131 | 0.114 |

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|---|---|---|---|---|---|---|---|---|
| 0.036 | 0.340 | 0.143 | 0.211 | 0.412 | 0.113 | 0.085 | 0.156 | 0.283 |
| 0.093 | 0.116 | 0.156 | 0.249 | 0.128 | 0.110 | 0.073 | 0.137 | 0.048 |
| 0.247 | 0.358 | 0.184 | 0.166 | 0.208 | 0.136 | 0.300 | 0.256 | 0.378 |
| 0.160 | 0.142 | 0.085 | 0.004 | 0.279 | 0.317 | 0.258 | -0.118 | 0.138 |
| -0.064 | 0.153 | -0.049 | -0.054 | 0.081 | -0.082 | 0.126 | 0.069 | -0.003 |
| 0.216 | 0.228 | 0.275 | 0.144 | 0.382 | 0.127 | 0.229 | 0.174 | 0.271 |
| 0.150 | 0.285 | 0.181 | 0.360 | 0.214 | -0.022 | 0.177 | 0.149 | 0.142 |
| 0.230 | 0.324 | 0.341 | 0.199 | 0.256 | 0.337 | 0.351 | 0.007 | 0.261 |
| 0.337 | 0.229 | 0.222 | 0.047 | 0.318 | 0.110 | 0.375 | 0.229 | 0.313 |
| 0.128 | 0.274 | -0.109 | -0.103 | -0.053 | -0.107 | 0.084 | -0.158 | 0.003 |
| 0.342 | 0.439 | 0.245 | 0.281 | 0.427 | 0.167 | 0.446 | 0.133 | 0.380 |
| 0.083 | 0.419 | 0.320 | 0.275 | 0.148 | 0.256 | 0.327 | -0.029 | 0.094 |
| 0.164 | 0.242 | 0.202 | -0.081 | 0.169 | 0.259 | 0.229 | 0.078 | 0.212 |
| 0.037 | 0.169 | 0.174 | 0.151 | 0.140 | -0.009 | 0.108 | 0.076 | 0.181 |
| 0.247 | 0.215 | 0.110 | 0.258 | 0.251 | 0.122 | 0.391 | 0.132 | 0.370 |
| 0.309 | -0.106 | 0.279 | 0.064 | 0.281 | 0.162 | -0.055 | -0.019 | 0.325 |
| -0.023 | 0.254 | -0.133 | 0.079 | 0.077 | -0.001 | 0.296 | 0.004 | 0.035 |

| Q55 | Q56 | Q57 | Q58 | Q59 | Q60 | Q61 | Q62 | Q63 |
|---|---|---|---|---|---|---|---|---|
| 0.470 | 0.159 | 0.243 | -0.110 | 0.011 | 0.115 | 0.366 | 0.167 | 0.265 |
| -0.028 | 0.123 | 0.122 | -0.263 | 0.290 | 0.225 | 0.102 | 0.318 | 0.155 |
| 0.495 | 0.214 | 0.261 | -0.040 | 0.112 | 0.055 | 0.266 | 0.186 | 0.234 |
| 0.285 | -0.069 | 0.316 | -0.106 | 0.127 | -0.029 | 0.254 | 0.090 | 0.424 |
| 0.331 | 0.099 | 0.222 | -0.132 | 0.281 | 0.162 | 0.139 | 0.141 | 0.272 |
| 0.138 | -0.093 | 0.317 | 0.118 | 0.018 | 0.336 | 0.120 | 0.138 | 0.014 |
| 0.275 | 0.246 | 0.479 | -0.301 | 0.324 | 0.023 | 0.282 | 0.188 | 0.309 |
| 0.233 | -0.056 | 0.366 | 0.009 | 0.083 | 0.268 | -0.029 | 0.446 | 0.189 |
| 0.124 | 0.187 | 0.161 | -0.028 | 0.211 | 0.153 | 0.147 | 0.357 | 0.173 |
| 0.289 | 0.065 | 0.466 | 0.153 | 0.163 | 0.278 | 0.091 | -0.044 | 0.093 |
| 0.352 | 0.171 | 0.125 | -0.155 | 0.210 | 0.114 | 0.347 | 0.053 | 0.209 |
| 0.139 | 0.250 | 0.197 | -0.218 | 0.373 | -0.092 | 0.240 | 0.140 | 0.215 |
| 0.413 | 0.084 | 0.221 | 0.122 | 0.046 | 0.235 | 0.165 | 0.208 | 0.206 |
| 0.193 | 0.232 | 0.290 | -0.021 | 0.331 | 0.046 | 0.225 | 0.207 | 0.376 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 0.140 | 0.318 | 0.173 | -0.222 | 0.299 | -0.029 | 0.273 | 0.260 | 0.257 |
| 0.400 | 0.118 | 0.295 | 0.026 | 0.150 | 0.226 | 0.071 | 0.202 | 0.221 |
| 0.002 | 0.145 | 0.172 | -0.017 | 0.223 | 0.071 | 0.062 | 0.126 | 0.235 |
| 0.262 | -0.087 | 0.303 | 0.006 | -0.025 | 0.129 | -0.099 | 0.223 | 0.125 |
| 0.220 | -0.077 | 0.294 | 0.234 | 0.128 | 0.205 | 0.008 | 0.271 | 0.309 |
| 0.250 | 0.133 | 0.416 | -0.166 | 0.317 | 0.000 | 0.133 | 0.232 | 0.188 |
| 0.300 | -0.004 | 0.236 | -0.199 | 0.127 | 0.015 | 0.013 | 0.274 | 0.241 |
| 0.131 | 0.156 | 0.250 | -0.102 | 0.247 | 0.147 | 0.261 | 0.090 | 0.349 |
| 0.453 | 0.147 | 0.245 | -0.019 | 0.012 | 0.050 | 0.178 | 0.102 | 0.259 |
| 0.107 | -0.148 | 0.258 | 0.147 | 0.000 | 0.046 | -0.042 | 0.330 | 0.121 |
| 0.160 | 0.115 | 0.372 | -0.060 | 0.180 | 0.031 | 0.034 | 0.156 | 0.230 |
| 0.436 | -0.116 | 0.535 | 0.143 | 0.126 | 0.371 | 0.110 | 0.187 | 0.208 |
| 0.355 | -0.031 | 0.323 | 0.122 | 0.149 | 0.391 | 0.166 | 0.106 | 0.308 |
| 0.660 | 0.151 | 0.339 | -0.037 | 0.047 | 0.181 | 0.313 | 0.128 | 0.337 |
| 0.280 | 0.255 | 0.146 | -0.152 | 0.424 | 0.121 | 0.332 | 0.278 | 0.341 |
| 0.510 | 0.009 | 0.334 | 0.073 | 0.070 | 0.176 | 0.225 | 0.165 | 0.198 |
| 0.184 | -0.094 | 0.226 | 0.033 | -0.041 | 0.145 | -0.150 | 0.106 | 0.073 |
| 0.170 | 0.237 | 0.098 | -0.011 | 0.053 | -0.080 | 0.208 | -0.041 | 0.120 |
| 0.307 | 0.097 | 0.155 | -0.174 | 0.066 | -0.011 | 0.258 | 0.134 | 0.387 |
| 0.230 | 0.035 | 0.166 | -0.197 | 0.156 | 0.078 | 0.304 | 0.236 | 0.220 |
| 0.256 | 0.214 | 0.129 | 0.076 | 0.136 | 0.159 | 0.266 | 0.155 | 0.192 |
| 0.081 | -0.020 | 0.187 | 0.091 | 0.178 | 0.019 | 0.077 | 0.174 | 0.405 |
| 0.271 | -0.045 | 0.141 | -0.219 | 0.335 | 0.085 | 0.204 | -0.009 | 0.109 |
| 0.282 | 0.143 | 0.221 | 0.020 | 0.262 | 0.160 | 0.290 | 0.163 | 0.226 |
| 0.074 | 0.095 | 0.190 | -0.196 | 0.366 | 0.091 | 0.172 | 0.328 | 0.224 |
| 0.573 | 0.055 | 0.526 | -0.056 | 0.292 | 0.157 | 0.077 | 0.219 | 0.290 |
| 0.222 | -0.239 | 0.382 | 0.124 | 0.061 | 0.070 | -0.083 | 0.419 | 0.070 |
| 0.110 | -0.074 | 0.118 | -0.134 | 0.121 | -0.002 | 0.060 | 0.066 | 0.172 |
| 0.343 | 0.114 | 0.203 | -0.105 | 0.218 | 0.065 | 0.251 | 0.376 | 0.512 |
| 0.159 | 0.337 | 0.284 | 0.023 | -0.016 | 0.063 | 0.096 | 0.233 | 0.057 |
| 0.304 | 0.209 | 0.245 | -0.157 | 0.253 | 0.073 | 0.267 | 0.512 | 0.153 |
| 0.225 | -0.039 | 0.352 | 0.003 | 0.324 | 0.036 | 0.093 | 0.247 | 0.160 |
| 0.192 | 0.172 | 0.020 | -0.105 | 0.228 | 0.340 | 0.116 | 0.358 | 0.142 |
| 0.048 | 0.111 | 0.233 | -0.028 | 0.155 | 0.143 | 0.156 | 0.184 | 0.085 |
| 0.272 | 0.155 | 0.264 | -0.191 | 0.323 | 0.211 | 0.249 | 0.166 | 0.004 |
| 0.209 | 0.042 | 0.290 | -0.038 | 0.159 | 0.412 | 0.128 | 0.208 | 0.279 |
| 0.274 | -0.197 | 0.373 | 0.094 | 0.050 | 0.113 | 0.110 | 0.136 | 0.317 |
| 0.065 | 0.300 | 0.042 | -0.114 | 0.230 | 0.085 | 0.073 | 0.300 | 0.258 |
| 0.054 | 0.056 | 0.069 | -0.040 | 0.131 | 0.156 | 0.137 | 0.256 | -0.118 |
| 0.268 | -0.049 | 0.297 | 0.004 | 0.114 | 0.283 | 0.048 | 0.378 | 0.138 |
| 1.000 | 0.088 | 0.405 | -0.074 | 0.137 | 0.217 | 0.335 | 0.179 | 0.248 |
| 0.088 | 1.000 | 0.013 | -0.225 | 0.069 | -0.064 | 0.329 | 0.081 | 0.035 |
| 0.405 | 0.013 | 1.000 | 0.094 | 0.099 | 0.186 | 0.074 | 0.231 | 0.175 |
| -0.074 | -0.225 | 0.094 | 1.000 | -0.277 | 0.047 | -0.301 | -0.018 | 0.014 |
| 0.137 | 0.069 | 0.099 | -0.277 | 1.000 | 0.019 | 0.284 | 0.149 | 0.153 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 0.217 | -0.064 | 0.186 | 0.047 | 0.019 | 1.000 | 0.024 | 0.317 | -0.016 |
| 0.335 | 0.329 | 0.074 | -0.301 | 0.284 | 0.024 | 1.000 | -0.034 | 0.245 |
| 0.179 | 0.081 | 0.231 | -0.018 | 0.149 | 0.317 | -0.034 | 1.000 | 0.185 |
| 0.248 | 0.035 | 0.175 | 0.014 | 0.153 | -0.016 | 0.245 | 0.185 | 1.000 |
| 0.168 | 0.293 | -0.001 | -0.218 | 0.156 | 0.027 | 0.383 | -0.096 | 0.090 |
| 0.155 | 0.122 | 0.232 | -0.167 | 0.233 | 0.183 | 0.142 | 0.331 | 0.056 |
| 0.321 | 0.262 | 0.169 | -0.321 | 0.203 | 0.117 | 0.300 | 0.279 | 0.082 |
| 0.402 | 0.194 | 0.396 | 0.025 | 0.100 | 0.225 | 0.197 | 0.459 | 0.302 |
| 0.294 | 0.174 | 0.290 | -0.188 | 0.324 | 0.117 | 0.185 | 0.175 | 0.246 |
| 0.012 | -0.011 | -0.102 | -0.005 | 0.317 | -0.088 | 0.127 | 0.135 | 0.135 |
| 0.234 | 0.145 | 0.315 | -0.106 | 0.303 | 0.212 | 0.096 | 0.471 | 0.227 |
| 0.212 | 0.255 | 0.186 | -0.263 | 0.238 | 0.104 | 0.241 | 0.291 | 0.248 |
| 0.190 | 0.242 | 0.292 | 0.254 | 0.018 | 0.260 | -0.011 | 0.278 | 0.215 |
| 0.327 | 0.033 | 0.167 | 0.002 | 0.187 | 0.192 | 0.040 | 0.224 | 0.052 |
| 0.503 | 0.163 | 0.458 | -0.030 | 0.114 | 0.087 | 0.177 | 0.199 | 0.158 |
| 0.093 | -0.071 | 0.321 | 0.227 | -0.030 | 0.142 | -0.026 | 0.102 | 0.170 |
| 0.162 | 0.138 | 0.075 | -0.224 | 0.258 | -0.108 | 0.396 | 0.215 | 0.243 |

| Q64 | Q65 | Q66 | Q67 | Q68 | Q69 | Q70 | Q71 | Q72 |
|---|---|---|---|---|---|---|---|---|
| 0.217 | -0.070 | 0.264 | 0.349 | 0.248 | 0.034 | 0.215 | 0.377 | 0.192 |
| 0.268 | 0.127 | 0.271 | 0.350 | 0.233 | 0.273 | 0.465 | 0.352 | 0.197 |
| 0.263 | 0.172 | 0.386 | 0.404 | 0.160 | 0.103 | 0.254 | 0.258 | 0.229 |
| 0.073 | 0.083 | 0.111 | 0.095 | 0.273 | 0.019 | 0.286 | 0.131 | 0.135 |
| 0.048 | 0.075 | 0.147 | 0.239 | 0.285 | 0.066 | 0.348 | 0.233 | 0.206 |
| 0.173 | 0.094 | 0.113 | 0.252 | 0.120 | -0.091 | 0.178 | 0.245 | 0.326 |
| 0.178 | 0.179 | 0.351 | 0.287 | 0.350 | 0.105 | 0.305 | 0.383 | 0.225 |
| 0.023 | 0.264 | 0.184 | 0.419 | 0.278 | 0.117 | 0.459 | 0.216 | 0.331 |
| -0.017 | 0.205 | 0.324 | 0.320 | 0.148 | 0.133 | 0.335 | 0.317 | 0.181 |
| 0.155 | 0.120 | -0.131 | 0.221 | 0.306 | -0.026 | 0.211 | 0.204 | 0.415 |
| 0.100 | -0.020 | 0.186 | 0.346 | 0.147 | 0.006 | 0.028 | 0.163 | 0.163 |
| 0.244 | 0.355 | 0.372 | 0.290 | 0.436 | 0.206 | 0.411 | 0.357 | 0.153 |
| 0.008 | 0.112 | 0.199 | 0.459 | 0.075 | 0.026 | 0.196 | 0.127 | 0.353 |
| 0.120 | 0.170 | 0.159 | 0.212 | 0.354 | 0.036 | 0.468 | 0.355 | 0.349 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 0.459 | 0.482 | 0.406 | 0.364 | 0.460 | 0.258 | 0.525 | 0.469 | 0.077 |
| -0.148 | 0.061 | 0.223 | 0.453 | 0.149 | 0.086 | 0.287 | 0.198 | 0.216 |
| 0.111 | 0.004 | -0.072 | 0.310 | -0.015 | 0.135 | 0.131 | 0.386 | 0.337 |
| -0.041 | 0.244 | -0.008 | 0.336 | 0.359 | 0.043 | 0.199 | 0.157 | 0.300 |
| -0.136 | 0.060 | -0.013 | 0.217 | 0.236 | 0.008 | 0.245 | 0.065 | 0.186 |
| 0.154 | 0.187 | 0.300 | 0.148 | 0.385 | 0.057 | 0.379 | 0.423 | 0.184 |
| 0.112 | 0.105 | 0.092 | 0.298 | 0.263 | 0.218 | 0.207 | 0.289 | 0.030 |
| 0.175 | 0.147 | 0.219 | 0.286 | 0.214 | 0.105 | 0.262 | 0.316 | 0.326 |
| 0.327 | 0.231 | 0.305 | 0.361 | 0.278 | 0.221 | 0.261 | 0.263 | 0.212 |
| -0.025 | 0.177 | -0.070 | 0.104 | 0.219 | -0.047 | 0.232 | 0.004 | 0.068 |
| 0.178 | 0.428 | 0.142 | 0.246 | 0.691 | -0.011 | 0.507 | 0.267 | 0.377 |
| -0.115 | 0.151 | 0.224 | 0.446 | 0.198 | 0.047 | 0.359 | 0.084 | 0.387 |
| 0.009 | 0.025 | 0.016 | 0.343 | 0.226 | -0.084 | 0.250 | 0.100 | 0.402 |
| 0.193 | 0.126 | 0.265 | 0.459 | 0.322 | 0.078 | 0.158 | 0.134 | 0.297 |
| 0.411 | 0.318 | 0.333 | 0.308 | 0.455 | 0.245 | 0.437 | 0.456 | 0.198 |
| -0.003 | 0.115 | 0.137 | 0.364 | 0.327 | 0.035 | 0.204 | 0.219 | 0.215 |
| -0.042 | 0.013 | -0.027 | 0.172 | 0.180 | 0.011 | 0.127 | 0.104 | 0.073 |
| 0.371 | 0.004 | 0.105 | 0.128 | 0.171 | -0.009 | 0.039 | 0.227 | 0.112 |
| 0.146 | 0.141 | 0.243 | 0.364 | 0.141 | 0.150 | 0.260 | 0.256 | 0.207 |
| 0.381 | 0.210 | 0.370 | 0.229 | 0.225 | 0.218 | 0.135 | 0.377 | 0.168 |
| 0.106 | 0.208 | 0.105 | 0.417 | 0.205 | 0.206 | 0.115 | 0.131 | 0.334 |
| -0.173 | 0.166 | 0.068 | 0.267 | 0.297 | 0.043 | 0.344 | 0.076 | 0.217 |
| 0.301 | 0.109 | 0.063 | 0.051 | 0.219 | 0.184 | 0.160 | 0.151 | 0.008 |
| 0.236 | 0.015 | 0.257 | 0.419 | 0.264 | 0.244 | 0.223 | 0.341 | 0.258 |
| 0.234 | 0.142 | 0.173 | 0.397 | 0.260 | 0.436 | 0.430 | 0.458 | 0.251 |
| 0.130 | 0.238 | 0.194 | 0.439 | 0.393 | 0.094 | 0.424 | 0.342 | 0.238 |
| -0.167 | 0.076 | 0.038 | 0.264 | 0.189 | 0.007 | 0.357 | 0.054 | 0.140 |
| 0.422 | 0.103 | 0.079 | 0.106 | 0.251 | 0.199 | 0.199 | 0.360 | 0.106 |
| 0.188 | 0.170 | 0.379 | 0.432 | 0.366 | 0.068 | 0.431 | 0.392 | 0.254 |
| -0.060 | 0.165 | 0.146 | 0.281 | 0.165 | -0.067 | 0.215 | 0.097 | 0.223 |
| 0.086 | 0.187 | 0.283 | 0.392 | 0.240 | -0.033 | 0.390 | 0.281 | 0.069 |
| -0.064 | 0.216 | 0.150 | 0.230 | 0.337 | 0.128 | 0.342 | 0.083 | 0.164 |
| 0.153 | 0.228 | 0.285 | 0.324 | 0.229 | 0.274 | 0.439 | 0.419 | 0.242 |
| -0.049 | 0.275 | 0.181 | 0.341 | 0.222 | -0.109 | 0.245 | 0.320 | 0.202 |
| -0.054 | 0.144 | 0.360 | 0.199 | 0.047 | -0.103 | 0.281 | 0.275 | -0.081 |
| 0.081 | 0.382 | 0.214 | 0.256 | 0.318 | -0.053 | 0.427 | 0.148 | 0.169 |
| -0.082 | 0.127 | -0.022 | 0.337 | 0.110 | -0.107 | 0.167 | 0.256 | 0.259 |
| 0.126 | 0.229 | 0.177 | 0.351 | 0.375 | 0.084 | 0.446 | 0.327 | 0.229 |
| 0.069 | 0.174 | 0.149 | 0.007 | 0.229 | -0.158 | 0.133 | -0.029 | 0.078 |
| -0.003 | 0.271 | 0.142 | 0.261 | 0.313 | 0.003 | 0.380 | 0.094 | 0.212 |
| 0.168 | 0.155 | 0.321 | 0.402 | 0.294 | 0.012 | 0.234 | 0.212 | 0.190 |
| 0.293 | 0.122 | 0.262 | 0.194 | 0.174 | -0.011 | 0.145 | 0.255 | 0.242 |
| -0.001 | 0.232 | 0.169 | 0.396 | 0.290 | -0.102 | 0.315 | 0.186 | 0.292 |
| -0.218 | -0.167 | -0.321 | 0.025 | -0.188 | -0.005 | -0.106 | -0.263 | 0.254 |
| 0.156 | 0.233 | 0.203 | 0.100 | 0.324 | 0.317 | 0.303 | 0.238 | 0.018 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 0.027 | 0.183 | 0.117 | 0.225 | 0.117 | -0.088 | 0.212 | 0.104 | 0.260 |
| 0.383 | 0.142 | 0.300 | 0.197 | 0.185 | 0.127 | 0.096 | 0.241 | -0.011 |
| -0.096 | 0.331 | 0.279 | 0.459 | 0.175 | 0.135 | 0.471 | 0.291 | 0.278 |
| 0.090 | 0.056 | 0.082 | 0.302 | 0.246 | 0.135 | 0.227 | 0.248 | 0.215 |
| 1.000 | 0.216 | 0.216 | 0.103 | 0.370 | 0.186 | 0.121 | 0.463 | 0.159 |
| 0.216 | 1.000 | 0.315 | 0.266 | 0.424 | 0.112 | 0.523 | 0.153 | 0.053 |
| 0.216 | 0.315 | 1.000 | 0.288 | 0.175 | 0.009 | 0.349 | 0.315 | 0.128 |
| 0.103 | 0.266 | 0.288 | 1.000 | 0.241 | 0.079 | 0.441 | 0.425 | 0.468 |
| 0.370 | 0.424 | 0.175 | 0.241 | 1.000 | 0.071 | 0.455 | 0.262 | 0.202 |
| 0.186 | 0.112 | 0.009 | 0.079 | 0.071 | 1.000 | 0.093 | 0.042 | -0.047 |
| 0.121 | 0.523 | 0.349 | 0.441 | 0.455 | 0.093 | 1.000 | 0.320 | 0.277 |
| 0.463 | 0.153 | 0.315 | 0.425 | 0.262 | 0.042 | 0.320 | 1.000 | 0.262 |
| 0.159 | 0.053 | 0.128 | 0.468 | 0.202 | -0.047 | 0.277 | 0.262 | 1.000 |
| -0.018 | 0.048 | 0.153 | 0.157 | -0.008 | 0.052 | 0.288 | 0.036 | 0.273 |
| 0.211 | 0.259 | 0.255 | 0.400 | 0.537 | 0.021 | 0.383 | 0.270 | 0.128 |
| -0.133 | 0.214 | -0.132 | 0.140 | 0.333 | -0.217 | 0.276 | -0.021 | 0.297 |
| 0.389 | 0.023 | 0.156 | 0.096 | 0.253 | 0.263 | 0.189 | 0.301 | 0.038 |

| Q73 | Q74 | Q75 | Q76 |
|---|---|---|---|
| 0.177 | 0.287 | 0.187 | 0.309 |
| 0.172 | 0.237 | -0.033 | 0.423 |
| 0.123 | 0.289 | -0.227 | 0.283 |
| 0.105 | 0.193 | 0.323 | 0.229 |
| 0.139 | 0.337 | 0.190 | 0.339 |
| 0.199 | 0.228 | 0.179 | 0.031 |
| 0.099 | 0.373 | 0.072 | 0.415 |
| 0.108 | 0.326 | 0.199 | 0.077 |
| 0.019 | 0.175 | 0.050 | 0.177 |
| -0.026 | 0.273 | 0.353 | -0.056 |
| 0.314 | 0.270 | 0.003 | 0.264 |
| 0.039 | 0.324 | 0.024 | 0.299 |
| 0.324 | 0.221 | 0.045 | -0.008 |
| 0.017 | 0.235 | 0.388 | 0.243 |

| | | | |
|---|---|---|---|
| 0.080 | 0.389 | -0.106 | 0.349 |
| 0.302 | 0.173 | 0.098 | -0.061 |
| 0.060 | 0.054 | -0.038 | 0.183 |
| 0.171 | 0.232 | 0.227 | -0.118 |
| 0.173 | 0.116 | 0.470 | -0.109 |
| 0.037 | 0.341 | 0.096 | 0.320 |
| 0.186 | 0.278 | -0.132 | 0.272 |
| 0.305 | 0.268 | 0.142 | 0.158 |
| 0.199 | 0.368 | -0.056 | 0.207 |
| 0.135 | 0.331 | 0.408 | 0.023 |
| 0.061 | 0.330 | 0.473 | 0.107 |
| 0.182 | 0.233 | 0.415 | -0.065 |
| 0.134 | 0.162 | 0.401 | 0.109 |
| 0.214 | 0.507 | 0.096 | 0.213 |
| 0.170 | 0.430 | -0.095 | 0.526 |
| 0.036 | 0.371 | 0.159 | 0.061 |
| -0.035 | 0.153 | 0.104 | -0.080 |
| 0.109 | 0.308 | -0.014 | 0.347 |
| 0.161 | 0.327 | -0.016 | 0.349 |
| 0.099 | 0.305 | -0.256 | 0.449 |
| 0.091 | 0.296 | 0.010 | 0.033 |
| 0.182 | 0.247 | 0.320 | -0.019 |
| 0.176 | 0.234 | -0.110 | 0.194 |
| 0.237 | 0.267 | -0.092 | 0.379 |
| 0.172 | 0.218 | 0.074 | 0.269 |
| 0.214 | 0.533 | 0.066 | 0.208 |
| 0.206 | 0.355 | 0.202 | 0.164 |
| 0.044 | 0.076 | -0.107 | 0.073 |
| 0.088 | 0.326 | 0.198 | 0.332 |
| 0.082 | 0.346 | -0.024 | 0.210 |
| 0.174 | 0.388 | 0.054 | 0.286 |
| 0.037 | 0.247 | 0.309 | -0.023 |
| 0.169 | 0.215 | -0.106 | 0.254 |
| 0.174 | 0.110 | 0.279 | -0.133 |
| 0.151 | 0.258 | 0.064 | 0.079 |
| 0.140 | 0.251 | 0.281 | 0.077 |
| -0.009 | 0.122 | 0.162 | -0.001 |
| 0.108 | 0.391 | -0.055 | 0.296 |
| 0.076 | 0.132 | -0.019 | 0.004 |
| 0.181 | 0.370 | 0.325 | 0.035 |
| 0.327 | 0.503 | 0.093 | 0.162 |
| 0.033 | 0.163 | -0.071 | 0.138 |
| 0.167 | 0.458 | 0.321 | 0.075 |
| 0.002 | -0.030 | 0.227 | -0.224 |
| 0.187 | 0.114 | -0.030 | 0.258 |

| | | | |
|---|---|---|---|
| 0.192 | 0.087 | 0.142 | -0.108 |
| 0.040 | 0.177 | -0.026 | 0.396 |
| 0.224 | 0.199 | 0.102 | 0.215 |
| 0.052 | 0.158 | 0.170 | 0.243 |
| -0.018 | 0.211 | -0.133 | 0.389 |
| 0.048 | 0.259 | 0.214 | 0.023 |
| 0.153 | 0.255 | -0.132 | 0.156 |
| 0.157 | 0.400 | 0.140 | 0.096 |
| -0.008 | 0.537 | 0.333 | 0.253 |
| 0.052 | 0.021 | -0.217 | 0.263 |
| 0.288 | 0.383 | 0.276 | 0.189 |
| 0.036 | 0.270 | -0.021 | 0.301 |
| 0.273 | 0.128 | 0.297 | 0.038 |
| 1.000 | 0.169 | 0.069 | 0.061 |
| 0.169 | 1.000 | 0.191 | 0.327 |
| 0.069 | 0.191 | 1.000 | -0.202 |
| 0.061 | 0.327 | -0.202 | 1.000 |

```
FACTOR
  /VARIABLES Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12 Q13 Q14 Q15 Q16 Q17
    Q25 Q26 Q27 Q28 Q29 Q30 Q31 Q32 Q33 Q34 Q35 Q36 Q37 Q38 Q39 Q40 Q41
    Q50 Q51 Q52 Q53 Q54 Q55 Q56 Q57 Q58 Q59 Q60 Q61 Q62 Q63 Q64 Q65 Q66
    Q75 Q76
  /MISSING LISTWISE
  /ANALYSIS Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12 Q13 Q14 Q15 Q16 Q17
    Q25 Q26 Q27 Q28 Q29 Q30 Q31 Q32 Q33 Q34 Q35 Q36 Q37 Q38 Q39 Q40 Q41
    Q50 Q51 Q52 Q53 Q54 Q55 Q56 Q57 Q58 Q59 Q60 Q61 Q62 Q63 Q64 Q65 Q66
    Q75 Q76
  /PRINT INITIAL CORRELATION DET KMO EXTRACTION ROTATION
  /FORMAT SORT BLANK(.316)
  /CRITERIA MINEIGEN(1) ITERATE(500)
  /EXTRACTION PAF
  /CRITERIA ITERATE(500) DELTA(0)
  /ROTATION OBLIMIN
  /METHOD=CORRELATION.
```

# Factor Analysis

**Notes**

| | | |
|---|---|---|
| Output Created | | 19-AUG-2016 13:46:42 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\Jordaan_T Data_Reversed.sav |
| | Active Dataset | DataSet1 |
| | Filter | <none> |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 204 |
| Missing Value Handling | Definition of Missing | MISSING=EXCLUDE: User-defined missing values are treated as missing. |
| | Cases Used | LISTWISE: Statistics are based on cases with no missing values for any variable used. |

| | | |
|---|---|---|
| Syntax | | FACTOR<br>/VARIABLES Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12 Q13 Q14 Q15 Q16 Q17 Q18 Q19 Q20 Q21 Q22 Q23 Q24 Q25 Q26 Q27 Q28 Q29 Q30 Q31 Q32 Q33 Q34 Q35 Q36 Q37 Q38 Q39 Q40 Q41 Q42 Q43 Q44 Q45 Q46 Q47 Q48 Q49 Q50 Q51 Q52 Q53 Q54 Q55 Q56 Q57 Q58 Q59 Q60 Q61 Q62 Q63 Q64 Q65 Q66 Q67 Q68 Q69 Q70 Q71 Q72 Q73 Q74 Q75 Q76<br>/MISSING LISTWISE<br>/ANALYSIS Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12 Q13 Q14 Q15 Q16 Q17 Q18 Q19 Q20 Q21 Q22 Q23 Q24 Q25 Q26 Q27 Q28 Q29 Q30 Q31 Q32 Q33 Q34 Q35 Q36 Q37 Q38 Q39 Q40 Q41 Q42 Q43 Q44 Q45 Q46 Q47 Q48 Q49 Q50 Q51 Q52 Q53 Q54 Q55 Q56 Q57 Q58 Q59 Q60 Q61 Q62 Q63 Q64 Q65 Q66 Q67 Q68 Q69 Q70 Q71 Q72 Q73 Q74 Q75 Q76<br>/PRINT INITIAL CORRELATION DET KMO EXTRACTION ROTATION<br>/FORMAT SORT BLANK(.316)<br>/CRITERIA MINEIGEN(1) ITERATE(500)<br>/EXTRACTION PAF<br>/CRITERIA ITERATE(500) DELTA(0)<br>/ROTATION OBLIMIN<br>/METHOD=CORRELATION. |
| Resources | Processor Time | 00:00:00.13 |
| | Elapsed Time | 00:00:00.13 |
| | Maximum Memory Required | 644384 (629.281K) bytes |

| | | Q1 |
|---|---|---|
| Correlation | Q1 | 1.000 |
| | Q2 | .212 |
| | Q3 | .171 |
| | Q4 | .437 |
| | Q5 | .177 |
| | Q6 | .257 |
| | Q7 | .324 |
| | Q8 | .161 |
| | Q9 | .173 |

| | |
|---|---|
| Q10 | -.078 |
| Q11 | .220 |
| Q12 | .128 |
| Q13 | .257 |
| Q14 | .420 |
| Q15 | .202 |
| Q16 | .347 |
| Q17 | .006 |
| Q18 | .159 |
| Q19 | .238 |
| Q20 | .185 |
| Q21 | .165 |
| Q22 | .293 |
| Q23 | .330 |
| Q24 | .088 |
| Q25 | .066 |
| Q26 | .343 |
| Q27 | .281 |
| Q28 | .330 |
| Q29 | .281 |
| Q30 | .243 |
| Q31 | .183 |
| Q32 | .317 |
| Q33 | .358 |
| Q34 | .168 |
| Q35 | .193 |
| Q36 | .240 |
| Q37 | .093 |
| Q38 | .338 |
| Q39 | .287 |
| Q40 | .352 |
| Q41 | .149 |
| Q42 | -.013 |
| Q43 | .467 |
| Q44 | .142 |
| Q45 | .256 |
| Q46 | .186 |
| Q47 | .258 |
| Q48 | .272 |
| Q49 | .152 |
| Q50 | -.002 |
| Q51 | .080 |
| Q52 | .047 |
| Q53 | .183 |
| Q54 | .173 |
| Q55 | .342 |
| Q56 | .065 |
| Q57 | .293 |
| Q58 | -.088 |
| Q59 | .073 |
| Q60 | .094 |

| | | |
|---|---|---|
| | Q61 | .314 |
| | Q62 | .187 |
| | Q63 | .318 |
| | Q64 | .080 |
| | Q65 | .017 |
| | Q66 | .226 |
| | Q67 | .304 |
| | Q68 | .195 |
| | Q69 | .154 |
| | Q70 | .291 |
| | Q71 | .167 |
| | Q72 | .110 |
| | Q73 | .033 |
| | Q74 | .244 |
| | Q75 | .163 |
| | Q76 | .250 |

a. Determinant = 6.069E-20

**KMO and Bartlett's Test**

| | | |
|---|---|---|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | .776 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 6408.660 |
| | df | 2850 |
| | Sig. | .000 |

**Communalities**

| | Initial | Extraction |
|---|---|---|
| Q1 | .706 | .691 |
| Q2 | .678 | .630 |
| Q3 | .626 | .568 |
| Q4 | .619 | .627 |
| Q5 | .715 | .637 |
| Q6 | .590 | .619 |
| Q7 | .745 | .725 |
| Q8 | .657 | .622 |
| Q9 | .588 | .597 |
| Q10 | .571 | .526 |
| Q11 | .725 | .712 |
| Q12 | .665 | .678 |
| Q13 | .787 | .725 |
| Q14 | .663 | .576 |
| Q15 | .679 | .637 |
| Q16 | .666 | .589 |
| Q17 | .550 | .535 |
| Q18 | .572 | .452 |
| Q19 | .664 | .617 |
| Q20 | .666 | .674 |
| Q21 | .620 | .599 |
| Q22 | .634 | .547 |
| Q23 | .720 | .675 |
| Q24 | .572 | .594 |

| | | |
|---|---|---|
| Q25 | .667 | .601 |
| Q26 | .704 | .651 |
| Q27 | .632 | .521 |
| Q28 | .735 | .665 |
| Q29 | .714 | .571 |
| Q30 | .668 | .582 |
| Q31 | .503 | .423 |
| Q32 | .555 | .444 |
| Q33 | .728 | .666 |
| Q34 | .593 | .577 |
| Q35 | .741 | .803 |
| Q36 | .683 | .651 |
| Q37 | .606 | .513 |
| Q38 | .689 | .645 |
| Q39 | .671 | .589 |
| Q40 | .679 | .629 |
| Q41 | .604 | .495 |
| Q42 | .553 | .483 |
| Q43 | .717 | .684 |
| Q44 | .454 | .366 |
| Q45 | .631 | .670 |
| Q46 | .640 | .540 |
| Q47 | .715 | .585 |
| Q48 | .564 | .473 |
| Q49 | .690 | .720 |
| Q50 | .558 | .488 |
| Q51 | .624 | .625 |
| Q52 | .631 | .545 |
| Q53 | .584 | .678 |
| Q54 | .641 | .564 |
| Q55 | .670 | .593 |
| Q56 | .480 | .415 |
| Q57 | .597 | .534 |
| Q58 | .477 | .381 |
| Q59 | .610 | .528 |
| Q60 | .520 | .476 |
| Q61 | .542 | .504 |
| Q62 | .585 | .512 |
| Q63 | .645 | .550 |
| Q64 | .629 | .615 |
| Q65 | .616 | .648 |
| Q66 | .591 | .495 |
| Q67 | .650 | .574 |
| Q68 | .635 | .592 |
| Q69 | .598 | .531 |
| Q70 | .718 | .682 |
| Q71 | .673 | .584 |
| Q72 | .648 | .539 |
| Q73 | .381 | .272 |
| Q74 | .688 | .701 |
| Q75 | .657 | .643 |

| | | |
|---|---|---|
| Q76 | .700 | .701 |

Extraction Method: Principal Axis Factoring.

**Total Variance Expla**

| Factor | Initial Eigenvalues | |
|---|---|---|
| | Total | % of Variance |
| 1 | 14.361 | 18.896 |
| 2 | 5.955 | 7.836 |
| 3 | 3.156 | 4.152 |
| 4 | 2.769 | 3.644 |
| 5 | 2.126 | 2.797 |
| 6 | 2.061 | 2.711 |
| 7 | 1.915 | 2.520 |
| 8 | 1.838 | 2.419 |
| 9 | 1.762 | 2.318 |
| 10 | 1.615 | 2.124 |
| 11 | 1.517 | 1.996 |
| 12 | 1.476 | 1.943 |
| 13 | 1.437 | 1.891 |
| 14 | 1.396 | 1.837 |
| 15 | 1.355 | 1.783 |
| 16 | 1.288 | 1.694 |
| 17 | 1.259 | 1.657 |
| 18 | 1.221 | 1.607 |
| 19 | 1.177 | 1.549 |
| 20 | 1.128 | 1.484 |
| 21 | 1.063 | 1.398 |
| 22 | 1.042 | 1.371 |
| 23 | 1.018 | 1.339 |
| 24 | .987 | 1.299 |
| 25 | .930 | 1.223 |
| 26 | .895 | 1.178 |
| 27 | .843 | 1.109 |
| 28 | .815 | 1.072 |
| 29 | .803 | 1.057 |
| 30 | .773 | 1.017 |
| 31 | .763 | 1.004 |
| 32 | .714 | .939 |
| 33 | .673 | .886 |
| 34 | .648 | .853 |
| 35 | .619 | .814 |
| 36 | .602 | .791 |
| 37 | .588 | .774 |
| 38 | .569 | .749 |
| 39 | .552 | .726 |
| 40 | .534 | .703 |
| 41 | .523 | .688 |

| | | |
|---|---|---|
| 42 | .502 | .660 |
| 43 | .471 | .619 |
| 44 | .461 | .606 |
| 45 | .445 | .586 |
| 46 | .434 | .571 |
| 47 | .412 | .542 |
| 48 | .398 | .523 |
| 49 | .382 | .503 |
| 50 | .369 | .486 |
| 51 | .354 | .466 |
| 52 | .344 | .453 |
| 53 | .335 | .441 |
| 54 | .319 | .420 |
| 55 | .297 | .391 |
| 56 | .292 | .384 |
| 57 | .272 | .358 |
| 58 | .262 | .345 |
| 59 | .246 | .324 |
| 60 | .236 | .311 |
| 61 | .233 | .306 |
| 62 | .220 | .289 |
| 63 | .213 | .280 |
| 64 | .204 | .269 |
| 65 | .177 | .233 |
| 66 | .170 | .224 |
| 67 | .167 | .220 |
| 68 | .148 | .195 |
| 69 | .138 | .182 |
| 70 | .128 | .169 |
| 71 | .125 | .165 |
| 72 | .113 | .149 |
| 73 | .101 | .133 |
| 74 | .099 | .130 |
| 75 | .092 | .121 |
| 76 | .073 | .097 |

Extraction Method: Principal Axis Factoring.

a. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.

| | | |
|---|---|---|
| | 1 | 2 |
| Q70 | .648 | |
| Q74 | .617 | |
| Q28 | .615 | |
| Q40 | .608 | |
| Q13 | .597 | |
| Q67 | .582 | |
| Q33 | .564 | |
| Q23 | .564 | |
| Q38 | .561 | -.342 |

| | | |
|---|---|---|
| Q27 | .560 | |
| Q29 | .559 | -.387 |
| Q55 | .558 | |
| Q5 | .555 | |
| Q7 | .555 | -.406 |
| Q26 | .544 | .396 |
| Q35 | .531 | |
| Q30 | .524 | |
| Q1 | .521 | |
| Q43 | .521 | |
| Q57 | .510 | |
| Q15 | .502 | -.355 |
| Q16 | .500 | |
| Q47 | .490 | -.325 |
| Q66 | .483 | |
| Q20 | .477 | |
| Q14 | .470 | |
| Q12 | .470 | |
| Q22 | .467 | |
| Q45 | .459 | |
| Q68 | .457 | |
| Q52 | .444 | |
| Q72 | .444 | |
| Q18 | .442 | |
| Q3 | .441 | |
| Q8 | .440 | |
| Q36 | .431 | .364 |
| Q63 | .424 | |
| Q62 | .422 | |
| Q71 | .421 | |
| Q39 | .417 | -.327 |
| Q59 | .404 | |
| Q11 | .402 | |
| Q21 | .400 | |
| Q6 | .383 | |
| Q48 | .364 | |
| Q65 | .350 | |
| Q54 | .343 | .336 |
| Q41 | .343 | |
| Q61 | .342 | -.317 |
| Q32 | | |
| Q60 | | |
| Q50 | | |
| Q76 | .356 | -.531 |
| Q19 | .323 | .481 |
| Q75 | | .476 |
| Q24 | | .474 |
| Q46 | .378 | .449 |
| Q51 | | .432 |
| Q64 | .317 | -.373 |
| Q69 | | -.372 |

| | | |
|---|---|---|
| Q34 | .324 | -.362 |
| Q37 | .334 | -.348 |
| Q56 | | -.345 |
| Q58 | | .327 |
| Q73 | | |
| Q2 | .394 | -.332 |
| Q25 | .418 | |
| Q17 | | -.331 |
| Q42 | | |
| Q4 | .414 | |
| Q10 | | |
| Q9 | | |
| Q44 | | |
| Q49 | .349 | |
| Q31 | | |
| Q53 | | |

Extraction Method: Principal Axis Factoring.
a. 23 factors extracted. 18 iterations required.

| | | |
|---|---|---|
| | 1 | 2 |
| Q74 | .680 | |
| Q40 | .481 | |
| Q28 | .350 | |
| Q55 | | |
| Q24 | | .666 |
| Q75 | | .590 |
| Q12 | | |
| Q7 | | |
| Q39 | | |
| Q2 | | |
| Q14 | | |
| Q29 | | |
| Q20 | | |
| Q25 | | |
| Q52 | | |
| Q37 | | |
| Q68 | | |
| Q4 | | |
| Q63 | | |
| Q43 | | |
| Q36 | | |
| Q22 | | |
| Q27 | | |
| Q46 | | |
| Q10 | | |
| Q9 | | |
| Q45 | | |
| Q67 | | |

| | | |
|---|---|---|
| Q56 | | |
| Q49 | | |
| Q5 | | |
| Q44 | | |
| Q31 | | |
| Q19 | | |
| Q18 | | |
| Q34 | | |
| Q61 | | |
| Q76 | | |
| Q21 | | |
| Q54 | | |
| Q6 | | |
| Q17 | | |
| Q35 | | |
| Q13 | | |
| Q30 | | |
| Q53 | | |
| Q65 | | |
| Q70 | | |
| Q51 | | |
| Q47 | | |
| Q69 | | |
| Q59 | | |
| Q71 | | |
| Q64 | | |
| Q42 | | |
| Q15 | | |
| Q66 | | |
| Q11 | | |
| Q16 | | |
| Q48 | | |
| Q38 | | |
| Q33 | | |
| Q41 | | |
| Q62 | | |
| Q8 | | |
| Q50 | | |
| Q72 | | |
| Q60 | | |
| Q73 | | |
| Q32 | | |
| Q23 | | |
| Q3 | | |
| Q1 | | |
| Q26 | | |
| Q57 | | |
| Q58 | | |

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.
a. Rotation converged in 80 iterations.

| | | |
|---|---|---|
| | 1 | 2 |
| Q74 | .771 | |
| Q40 | .642 | |
| Q28 | .548 | |
| Q55 | .499 | |
| Q67 | .428 | |
| Q27 | .407 | |
| Q57 | .388 | |
| Q24 | | .680 |
| Q75 | | .665 |
| Q54 | | .405 |
| Q7 | | |
| Q12 | .332 | |
| Q39 | | |
| Q2 | | |
| Q29 | | |
| Q14 | | |
| Q22 | | |
| Q66 | | |
| Q20 | | |
| Q25 | | |
| Q52 | | |
| Q37 | | |
| Q68 | | |
| Q4 | | |
| Q43 | | |
| Q63 | | |
| Q1 | | |
| Q36 | | .395 |
| Q46 | .335 | |
| Q10 | | |
| Q9 | | |
| Q45 | .457 | |
| Q49 | | |
| Q5 | .379 | |
| Q44 | | |
| Q58 | | |
| Q31 | | |
| Q19 | | .425 |
| Q18 | | |
| Q34 | | |
| Q76 | | |
| Q61 | | |
| Q56 | | |
| Q21 | | |
| Q6 | | |
| Q17 | | |

| | | |
|---|---|---|
| Q35 | .323 | |
| Q13 | | |
| Q30 | .410 | |
| Q53 | | |
| Q65 | | |
| Q70 | .429 | |
| Q51 | | |
| Q47 | | |
| Q69 | | |
| Q59 | | |
| Q71 | | |
| Q64 | | |
| Q42 | | |
| Q15 | | |
| Q11 | | |
| Q38 | | |
| Q33 | | |
| Q16 | | |
| Q48 | | |
| Q41 | | |
| Q62 | | |
| Q8 | | |
| Q50 | | |
| Q72 | | |
| Q60 | | |
| Q26 | | |
| Q73 | | |
| Q23 | .397 | |
| Q32 | | |
| Q3 | | |

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.

| Factor | 1 | 2 |
|---|---|---|
| 1 | 1.000 | .115 |
| 2 | .115 | 1.000 |
| 3 | .183 | -.007 |
| 4 | -.218 | .046 |
| 5 | -.216 | -.193 |
| 6 | -.004 | .057 |
| 7 | .121 | .164 |
| 8 | .127 | -.080 |
| 9 | .170 | .167 |
| 10 | .010 | -.172 |
| 11 | -.199 | -.025 |
| 12 | .144 | .111 |
| 13 | -.294 | .001 |
| 14 | .104 | .163 |
| 15 | -.209 | -.101 |
| 16 | .002 | -.162 |

| | | |
|---|---|---|
| 17 | .096 | -.121 |
| 18 | .149 | .026 |
| 19 | .208 | .143 |
| 20 | -.175 | -.160 |
| 21 | .206 | .152 |
| 22 | .278 | -.079 |
| 23 | -.066 | -.053 |

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.

```
FACTOR
  /VARIABLES Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12 Q13 Q14 Q15 Q16 Q17
    Q25 Q26 Q27 Q28 Q29 Q30 Q31 Q32 Q33 Q34 Q35 Q36 Q37 Q38 Q39 Q40 Q41
    Q50 Q51 Q52 Q53 Q54 Q55 Q56 Q57 Q58 Q59 Q60 Q61 Q62 Q63 Q64 Q65 Q66
    Q75 Q76
  /MISSING LISTWISE
  /ANALYSIS Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12 Q13 Q14 Q15 Q16 Q17
    Q25 Q26 Q27 Q28 Q29 Q30 Q31 Q32 Q33 Q34 Q35 Q36 Q37 Q38 Q39 Q40 Q41
    Q50 Q51 Q52 Q53 Q54 Q55 Q56 Q57 Q58 Q59 Q60 Q61 Q62 Q63 Q64 Q65 Q66
    Q75 Q76
  /PRINT INITIAL CORRELATION DET KMO EXTRACTION ROTATION
  /FORMAT SORT BLANK(.316)
  /CRITERIA MINEIGEN(1) ITERATE(500)
  /EXTRACTION PC
  /CRITERIA ITERATE(500)
  /ROTATION VARIMAX
  /METHOD=CORRELATION.
```

# Factor Analysis

**Notes**

| | | |
|---|---|---|
| Output Created | | 19-AUG-2016 13:47:15 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\Jordaan_T Data_Reversed.sav |
| | Active Dataset | DataSet1 |
| | Filter | <none> |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 204 |
| Missing Value Handling | Definition of Missing | MISSING=EXCLUDE: User-defined missing values are treated as missing. |
| | Cases Used | LISTWISE: Statistics are based on cases with no missing values for any variable used. |

| | | |
|---|---|---|
| Syntax | | FACTOR<br>/VARIABLES Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12 Q13 Q14 Q15 Q16 Q17 Q18 Q19 Q20 Q21 Q22 Q23 Q24<br>Q25 Q26 Q27 Q28 Q29 Q30 Q31 Q32 Q33 Q34 Q35 Q36 Q37 Q38 Q39 Q40 Q41 Q42 Q43 Q44 Q45 Q46 Q47 Q48 Q49<br>Q50 Q51 Q52 Q53 Q54 Q55 Q56 Q57 Q58 Q59 Q60 Q61 Q62 Q63 Q64 Q65 Q66 Q67 Q68 Q69 Q70 Q71 Q72 Q73 Q74<br>Q75 Q76<br>/MISSING LISTWISE<br>/ANALYSIS Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12 Q13 Q14 Q15 Q16 Q17 Q18 Q19 Q20 Q21 Q22 Q23 Q24<br>Q25 Q26 Q27 Q28 Q29 Q30 Q31 Q32 Q33 Q34 Q35 Q36 Q37 Q38 Q39 Q40 Q41 Q42 Q43 Q44 Q45 Q46 Q47 Q48 Q49<br>Q50 Q51 Q52 Q53 Q54 Q55 Q56 Q57 Q58 Q59 Q60 Q61 Q62 Q63 Q64 Q65 Q66 Q67 Q68 Q69 Q70 Q71 Q72 Q73 Q74<br>Q75 Q76<br>/PRINT INITIAL CORRELATION DET KMO EXTRACTION ROTATION<br>/FORMAT SORT BLANK(.316)<br>/CRITERIA MINEIGEN(1) ITERATE(500)<br>/EXTRACTION PC<br>/CRITERIA ITERATE(500)<br>/ROTATION VARIMAX<br>/METHOD=CORRELATION. |
| Resources | Processor Time | 00:00:00.14 |
| | Elapsed Time | 00:00:00.16 |
| | Maximum Memory Required | 644384 (629.281K) bytes |

| | | Q1 |
|---|---|---|
| Correlation | Q1 | 1.000 |
| | Q2 | .212 |
| | Q3 | .171 |
| | Q4 | .437 |
| | Q5 | .177 |
| | Q6 | .257 |
| | Q7 | .324 |
| | Q8 | .161 |
| | Q9 | .173 |
| | Q10 | -.078 |

| | |
|---|---|
| Q11 | .220 |
| Q12 | .128 |
| Q13 | .257 |
| Q14 | .420 |
| Q15 | .202 |
| Q16 | .347 |
| Q17 | .006 |
| Q18 | .159 |
| Q19 | .238 |
| Q20 | .185 |
| Q21 | .165 |
| Q22 | .293 |
| Q23 | .330 |
| Q24 | .088 |
| Q25 | .066 |
| Q26 | .343 |
| Q27 | .281 |
| Q28 | .330 |
| Q29 | .281 |
| Q30 | .243 |
| Q31 | .183 |
| Q32 | .317 |
| Q33 | .358 |
| Q34 | .168 |
| Q35 | .193 |
| Q36 | .240 |
| Q37 | .093 |
| Q38 | .338 |
| Q39 | .287 |
| Q40 | .352 |
| Q41 | .149 |
| Q42 | -.013 |
| Q43 | .467 |
| Q44 | .142 |
| Q45 | .256 |
| Q46 | .186 |
| Q47 | .258 |
| Q48 | .272 |
| Q49 | .152 |
| Q50 | -.002 |
| Q51 | .080 |
| Q52 | .047 |
| Q53 | .183 |
| Q54 | .173 |
| Q55 | .342 |
| Q56 | .065 |
| Q57 | .293 |
| Q58 | -.088 |
| Q59 | .073 |
| Q60 | .094 |
| Q61 | .314 |

| | | |
|---|---|---|
| | Q62 | .187 |
| | Q63 | .318 |
| | Q64 | .080 |
| | Q65 | .017 |
| | Q66 | .226 |
| | Q67 | .304 |
| | Q68 | .195 |
| | Q69 | .154 |
| | Q70 | .291 |
| | Q71 | .167 |
| | Q72 | .110 |
| | Q73 | .033 |
| | Q74 | .244 |
| | Q75 | .163 |
| | Q76 | .250 |

a. Determinant = 6.069E-20

**KMO and Bartlett's Test**

| | | |
|---|---|---|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | .776 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 6408.660 |
| | df | 2850 |
| | Sig. | .000 |

**Communalities**

| | Initial | Extraction |
|---|---|---|
| Q1 | 1.000 | .750 |
| Q2 | 1.000 | .716 |
| Q3 | 1.000 | .696 |
| Q4 | 1.000 | .747 |
| Q5 | 1.000 | .716 |
| Q6 | 1.000 | .725 |
| Q7 | 1.000 | .749 |
| Q8 | 1.000 | .736 |
| Q9 | 1.000 | .723 |
| Q10 | 1.000 | .715 |
| Q11 | 1.000 | .751 |
| Q12 | 1.000 | .754 |
| Q13 | 1.000 | .756 |
| Q14 | 1.000 | .682 |
| Q15 | 1.000 | .710 |
| Q16 | 1.000 | .677 |
| Q17 | 1.000 | .710 |
| Q18 | 1.000 | .642 |
| Q19 | 1.000 | .711 |
| Q20 | 1.000 | .752 |
| Q21 | 1.000 | .743 |
| Q22 | 1.000 | .692 |
| Q23 | 1.000 | .731 |
| Q24 | 1.000 | .774 |
| Q25 | 1.000 | .708 |

| | | |
|---|---|---|
| Q26 | 1.000 | .711 |
| Q27 | 1.000 | .594 |
| Q28 | 1.000 | .716 |
| Q29 | 1.000 | .624 |
| Q30 | 1.000 | .681 |
| Q31 | 1.000 | .692 |
| Q32 | 1.000 | .703 |
| Q33 | 1.000 | .716 |
| Q34 | 1.000 | .742 |
| Q35 | 1.000 | .779 |
| Q36 | 1.000 | .721 |
| Q37 | 1.000 | .690 |
| Q38 | 1.000 | .708 |
| Q39 | 1.000 | .687 |
| Q40 | 1.000 | .716 |
| Q41 | 1.000 | .697 |
| Q42 | 1.000 | .688 |
| Q43 | 1.000 | .741 |
| Q44 | 1.000 | .627 |
| Q45 | 1.000 | .750 |
| Q46 | 1.000 | .642 |
| Q47 | 1.000 | .695 |
| Q48 | 1.000 | .700 |
| Q49 | 1.000 | .779 |
| Q50 | 1.000 | .729 |
| Q51 | 1.000 | .746 |
| Q52 | 1.000 | .682 |
| Q53 | 1.000 | .827 |
| Q54 | 1.000 | .719 |
| Q55 | 1.000 | .680 |
| Q56 | 1.000 | .684 |
| Q57 | 1.000 | .668 |
| Q58 | 1.000 | .656 |
| Q59 | 1.000 | .717 |
| Q60 | 1.000 | .712 |
| Q61 | 1.000 | .668 |
| Q62 | 1.000 | .630 |
| Q63 | 1.000 | .692 |
| Q64 | 1.000 | .718 |
| Q65 | 1.000 | .756 |
| Q66 | 1.000 | .675 |
| Q67 | 1.000 | .659 |
| Q68 | 1.000 | .699 |
| Q69 | 1.000 | .737 |
| Q70 | 1.000 | .729 |
| Q71 | 1.000 | .720 |
| Q72 | 1.000 | .652 |
| Q73 | 1.000 | .666 |
| Q74 | 1.000 | .766 |
| Q75 | 1.000 | .721 |
| Q76 | 1.000 | .760 |

Extraction Method: Principal Component Analysis.

**To**

| Component | Initial Eigenvalues | |
|---|---|---|
| | Total | % of Variance |
| 1 | 14.361 | 18.896 |
| 2 | 5.955 | 7.836 |
| 3 | 3.156 | 4.152 |
| 4 | 2.769 | 3.644 |
| 5 | 2.126 | 2.797 |
| 6 | 2.061 | 2.711 |
| 7 | 1.915 | 2.520 |
| 8 | 1.838 | 2.419 |
| 9 | 1.762 | 2.318 |
| 10 | 1.615 | 2.124 |
| 11 | 1.517 | 1.996 |
| 12 | 1.476 | 1.943 |
| 13 | 1.437 | 1.891 |
| 14 | 1.396 | 1.837 |
| 15 | 1.355 | 1.783 |
| 16 | 1.288 | 1.694 |
| 17 | 1.259 | 1.657 |
| 18 | 1.221 | 1.607 |
| 19 | 1.177 | 1.549 |
| 20 | 1.128 | 1.484 |
| 21 | 1.063 | 1.398 |
| 22 | 1.042 | 1.371 |
| 23 | 1.018 | 1.339 |
| 24 | .987 | 1.299 |
| 25 | .930 | 1.223 |
| 26 | .895 | 1.178 |
| 27 | .843 | 1.109 |
| 28 | .815 | 1.072 |
| 29 | .803 | 1.057 |
| 30 | .773 | 1.017 |
| 31 | .763 | 1.004 |
| 32 | .714 | .939 |
| 33 | .673 | .886 |
| 34 | .648 | .853 |
| 35 | .619 | .814 |
| 36 | .602 | .791 |
| 37 | .588 | .774 |
| 38 | .569 | .749 |
| 39 | .552 | .726 |
| 40 | .534 | .703 |
| 41 | .523 | .688 |
| 42 | .502 | .660 |
| 43 | .471 | .619 |
| 44 | .461 | .606 |
| 45 | .445 | .586 |

| | | |
|---|---|---|
| 46 | .434 | .571 |
| 47 | .412 | .542 |
| 48 | .398 | .523 |
| 49 | .382 | .503 |
| 50 | .369 | .486 |
| 51 | .354 | .466 |
| 52 | .344 | .453 |
| 53 | .335 | .441 |
| 54 | .319 | .420 |
| 55 | .297 | .391 |
| 56 | .292 | .384 |
| 57 | .272 | .358 |
| 58 | .262 | .345 |
| 59 | .246 | .324 |
| 60 | .236 | .311 |
| 61 | .233 | .306 |
| 62 | .220 | .289 |
| 63 | .213 | .280 |
| 64 | .204 | .269 |
| 65 | .177 | .233 |
| 66 | .170 | .224 |
| 67 | .167 | .220 |
| 68 | .148 | .195 |
| 69 | .138 | .182 |
| 70 | .128 | .169 |
| 71 | .125 | .165 |
| 72 | .113 | .149 |
| 73 | .101 | .133 |
| 74 | .099 | .130 |
| 75 | .092 | .121 |
| 76 | .073 | .097 |

Extraction Method: Principal Component Analysis.

| | | |
|---|---|---|
| | 1 | 2 |
| Q70 | .654 | |
| Q74 | .621 | |
| Q28 | .621 | |
| Q40 | .616 | |
| Q13 | .600 | |
| Q67 | .592 | |
| Q27 | .572 | |
| Q33 | .569 | |
| Q23 | .569 | |
| Q29 | .568 | -.403 |
| Q38 | .567 | -.351 |
| Q55 | .566 | |
| Q5 | .562 | |
| Q7 | .558 | -.411 |

| | | |
|---|---|---|
| Q26 | .550 | .404 |
| Q30 | .533 | |
| Q35 | .531 | |
| Q1 | .526 | |
| Q43 | .525 | |
| Q57 | .520 | |
| Q15 | .508 | -.366 |
| Q16 | .507 | |
| Q47 | .497 | -.337 |
| Q66 | .494 | |
| Q20 | .482 | |
| Q14 | .477 | |
| Q22 | .476 | |
| Q12 | .474 | |
| Q68 | .464 | |
| Q45 | .464 | |
| Q18 | .454 | |
| Q52 | .453 | |
| Q72 | .452 | |
| Q3 | .448 | |
| Q8 | .446 | |
| Q36 | .436 | .371 |
| Q63 | .432 | |
| Q71 | .428 | |
| Q59 | .412 | |
| Q11 | .404 | |
| Q6 | .389 | |
| Q48 | .373 | |
| Q65 | .354 | |
| Q41 | .351 | |
| Q76 | .358 | -.540 |
| Q19 | .328 | .495 |
| Q24 | | .491 |
| Q75 | | .488 |
| Q46 | .385 | .467 |
| Q51 | | .445 |
| Q69 | | -.390 |
| Q34 | .329 | -.378 |
| Q56 | | -.370 |
| Q37 | .341 | -.366 |
| Q58 | | .353 |
| Q54 | .350 | .350 |
| Q73 | | |
| Q2 | .398 | -.342 |
| Q39 | .423 | -.340 |
| Q25 | .425 | |
| Q64 | .321 | -.386 |
| Q17 | | -.347 |
| Q42 | | |
| Q4 | .419 | |
| Q32 | .317 | |

| | | |
|---|---|---|
| Q10 | | |
| Q62 | .431 | |
| Q9 | | |
| Q44 | | |
| Q49 | .351 | |
| Q31 | | |
| Q61 | .350 | -.335 |
| Q50 | | |
| Q21 | .406 | |
| Q53 | | |
| Q60 | | |

Extraction Method: Principal Component Analysis.

a. 23 components extracted.

| | 1 | 2 |
|---|---|---|
| Q13 | .785 | |
| Q35 | .735 | |
| Q11 | .589 | |
| Q28 | .563 | |
| Q33 | .556 | |
| Q38 | .529 | .461 |
| Q55 | .519 | |
| Q30 | .519 | |
| Q16 | .450 | |
| Q27 | .398 | |
| Q26 | .397 | |
| Q67 | .391 | |
| Q2 | | .723 |
| Q39 | | .712 |
| Q7 | | .665 |
| Q12 | | .621 |
| Q29 | | .564 |
| Q14 | | .548 |
| Q76 | | .541 |
| Q47 | | .475 |
| Q69 | | .420 |
| Q22 | .385 | .406 |
| Q20 | | .385 |
| Q4 | | |
| Q63 | | |
| Q43 | | |
| Q1 | | |
| Q36 | | |
| Q46 | | |
| Q65 | | |
| Q25 | | |
| Q68 | | |
| Q52 | | .376 |

| | | |
|---|---|---|
| Q70 | | |
| Q71 | | |
| Q64 | | |
| Q42 | | |
| Q15 | | .371 |
| Q9 | | |
| Q45 | | |
| Q41 | | |
| Q62 | | |
| Q8 | | |
| Q37 | | |
| Q59 | | |
| Q5 | | |
| Q49 | | |
| Q32 | | |
| Q23 | .476 | |
| Q3 | .373 | |
| Q31 | | |
| Q18 | | |
| Q19 | | |
| Q6 | | |
| Q48 | | |
| Q17 | | |
| Q34 | | |
| Q61 | | |
| Q44 | | |
| Q56 | | |
| Q74 | | |
| Q40 | | |
| Q24 | | |
| Q75 | | |
| Q10 | | |
| Q58 | | |
| Q72 | .373 | |
| Q66 | .377 | |
| Q51 | | |
| Q21 | | |
| Q54 | | |
| Q50 | | |
| Q60 | | |
| Q57 | | |
| Q53 | | |
| Q73 | | |

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 44 iterations.

| Component | 1 | 2 |
|---|---|---|
| 1 | .528 | .430 |
| 2 | -.039 | -.497 |

| | | |
|---|---|---|
| 3 | -.662 | .470 |
| 4 | .130 | .141 |
| 5 | .040 | .125 |
| 6 | -.066 | -.096 |
| 7 | -.210 | -.061 |
| 8 | .008 | -.055 |
| 9 | -.113 | .129 |
| 10 | .039 | -.136 |
| 11 | .052 | -.129 |
| 12 | .009 | -.189 |
| 13 | -.145 | .150 |
| 14 | .065 | -.114 |
| 15 | -.164 | -.146 |
| 16 | -.119 | -.184 |
| 17 | -.142 | -.024 |
| 18 | .004 | .096 |
| 19 | -.198 | -.095 |
| 20 | -.006 | .068 |
| 21 | -.188 | .184 |
| 22 | .056 | .062 |
| 23 | -.184 | -.237 |

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

7 Q18 Q19 Q20 Q21 Q22 Q23 Q24
1 Q42 Q43 Q44 Q45 Q46 Q47 Q48 Q49
5 Q67 Q68 Q69 Q70 Q71 Q72 Q73 Q74

Q18 Q19 Q20 Q21 Q22 Q23 Q24
1 Q42 Q43 Q44 Q45 Q46 Q47 Q48 Q49
5 Q67 Q68 Q69 Q70 Q71 Q72 Q73 Q74

| Q2 | Q3 | Q4 | Q5 | Q6 | Q7 |
|---|---|---|---|---|---|
| .212 | .171 | .437 | .177 | .257 | .324 |
| 1.000 | -.015 | .144 | .279 | .277 | .418 |
| -.015 | 1.000 | .138 | .236 | .082 | .165 |
| .144 | .138 | 1.000 | .135 | .092 | .157 |
| .279 | .236 | .135 | 1.000 | .031 | .462 |
| .277 | .082 | .092 | .031 | 1.000 | .191 |
| .418 | .165 | .157 | .462 | .191 | 1.000 |
| .099 | .184 | .230 | .226 | .066 | .159 |
| .140 | .194 | .091 | .112 | .077 | .079 |

| | | | | | |
|---|---|---|---|---|---|
| -.009 | .178 | .100 | .207 | .062 | .137 |
| .091 | .150 | .059 | .365 | .129 | .325 |
| .371 | .092 | .047 | .303 | .184 | .536 |
| .041 | .383 | .132 | .375 | .260 | .231 |
| .341 | .078 | .300 | .243 | .283 | .405 |
| .414 | .165 | .099 | .309 | .153 | .388 |
| .188 | .185 | .160 | .167 | .322 | .254 |
| .296 | -.025 | -.041 | .160 | .286 | .214 |
| .078 | .189 | .237 | .185 | .212 | .168 |
| .101 | .043 | .271 | .062 | .126 | .069 |
| .180 | .275 | .177 | .334 | .147 | .531 |
| .053 | .253 | .133 | .203 | .070 | .201 |
| .261 | .092 | .268 | .256 | .187 | .454 |
| .127 | .553 | .146 | .358 | .205 | .239 |
| -.054 | -.079 | .026 | -.111 | .071 | -.071 |
| .050 | .234 | .254 | .168 | .094 | .162 |
| .014 | .311 | .375 | .151 | .217 | .158 |
| .146 | .242 | .342 | .352 | .334 | .220 |
| .069 | .429 | .214 | .382 | .196 | .276 |
| .493 | .176 | .181 | .332 | .302 | .445 |
| -.046 | .285 | .263 | .248 | .128 | .105 |
| .027 | .096 | .149 | .157 | .140 | .141 |
| .107 | .303 | .184 | .355 | .064 | .187 |
| .175 | .305 | .205 | .375 | .168 | .311 |
| .286 | .126 | .105 | .163 | .121 | .282 |
| .044 | .286 | .106 | .343 | .145 | .199 |
| .118 | .011 | .341 | .091 | .191 | .094 |
| .102 | .149 | .020 | .386 | .143 | .315 |
| .308 | .259 | .176 | .358 | .179 | .411 |
| .531 | .016 | .154 | .232 | .179 | .459 |
| .146 | .303 | .230 | .310 | .262 | .220 |
| .147 | .093 | .195 | .196 | .065 | .092 |
| .134 | .182 | .126 | .103 | .161 | .172 |
| .169 | .171 | .464 | .212 | .220 | .203 |
| .054 | .139 | -.013 | .212 | .070 | .241 |
| .150 | .326 | .197 | .117 | .064 | .070 |
| .012 | .220 | .280 | .122 | .091 | .046 |
| .302 | .144 | .085 | .509 | .116 | .311 |
| .029 | .069 | .140 | .099 | .260 | .115 |
| .131 | .129 | .032 | .443 | .051 | .227 |
| .099 | .022 | .171 | .099 | .078 | .053 |
| .047 | .111 | .164 | .078 | .197 | .129 |
| .298 | .303 | .051 | .281 | .073 | .335 |
| .001 | -.015 | .158 | -.040 | .196 | -.028 |
| .143 | .054 | .146 | .112 | .180 | .082 |
| .018 | .327 | .197 | .292 | .181 | .247 |
| .116 | .041 | -.046 | .073 | -.164 | .172 |
| .084 | .258 | .337 | .206 | .283 | .277 |
| -.177 | -.036 | -.054 | -.114 | .051 | -.204 |
| .232 | .101 | .103 | .352 | .079 | .242 |
| .116 | .077 | .003 | .142 | .177 | .010 |

| | | | | | |
|---|---|---|---|---|---|
| .231 | .192 | .173 | .212 | .107 | .347 |
| .231 | .154 | .187 | .120 | .221 | .124 |
| .108 | .105 | .486 | .227 | .035 | .215 |
| .191 | .132 | .034 | .234 | .082 | .238 |
| .020 | .194 | .112 | -.006 | .091 | .087 |
| .327 | .266 | .127 | .275 | .207 | .385 |
| .211 | .334 | .147 | .207 | .170 | .157 |
| .114 | .135 | .180 | .296 | .129 | .290 |
| .283 | .090 | -.027 | .150 | .122 | .251 |
| .337 | .234 | .282 | .330 | .228 | .257 |
| .203 | .211 | .092 | .220 | .151 | .289 |
| .109 | .196 | .107 | .152 | .249 | .118 |
| .014 | .099 | .058 | .009 | .000 | -.073 |
| .192 | .205 | .218 | .341 | .278 | .280 |
| -.004 | -.123 | .149 | .017 | .204 | -.070 |
| .400 | .138 | .145 | .361 | .145 | .443 |

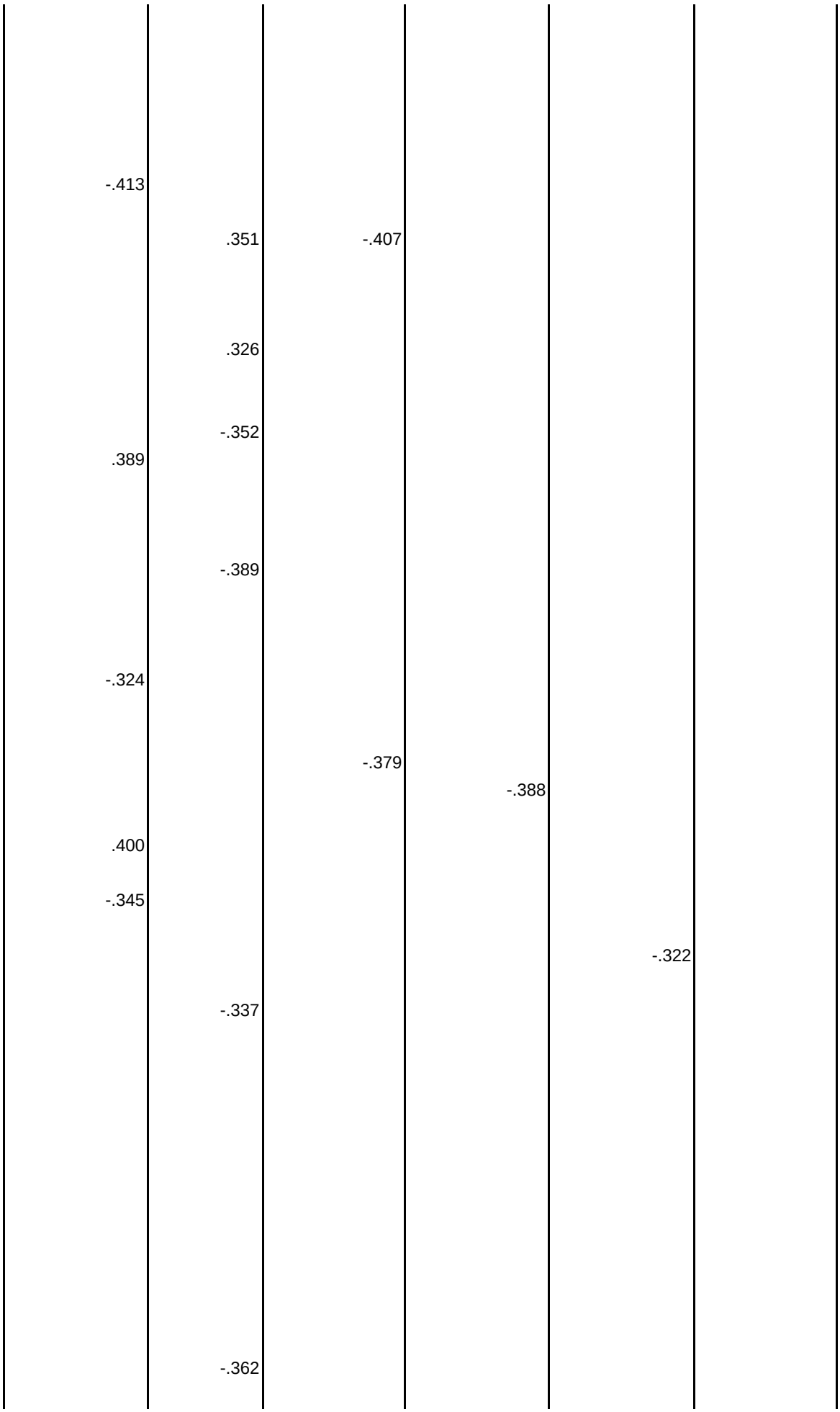
**ıined**

| | Extraction Sums of Squared Loadings | | | Rotation Sums of Squared Loadings[a] |
|---|---|---|---|---|
| Cumulative % | Total | % of Variance | Cumulative % | Total |
| 18.896 | 13.972 | 18.384 | 18.384 | 5.874 |
| 26.731 | 5.541 | 7.291 | 25.675 | 2.959 |
| 30.884 | 2.786 | 3.666 | 29.341 | 5.337 |
| 34.528 | 2.364 | 3.110 | 32.452 | 3.533 |
| 37.325 | 1.705 | 2.244 | 34.695 | 5.201 |
| 40.037 | 1.625 | 2.138 | 36.833 | 1.282 |
| 42.556 | 1.488 | 1.958 | 38.791 | 2.598 |
| 44.975 | 1.432 | 1.885 | 40.676 | 2.998 |
| 47.293 | 1.337 | 1.759 | 42.435 | 3.156 |
| 49.418 | 1.189 | 1.564 | 43.999 | 3.374 |
| 51.413 | 1.112 | 1.463 | 45.462 | 2.619 |
| 53.356 | 1.050 | 1.381 | 46.843 | 3.449 |
| 55.247 | 1.038 | 1.366 | 48.209 | 5.129 |
| 57.084 | .990 | 1.303 | 49.511 | 1.762 |
| 58.867 | .931 | 1.225 | 50.737 | 3.278 |
| 60.562 | .865 | 1.139 | 51.876 | 2.745 |
| 62.218 | .839 | 1.104 | 52.980 | 3.425 |
| 63.825 | .795 | 1.046 | 54.026 | 3.559 |
| 65.374 | .751 | .989 | 55.014 | 3.297 |
| 66.858 | .698 | .919 | 55.933 | 2.470 |
| 68.257 | .635 | .836 | 56.770 | 3.342 |
| 69.628 | .622 | .818 | 57.587 | 4.314 |
| 70.967 | .601 | .791 | 58.378 | 1.463 |
| 72.266 | | | | |
| 73.489 | | | | |
| 74.667 | | | | |
| 75.776 | | | | |
| 76.849 | | | | |
| 77.905 | | | | |
| 78.922 | | | | |
| 79.927 | | | | |
| 80.866 | | | | |
| 81.752 | | | | |
| 82.604 | | | | |
| 83.419 | | | | |
| 84.210 | | | | |
| 84.984 | | | | |
| 85.733 | | | | |
| 86.459 | | | | |
| 87.162 | | | | |
| 87.850 | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 88.510 | | | | | |
| 89.129 | | | | | |
| 89.735 | | | | | |
| 90.321 | | | | | |
| 90.892 | | | | | |
| 91.434 | | | | | |
| 91.958 | | | | | |
| 92.461 | | | | | |
| 92.946 | | | | | |
| 93.412 | | | | | |
| 93.865 | | | | | |
| 94.306 | | | | | |
| 94.726 | | | | | |
| 95.117 | | | | | |
| 95.502 | | | | | |
| 95.860 | | | | | |
| 96.205 | | | | | |
| 96.529 | | | | | |
| 96.839 | | | | | |
| 97.146 | | | | | |
| 97.435 | | | | | |
| 97.714 | | | | | |
| 97.983 | | | | | |
| 98.216 | | | | | |
| 98.440 | | | | | |
| 98.660 | | | | | |
| 98.855 | | | | | |
| 99.037 | | | | | |
| 99.206 | | | | | |
| 99.371 | | | | | |
| 99.519 | | | | | |
| 99.652 | | | | | |
| 99.782 | | | | | |
| 99.903 | | | | | |
| 100.000 | | | | | |

**Factor Matı**

| 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|
| -.395 | | | | | |
| -.482 | | | | | |
| -.355 | | | | | |
| -.348 | | | | | |


-.413
.351
-.407
.326
-.352
.389
-.389
-.324
-.379
-.388
.400
-.345
-.322
-.337
-.362

| | | | | | |
|---|---|---|---|---|---|
| .419 | | | | | |
| | -.424 | | | | |
| | .350 | | | | |
| | | -.470 | | | |
| | | | .460 | | |
| | | | | .408 | |
| | | | | .373 | .409 |
| | | | -.353 | | |

**Pattern Mat**

| 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|
| .668 | | | | | |
| .580 | | | | | |
| .388 | | | | | |
| .361 | | | | | |
| .339 | | | | | |
| | -.606 | | | | |
| | -.456 | | | | |
| | -.399 | | | | |
| | -.359 | | | | |
| | | -.705 | | | |
| | | -.659 | | | |
| | | -.635 | | | |
| | | -.353 | | | |
| | | | .537 | | |
| | | | | .668 | |
| | | | | .436 | |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | .795 |
| | | | | | .439 |
| | | | | | .321 |
| | | -.369 | | | |
| | | | | | |

**Structure Ma**

| 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|
| | | -.361 | | | |
| | | | | .363 | |
| | | -.403 | | | |
| | | -.326 | | | |
| .723 | -.378 | | | | .335 |
| .713 | | | | | |
| .567 | | | | | |
| .554 | | | | | |
| .531 | | | | | |
| .486 | | -.447 | | | |
| .424 | | -.353 | | | |
| .377 | | | | | |
| .397 | -.677 | | | | |
| | -.564 | | | | |
| .333 | -.501 | | | | |
| | -.456 | | | | |
| | -.432 | | | | |
| | | -.723 | | | |
| | | -.715 | | .350 | |
| | | -.678 | | | |
| .350 | | -.534 | | | |
| | | -.510 | | .404 | |
| | | -.398 | | .317 | |
| | | | .569 | | |
| | | | | .702 | |
| | | | | .508 | |
| | | | | | .804 |
| .329 | -.325 | | | | .547 |
| | | | | | .391 |
| | | -.385 | | | |
| .378 | | | | | |
| .325 | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | | -.391 | | | |
| .408 | | | | | .403 |
| | -.345 | | | | |
| .467 | | | | | |
| | | | | | .340 |
| .435 | | | | | |
| | | | | | .318 |
| | | -.402 | | | |
| | | | | | |

**Factor Correlatic**

| 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|
| .183 | -.218 | -.216 | -.004 | .121 | .127 |
| -.007 | .046 | -.193 | .057 | .164 | -.080 |
| 1.000 | -.183 | -.200 | -.036 | .066 | .243 |
| -.183 | 1.000 | .153 | -.028 | -.010 | -.074 |
| -.200 | .153 | 1.000 | .033 | -.160 | -.050 |
| -.036 | -.028 | .033 | 1.000 | .073 | .030 |
| .066 | -.010 | -.160 | .073 | 1.000 | .064 |
| .243 | -.074 | -.050 | .030 | .064 | 1.000 |
| .048 | -.177 | -.200 | .070 | .129 | .023 |
| .283 | -.031 | -.045 | -.027 | .022 | .163 |
| -.024 | .056 | .049 | -.035 | -.011 | -.083 |
| .232 | -.056 | -.179 | .028 | .120 | .061 |
| -.107 | .160 | .169 | -.042 | -.077 | -.093 |
| -.008 | -.044 | -.126 | -.075 | -.019 | .042 |
| -.140 | .127 | .157 | -.001 | -.138 | -.037 |
| .239 | -.062 | .001 | -.055 | .020 | .167 |

| | | | | | |
|---|---|---|---|---|---|
| .220 | -.240 | -.091 | -.025 | .017 | .109 |
| .168 | -.004 | -.139 | .076 | .082 | .159 |
| .130 | -.099 | -.147 | -.053 | .118 | .037 |
| -.040 | .104 | .107 | -.030 | -.066 | .005 |
| .062 | -.060 | -.129 | -.003 | .077 | .028 |
| .138 | -.152 | -.152 | .024 | .014 | .124 |
| .043 | .008 | .089 | .033 | -.071 | -.001 |

7 Q18 Q19 Q20 Q21 Q22 Q23 Q24
1 Q42 Q43 Q44 Q45 Q46 Q47 Q48 Q49
5 Q67 Q68 Q69 Q70 Q71 Q72 Q73 Q74

Q18 Q19 Q20 Q21 Q22 Q23 Q24
1 Q42 Q43 Q44 Q45 Q46 Q47 Q48 Q49
5 Q67 Q68 Q69 Q70 Q71 Q72 Q73 Q74

| Q2 | Q3 | Q4 | Q5 | Q6 | Q7 |
|---|---|---|---|---|---|
| .212 | .171 | .437 | .177 | .257 | .324 |
| 1.000 | -.015 | .144 | .279 | .277 | .418 |
| -.015 | 1.000 | .138 | .236 | .082 | .165 |
| .144 | .138 | 1.000 | .135 | .092 | .157 |
| .279 | .236 | .135 | 1.000 | .031 | .462 |
| .277 | .082 | .092 | .031 | 1.000 | .191 |
| .418 | .165 | .157 | .462 | .191 | 1.000 |
| .099 | .184 | .230 | .226 | .066 | .159 |
| .140 | .194 | .091 | .112 | .077 | .079 |
| -.009 | .178 | .100 | .207 | .062 | .137 |

| | | | | | |
|---|---|---|---|---|---|
| .091 | .150 | .059 | .365 | .129 | .325 |
| .371 | .092 | .047 | .303 | .184 | .536 |
| .041 | .383 | .132 | .375 | .260 | .231 |
| .341 | .078 | .300 | .243 | .283 | .405 |
| .414 | .165 | .099 | .309 | .153 | .388 |
| .188 | .185 | .160 | .167 | .322 | .254 |
| .296 | -.025 | -.041 | .160 | .286 | .214 |
| .078 | .189 | .237 | .185 | .212 | .168 |
| .101 | .043 | .271 | .062 | .126 | .069 |
| .180 | .275 | .177 | .334 | .147 | .531 |
| .053 | .253 | .133 | .203 | .070 | .201 |
| .261 | .092 | .268 | .256 | .187 | .454 |
| .127 | .553 | .146 | .358 | .205 | .239 |
| -.054 | -.079 | .026 | -.111 | .071 | -.071 |
| .050 | .234 | .254 | .168 | .094 | .162 |
| .014 | .311 | .375 | .151 | .217 | .158 |
| .146 | .242 | .342 | .352 | .334 | .220 |
| .069 | .429 | .214 | .382 | .196 | .276 |
| .493 | .176 | .181 | .332 | .302 | .445 |
| -.046 | .285 | .263 | .248 | .128 | .105 |
| .027 | .096 | .149 | .157 | .140 | .141 |
| .107 | .303 | .184 | .355 | .064 | .187 |
| .175 | .305 | .205 | .375 | .168 | .311 |
| .286 | .126 | .105 | .163 | .121 | .282 |
| .044 | .286 | .106 | .343 | .145 | .199 |
| .118 | .011 | .341 | .091 | .191 | .094 |
| .102 | .149 | .020 | .386 | .143 | .315 |
| .308 | .259 | .176 | .358 | .179 | .411 |
| .531 | .016 | .154 | .232 | .179 | .459 |
| .146 | .303 | .230 | .310 | .262 | .220 |
| .147 | .093 | .195 | .196 | .065 | .092 |
| .134 | .182 | .126 | .103 | .161 | .172 |
| .169 | .171 | .464 | .212 | .220 | .203 |
| .054 | .139 | -.013 | .212 | .070 | .241 |
| .150 | .326 | .197 | .117 | .064 | .070 |
| .012 | .220 | .280 | .122 | .091 | .046 |
| .302 | .144 | .085 | .509 | .116 | .311 |
| .029 | .069 | .140 | .099 | .260 | .115 |
| .131 | .129 | .032 | .443 | .051 | .227 |
| .099 | .022 | .171 | .099 | .078 | .053 |
| .047 | .111 | .164 | .078 | .197 | .129 |
| .298 | .303 | .051 | .281 | .073 | .335 |
| .001 | -.015 | .158 | -.040 | .196 | -.028 |
| .143 | .054 | .146 | .112 | .180 | .082 |
| .018 | .327 | .197 | .292 | .181 | .247 |
| .116 | .041 | -.046 | .073 | -.164 | .172 |
| .084 | .258 | .337 | .206 | .283 | .277 |
| -.177 | -.036 | -.054 | -.114 | .051 | -.204 |
| .232 | .101 | .103 | .352 | .079 | .242 |
| .116 | .077 | .003 | .142 | .177 | .010 |
| .231 | .192 | .173 | .212 | .107 | .347 |

| | | | | | |
|---|---|---|---|---|---|
| .231 | .154 | .187 | .120 | .221 | .124 |
| .108 | .105 | .486 | .227 | .035 | .215 |
| .191 | .132 | .034 | .234 | .082 | .238 |
| .020 | .194 | .112 | -.006 | .091 | .087 |
| .327 | .266 | .127 | .275 | .207 | .385 |
| .211 | .334 | .147 | .207 | .170 | .157 |
| .114 | .135 | .180 | .296 | .129 | .290 |
| .283 | .090 | -.027 | .150 | .122 | .251 |
| .337 | .234 | .282 | .330 | .228 | .257 |
| .203 | .211 | .092 | .220 | .151 | .289 |
| .109 | .196 | .107 | .152 | .249 | .118 |
| .014 | .099 | .058 | .009 | .000 | -.073 |
| .192 | .205 | .218 | .341 | .278 | .280 |
| -.004 | -.123 | .149 | .017 | .204 | -.070 |
| .400 | .138 | .145 | .361 | .145 | .443 |

**tal Variance Explained**

| | Extraction Sums of Squared Loadings | | | Rotation Sums of Squared L | |
|---|---|---|---|---|---|
| Cumulative % | Total | % of Variance | Cumulative % | Total | % of Variance |
| 18.896 | 14.361 | 18.896 | 18.896 | 5.799 | 7.630 |
| 26.731 | 5.955 | 7.836 | 26.731 | 5.331 | 7.015 |
| 30.884 | 3.156 | 4.152 | 30.884 | 3.714 | 4.887 |
| 34.528 | 2.769 | 3.644 | 34.528 | 2.923 | 3.847 |
| 37.325 | 2.126 | 2.797 | 37.325 | 2.355 | 3.098 |
| 40.037 | 2.061 | 2.711 | 40.037 | 2.352 | 3.095 |
| 42.556 | 1.915 | 2.520 | 42.556 | 2.229 | 2.932 |
| 44.975 | 1.838 | 2.419 | 44.975 | 2.150 | 2.829 |
| 47.293 | 1.762 | 2.318 | 47.293 | 2.148 | 2.827 |
| 49.418 | 1.615 | 2.124 | 49.418 | 2.071 | 2.725 |
| 51.413 | 1.517 | 1.996 | 51.413 | 1.959 | 2.578 |
| 53.356 | 1.476 | 1.943 | 53.356 | 1.936 | 2.548 |
| 55.247 | 1.437 | 1.891 | 55.247 | 1.887 | 2.482 |
| 57.084 | 1.396 | 1.837 | 57.084 | 1.855 | 2.441 |
| 58.867 | 1.355 | 1.783 | 58.867 | 1.841 | 2.422 |
| 60.562 | 1.288 | 1.694 | 60.562 | 1.791 | 2.356 |
| 62.218 | 1.259 | 1.657 | 62.218 | 1.764 | 2.321 |
| 63.825 | 1.221 | 1.607 | 63.825 | 1.747 | 2.298 |
| 65.374 | 1.177 | 1.549 | 65.374 | 1.716 | 2.257 |
| 66.858 | 1.128 | 1.484 | 66.858 | 1.709 | 2.248 |
| 68.257 | 1.063 | 1.398 | 68.257 | 1.697 | 2.233 |
| 69.628 | 1.042 | 1.371 | 69.628 | 1.577 | 2.075 |
| 70.967 | 1.018 | 1.339 | 70.967 | 1.385 | 1.823 |
| 72.266 | | | | | |
| 73.489 | | | | | |
| 74.667 | | | | | |
| 75.776 | | | | | |
| 76.849 | | | | | |
| 77.905 | | | | | |
| 78.922 | | | | | |
| 79.927 | | | | | |
| 80.866 | | | | | |
| 81.752 | | | | | |
| 82.604 | | | | | |
| 83.419 | | | | | |
| 84.210 | | | | | |
| 84.984 | | | | | |
| 85.733 | | | | | |
| 86.459 | | | | | |
| 87.162 | | | | | |
| 87.850 | | | | | |
| 88.510 | | | | | |
| 89.129 | | | | | |
| 89.735 | | | | | |
| 90.321 | | | | | |

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|---|---|---|---|---|---|
| 90.892 | | | | | |
| 91.434 | | | | | |
| 91.958 | | | | | |
| 92.461 | | | | | |
| 92.946 | | | | | |
| 93.412 | | | | | |
| 93.865 | | | | | |
| 94.306 | | | | | |
| 94.726 | | | | | |
| 95.117 | | | | | |
| 95.502 | | | | | |
| 95.860 | | | | | |
| 96.205 | | | | | |
| 96.529 | | | | | |
| 96.839 | | | | | |
| 97.146 | | | | | |
| 97.435 | | | | | |
| 97.714 | | | | | |
| 97.983 | | | | | |
| 98.216 | | | | | |
| 98.440 | | | | | |
| 98.660 | | | | | |
| 98.855 | | | | | |
| 99.037 | | | | | |
| 99.206 | | | | | |
| 99.371 | | | | | |
| 99.519 | | | | | |
| 99.652 | | | | | |
| 99.782 | | | | | |
| 99.903 | | | | | |
| 100.000 | | | | | |

**Component M**

| 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|
| -.419 | | | | | |
| -.493 | | | | | |
| -.376 | | | | | |
| -.369 | | | | | |
| -.318 | | | | | |

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|---|---|---|---|---|---|---|
| -.408 | | | | | | |
| | .356 | -.436 | | | | |
| | .360 | | | | | |
| | -.368 | | | | | |
| .419 | | | | | | |
| | | | | | -.367 | |
| | -.422 | | | | | |
| | | | | | .345 | |
| | | .327 | | | -.318 | |
| -.358 | | | | | | |
| | .324 | | | | | |
| | | -.429 | | | | |
| -.355 | | | | | | |
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| | -.347 | | | | | |
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| | | | | -.322 | | |
| .443 | | | | | | |
| .432 | | | | | | |
| | -.456 | | | | | |
| | -.394 | | | | | |
| | .393 | | | | | |
| | -.364 | | | | | -.353 |
| | | -.510 | | | | |
| | | -.326 | | | | |

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|---|---|---|---|---|---|
| | | | .549 | | |
| | | | -.461 | | |
| | | | | .435 | |
| | | | | .356 | |
| | | | | .360 | .425 |
| | | | | | |
| | | | | | -.369 |
| | | | -.334 | | |
| | | | | | |

**Rotated Compone**

| 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|
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| .346 | | | | | |
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| .382 | | | | | |
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| | | | | | .356 |
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| | .316 | | | | |
| .765 | | | | | |
| .716 | | | | | |
| .705 | | | | | |
| .505 | | | | | |
| .481 | | | | | |
| .383 | | | .372 | | |
| | .772 | | | | |
| | .683 | | | | |
| | .526 | | | | |
| | .456 | | | | |

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|---|---|---|---|---|---|
| | .439 | | | .332 | |
| | | .696 | | | |
| | | .635 | | | |
| | | .595 | | | |
| | | .443 | | | |
| | | | .693 | | |
| | | | .612 | | |
| | | | | .755 | |
| | | | | .526 | |
| | | | | .476 | |
| | | | | | .600 |
| | | | | | .557 |
| | | | | | .555 |
| | | | | | .490 |
| | | | .350 | | |
| .366 | | | | | |
| | | | | -.339 | |
| | | | | | |

**Component Transfor**

| 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|
| .341 | .261 | .182 | .190 | .188 | .180 |
| .248 | .169 | -.234 | .203 | .233 | -.222 |

| | | | | | |
|---|---|---|---|---|---|
| .262 | .186 | .175 | .139 | .082 | -.017 |
| .265 | -.561 | -.373 | .158 | -.151 | -.189 |
| -.622 | .006 | .127 | .067 | .160 | .021 |
| .095 | .079 | .178 | .053 | -.420 | -.018 |
| -.127 | -.022 | -.173 | .551 | .145 | .097 |
| .144 | .164 | -.153 | -.096 | -.214 | .338 |
| -.046 | -.282 | -.263 | -.478 | .159 | .447 |
| -.036 | -.240 | .174 | .173 | -.060 | .241 |
| .318 | .016 | .149 | -.231 | -.024 | -.072 |
| -.013 | -.063 | .385 | -.043 | -.216 | -.115 |
| -.162 | .108 | -.138 | -.314 | -.149 | -.445 |
| -.238 | .330 | -.140 | .098 | -.029 | -.034 |
| .049 | -.405 | .265 | .126 | .266 | .000 |
| .101 | .004 | .198 | -.053 | .054 | .113 |
| -.097 | -.081 | .248 | .036 | -.281 | .187 |
| -.069 | -.086 | .065 | .003 | .394 | -.056 |
| .176 | -.002 | .121 | -.215 | .227 | -.123 |
| -.017 | -.156 | .066 | .211 | -.303 | .123 |
| .014 | .018 | -.309 | .160 | -.239 | -.046 |
| -.039 | .053 | .052 | .016 | -.059 | -.016 |
| .053 | .231 | -.203 | -.022 | .021 | .447 |

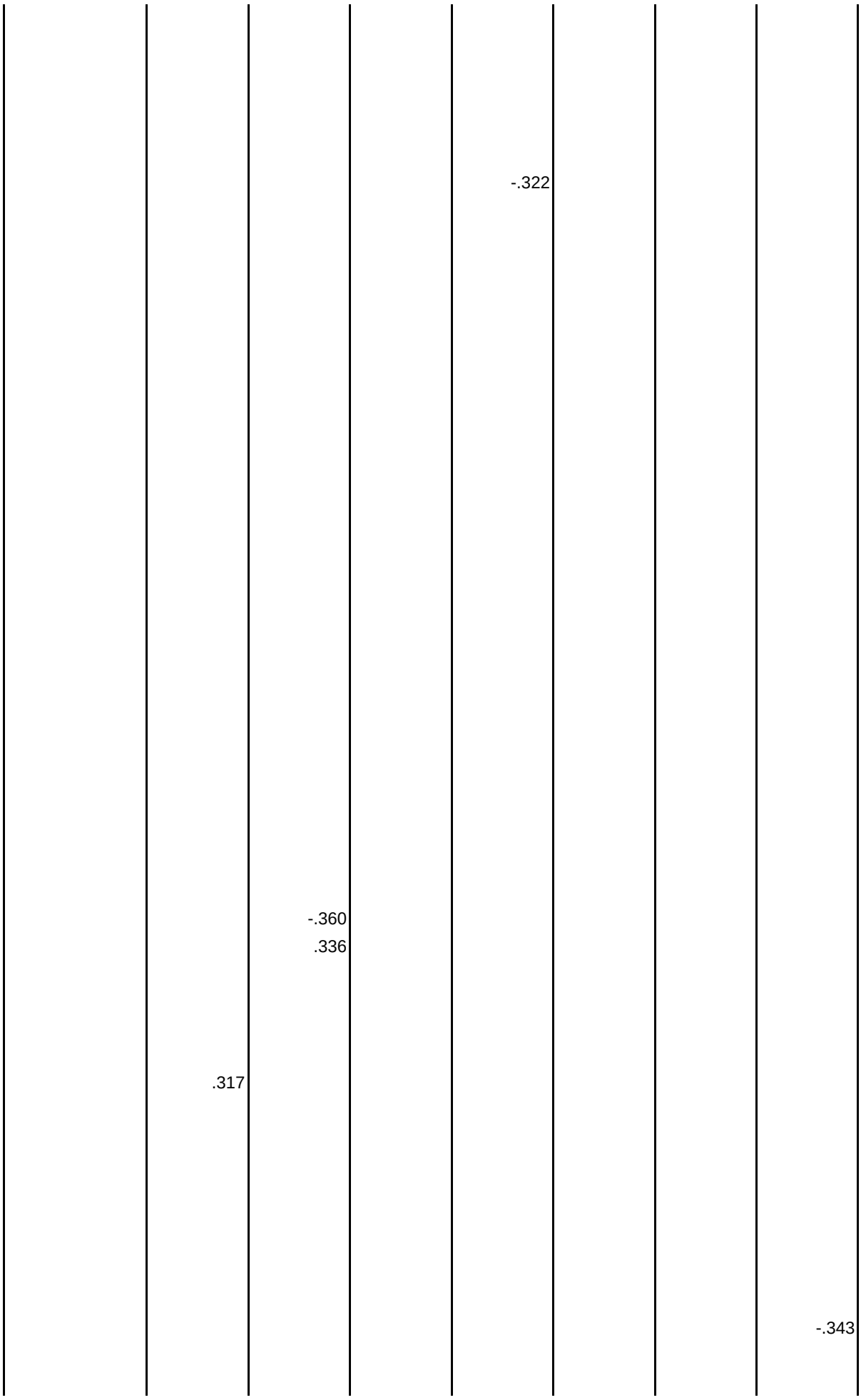
| Q8 | Q9 | Q10 | Q11 | Q12 | Q13 | Q14 | Q15 |
|---|---|---|---|---|---|---|---|
| .161 | .173 | -.078 | .220 | .128 | .257 | .420 | .202 |
| .099 | .140 | -.009 | .091 | .371 | .041 | .341 | .414 |
| .184 | .194 | .178 | .150 | .092 | .383 | .078 | .165 |
| .230 | .091 | .100 | .059 | .047 | .132 | .300 | .099 |
| .226 | .112 | .207 | .365 | .303 | .375 | .243 | .309 |
| .066 | .077 | .062 | .129 | .184 | .260 | .283 | .153 |
| .159 | .079 | .137 | .325 | .536 | .231 | .405 | .388 |
| 1.000 | .316 | .238 | .162 | .054 | .216 | .085 | .024 |
| .316 | 1.000 | .193 | .087 | .075 | .063 | .300 | .117 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| .238 | .193 | 1.000 | .099 | .073 | .101 | .146 | .041 |
| .162 | .087 | .099 | 1.000 | .153 | .462 | .057 | .197 |
| .054 | .075 | .073 | .153 | 1.000 | .182 | .242 | .420 |
| .216 | .063 | .101 | .462 | .182 | 1.000 | .101 | .254 |
| .085 | .300 | .146 | .057 | .242 | .101 | 1.000 | .211 |
| .024 | .117 | .041 | .197 | .420 | .254 | .211 | 1.000 |
| .311 | .221 | .212 | .271 | .144 | .413 | .189 | .183 |
| .073 | .113 | .124 | .204 | .180 | .043 | .184 | .186 |
| .334 | .153 | .189 | .049 | .088 | .274 | .129 | .144 |
| .185 | .222 | .044 | -.014 | -.015 | .142 | .244 | .065 |
| .136 | .092 | .196 | .174 | .362 | .176 | .270 | .228 |
| .214 | .042 | .056 | .096 | .159 | .277 | -.035 | .138 |
| .118 | -.059 | .083 | .324 | .249 | .329 | .292 | .366 |
| .243 | .087 | .141 | .152 | .199 | .526 | .122 | .251 |
| .208 | .092 | .101 | -.130 | -.095 | -.001 | -.019 | -.125 |
| .122 | .100 | .272 | -.001 | .176 | .174 | .179 | .176 |
| .445 | .233 | .273 | .089 | .052 | .373 | .250 | .031 |
| .222 | .075 | .197 | .256 | .221 | .354 | .267 | .149 |
| .227 | .097 | .223 | .471 | .222 | .452 | .170 | .280 |
| .121 | .062 | .112 | .192 | .410 | .298 | .291 | .523 |
| .309 | .181 | .213 | .137 | .190 | .380 | .161 | .096 |
| .320 | .238 | .196 | -.014 | .013 | .024 | .181 | .020 |
| .000 | .033 | .061 | .134 | .057 | .195 | .100 | .254 |
| .141 | .047 | .098 | .505 | .318 | .525 | .126 | .381 |
| .162 | .151 | .055 | .237 | .077 | .161 | .166 | .382 |
| .239 | -.013 | .114 | .357 | .243 | .679 | .069 | .311 |
| .300 | .389 | .163 | .131 | .109 | .188 | .312 | .127 |
| .105 | -.029 | .125 | .241 | .205 | .247 | .078 | .221 |
| .153 | .121 | .162 | .456 | .338 | .410 | .297 | .368 |
| .213 | .109 | -.011 | .159 | .373 | .082 | .403 | .306 |
| .214 | .196 | .242 | .178 | .233 | .376 | .277 | .253 |
| .341 | .061 | .052 | .020 | .060 | .125 | .081 | .084 |
| .133 | .044 | .119 | -.032 | .104 | .052 | .025 | .198 |
| .219 | .286 | -.039 | .186 | .097 | .219 | .351 | .260 |
| .085 | .201 | .104 | .230 | .170 | .151 | .117 | .159 |
| .297 | .321 | .128 | .085 | .097 | .274 | .197 | .219 |
| .167 | .193 | .159 | -.135 | .075 | .086 | .274 | -.020 |
| .217 | .094 | .101 | .239 | .426 | .298 | .231 | .254 |
| .127 | .185 | .178 | .184 | .095 | .219 | .136 | .131 |
| .051 | .206 | .102 | .314 | .221 | .233 | .147 | .186 |
| .285 | .131 | .139 | .012 | .154 | .095 | .084 | .053 |
| .155 | .192 | .168 | -.048 | .125 | .162 | .108 | .089 |
| .105 | .190 | .125 | .134 | .326 | .148 | .207 | .315 |
| .068 | .144 | -.053 | .069 | .114 | .195 | .206 | .055 |
| .202 | .188 | .020 | .005 | .220 | .191 | .089 | .113 |
| .229 | .044 | .139 | .271 | .186 | .434 | .182 | .087 |
| -.039 | .160 | .100 | .174 | .099 | -.073 | .115 | .202 |
| .227 | .062 | .213 | .069 | .169 | .291 | .262 | .106 |
| .042 | .068 | .143 | -.067 | -.099 | .093 | -.090 | -.121 |
| .121 | .083 | .109 | .264 | .289 | .201 | .242 | .241 |
| .154 | .148 | .159 | .024 | -.019 | .242 | .031 | .057 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| .080 | .167 | -.012 | .252 | .179 | .168 | .347 | .282 |
| .291 | .175 | -.086 | .035 | .161 | .254 | .172 | .203 |
| .104 | .140 | -.005 | .034 | .136 | .245 | .293 | .150 |
| .041 | -.071 | .134 | .134 | .260 | .108 | .075 | .421 |
| .187 | .096 | .062 | -.081 | .200 | .144 | .108 | .234 |
| .168 | .108 | -.043 | .238 | .346 | .277 | .183 | .407 |
| .324 | .240 | .119 | .206 | .192 | .394 | .176 | .268 |
| .183 | .051 | .148 | .164 | .376 | .136 | .208 | .265 |
| .045 | .060 | .007 | .085 | .194 | .106 | .187 | .214 |
| .344 | .193 | .176 | .001 | .332 | .310 | .385 | .344 |
| .182 | .169 | .247 | .240 | .207 | .178 | .213 | .362 |
| .300 | .104 | .272 | .188 | .141 | .365 | .222 | .124 |
| .059 | -.018 | .005 | .037 | -.059 | .134 | -.084 | -.016 |
| .287 | .128 | .275 | .254 | .323 | .338 | .245 | .293 |
| .174 | .191 | .142 | -.025 | -.049 | .009 | .205 | -.001 |
| .129 | .106 | .022 | .280 | .262 | .079 | .294 | .261 |

**rix**[a]

| Factor | | | | | | | |
|---|---|---|---|---|---|---|---|
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| | | | | | | | |


-.322
-.360
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| .609 | | | | | | | |
| .424 | | | | | | | |
| .383 | | | | | | | |
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| | .481 | | | | | | |
| | .458 | | | | | | .323 |
| | | -.687 | | | | | |
| | | -.350 | | | | | |
| | | | .705 | | | | |
| | | | .529 | | | | |
| | | | | -.831 | | | |
| | | | | -.562 | | | |
| | | | | -.350 | | | |
| | | | | | .814 | | |
| | | | | | | -.732 | |
| | | | | | | -.370 | |
| | | | | | | | -.613 |
| | | | | | | | .430 |
| | | | | | | | .370 |
| .322 | | | | | | | |
| | | | | | | | |

**atrix**

| Factor | | | | | | | |
|---|---|---|---|---|---|---|---|
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| | | -.338 | .338 | -.372 | | | |
| | | -.332 | | -.353 | | | |
| | | | | -.375 | | | |
| | | | | -.409 | | | |
| | | | .345 | -.381 | | | |
| | | -.389 | | | .376 | | |
| | .380 | | | | | | |
| | .344 | | .334 | | | | .359 |
| | | | .382 | | | | .328 |
| | .388 | | .367 | | | | |
| | | | | -.316 | | | |
| | | | | | | -.457 | |
| | | | | | | -.370 | |
| | | | .325 | | | | |
| .394 | | | | | | | |
| | | | | -.319 | | | |
| .624 | | | | | | | |
| .512 | | | | | | | |
| .491 | | | | | | | |
| | .702 | | | | | | |
| | .604 | | | | | | .492 |
| | .562 | | | | | | |
| | | -.727 | | | | | |
| | | | .719 | | | | |
| | | | .548 | | | | |

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| | | | | -.855 | | | |
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| | | | | | | -.764 | |
| | | | | | | -.536 | |
| | | | | | | | -.585 |
| | | | | | | | .503 |
| | .335 | | | | | | .471 |
| | | | | | | | .368 |
| | | | | | | | |
| | .359 | | | | | -.356 | |
| | | | | -.341 | | | |
| | | | | -.345 | | | .381 |
| | | -.345 | | -.427 | | | |
| .329 | | | .401 | | | | |
| | | | .331 | | | -.341 | |
| | | | | | | | |
| .442 | | | | | | | |
| | | | | | | | |
| | | | | -.407 | | | |
| | | | | | | | |
| .330 | | | | -.372 | | | |
| | | | | | | | |
| | | | | -.429 | | | |
| | | | | | | | |
| | | | | -.319 | | | |

**on Matrix**

| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|
| .170 | .010 | -.199 | .144 | -.294 | .104 | -.209 | .002 |
| .167 | -.172 | -.025 | .111 | .001 | .163 | -.101 | -.162 |
| .048 | .283 | -.024 | .232 | -.107 | -.008 | -.140 | .239 |
| -.177 | -.031 | .056 | -.056 | .160 | -.044 | .127 | -.062 |
| -.200 | -.045 | .049 | -.179 | .169 | -.126 | .157 | .001 |
| .070 | -.027 | -.035 | .028 | -.042 | -.075 | -.001 | -.055 |
| .129 | .022 | -.011 | .120 | -.077 | -.019 | -.138 | .020 |
| .023 | .163 | -.083 | .061 | -.093 | .042 | -.037 | .167 |
| 1.000 | .026 | -.127 | .144 | -.119 | .042 | -.081 | -.026 |
| .026 | 1.000 | .010 | .107 | -.072 | -.080 | .040 | .268 |
| -.127 | .010 | 1.000 | -.051 | .162 | -.026 | .135 | .003 |
| .144 | .107 | -.051 | 1.000 | -.199 | -.007 | -.043 | .050 |
| -.119 | -.072 | .162 | -.199 | 1.000 | -.046 | .106 | -.040 |
| .042 | -.080 | -.026 | -.007 | -.046 | 1.000 | -.086 | -.103 |
| -.081 | .040 | .135 | -.043 | .106 | -.086 | 1.000 | .049 |
| -.026 | .268 | .003 | .050 | -.040 | -.103 | .049 | 1.000 |

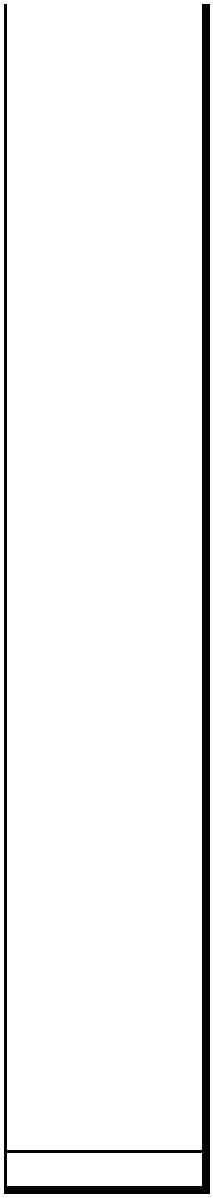
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| -.002 | .178 | -.063 | .099 | -.066 | -.007 | -.132 | .152 |
| .039 | .131 | -.093 | .131 | -.215 | .005 | -.078 | .090 |
| .126 | -.013 | -.169 | .126 | -.107 | .087 | -.160 | -.020 |
| -.118 | .055 | .049 | -.043 | .148 | -.096 | .093 | .090 |
| .138 | -.020 | -.095 | .114 | -.235 | .065 | -.145 | -.059 |
| .102 | .136 | -.127 | .059 | -.253 | .020 | -.107 | .052 |
| -.074 | .000 | .086 | -.017 | .025 | -.059 | .034 | .021 |

| Q8 | Q9 | Q10 | Q11 | Q12 | Q13 | Q14 | Q15 |
|---|---|---|---|---|---|---|---|
| .161 | .173 | -.078 | .220 | .128 | .257 | .420 | .202 |
| .099 | .140 | -.009 | .091 | .371 | .041 | .341 | .414 |
| .184 | .194 | .178 | .150 | .092 | .383 | .078 | .165 |
| .230 | .091 | .100 | .059 | .047 | .132 | .300 | .099 |
| .226 | .112 | .207 | .365 | .303 | .375 | .243 | .309 |
| .066 | .077 | .062 | .129 | .184 | .260 | .283 | .153 |
| .159 | .079 | .137 | .325 | .536 | .231 | .405 | .388 |
| 1.000 | .316 | .238 | .162 | .054 | .216 | .085 | .024 |
| .316 | 1.000 | .193 | .087 | .075 | .063 | .300 | .117 |
| .238 | .193 | 1.000 | .099 | .073 | .101 | .146 | .041 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| .162 | .087 | .099 | 1.000 | .153 | .462 | .057 | .197 |
| .054 | .075 | .073 | .153 | 1.000 | .182 | .242 | .420 |
| .216 | .063 | .101 | .462 | .182 | 1.000 | .101 | .254 |
| .085 | .300 | .146 | .057 | .242 | .101 | 1.000 | .211 |
| .024 | .117 | .041 | .197 | .420 | .254 | .211 | 1.000 |
| .311 | .221 | .212 | .271 | .144 | .413 | .189 | .183 |
| .073 | .113 | .124 | .204 | .180 | .043 | .184 | .186 |
| .334 | .153 | .189 | .049 | .088 | .274 | .129 | .144 |
| .185 | .222 | .044 | -.014 | -.015 | .142 | .244 | .065 |
| .136 | .092 | .196 | .174 | .362 | .176 | .270 | .228 |
| .214 | .042 | .056 | .096 | .159 | .277 | -.035 | .138 |
| .118 | -.059 | .083 | .324 | .249 | .329 | .292 | .366 |
| .243 | .087 | .141 | .152 | .199 | .526 | .122 | .251 |
| .208 | .092 | .101 | -.130 | -.095 | -.001 | -.019 | -.125 |
| .122 | .100 | .272 | -.001 | .176 | .174 | .179 | .176 |
| .445 | .233 | .273 | .089 | .052 | .373 | .250 | .031 |
| .222 | .075 | .197 | .256 | .221 | .354 | .267 | .149 |
| .227 | .097 | .223 | .471 | .222 | .452 | .170 | .280 |
| .121 | .062 | .112 | .192 | .410 | .298 | .291 | .523 |
| .309 | .181 | .213 | .137 | .190 | .380 | .161 | .096 |
| .320 | .238 | .196 | -.014 | .013 | .024 | .181 | .020 |
| .000 | .033 | .061 | .134 | .057 | .195 | .100 | .254 |
| .141 | .047 | .098 | .505 | .318 | .525 | .126 | .381 |
| .162 | .151 | .055 | .237 | .077 | .161 | .166 | .382 |
| .239 | -.013 | .114 | .357 | .243 | .679 | .069 | .311 |
| .300 | .389 | .163 | .131 | .109 | .188 | .312 | .127 |
| .105 | -.029 | .125 | .241 | .205 | .247 | .078 | .221 |
| .153 | .121 | .162 | .456 | .338 | .410 | .297 | .368 |
| .213 | .109 | -.011 | .159 | .373 | .082 | .403 | .306 |
| .214 | .196 | .242 | .178 | .233 | .376 | .277 | .253 |
| .341 | .061 | .052 | .020 | .060 | .125 | .081 | .084 |
| .133 | .044 | .119 | -.032 | .104 | .052 | .025 | .198 |
| .219 | .286 | -.039 | .186 | .097 | .219 | .351 | .260 |
| .085 | .201 | .104 | .230 | .170 | .151 | .117 | .159 |
| .297 | .321 | .128 | .085 | .097 | .274 | .197 | .219 |
| .167 | .193 | .159 | -.135 | .075 | .086 | .274 | -.020 |
| .217 | .094 | .101 | .239 | .426 | .298 | .231 | .254 |
| .127 | .185 | .178 | .184 | .095 | .219 | .136 | .131 |
| .051 | .206 | .102 | .314 | .221 | .233 | .147 | .186 |
| .285 | .131 | .139 | .012 | .154 | .095 | .084 | .053 |
| .155 | .192 | .168 | -.048 | .125 | .162 | .108 | .089 |
| .105 | .190 | .125 | .134 | .326 | .148 | .207 | .315 |
| .068 | .144 | -.053 | .069 | .114 | .195 | .206 | .055 |
| .202 | .188 | .020 | .005 | .220 | .191 | .089 | .113 |
| .229 | .044 | .139 | .271 | .186 | .434 | .182 | .087 |
| -.039 | .160 | .100 | .174 | .099 | -.073 | .115 | .202 |
| .227 | .062 | .213 | .069 | .169 | .291 | .262 | .106 |
| .042 | .068 | .143 | -.067 | -.099 | .093 | -.090 | -.121 |
| .121 | .083 | .109 | .264 | .289 | .201 | .242 | .241 |
| .154 | .148 | .159 | .024 | -.019 | .242 | .031 | .057 |
| .080 | .167 | -.012 | .252 | .179 | .168 | .347 | .282 |

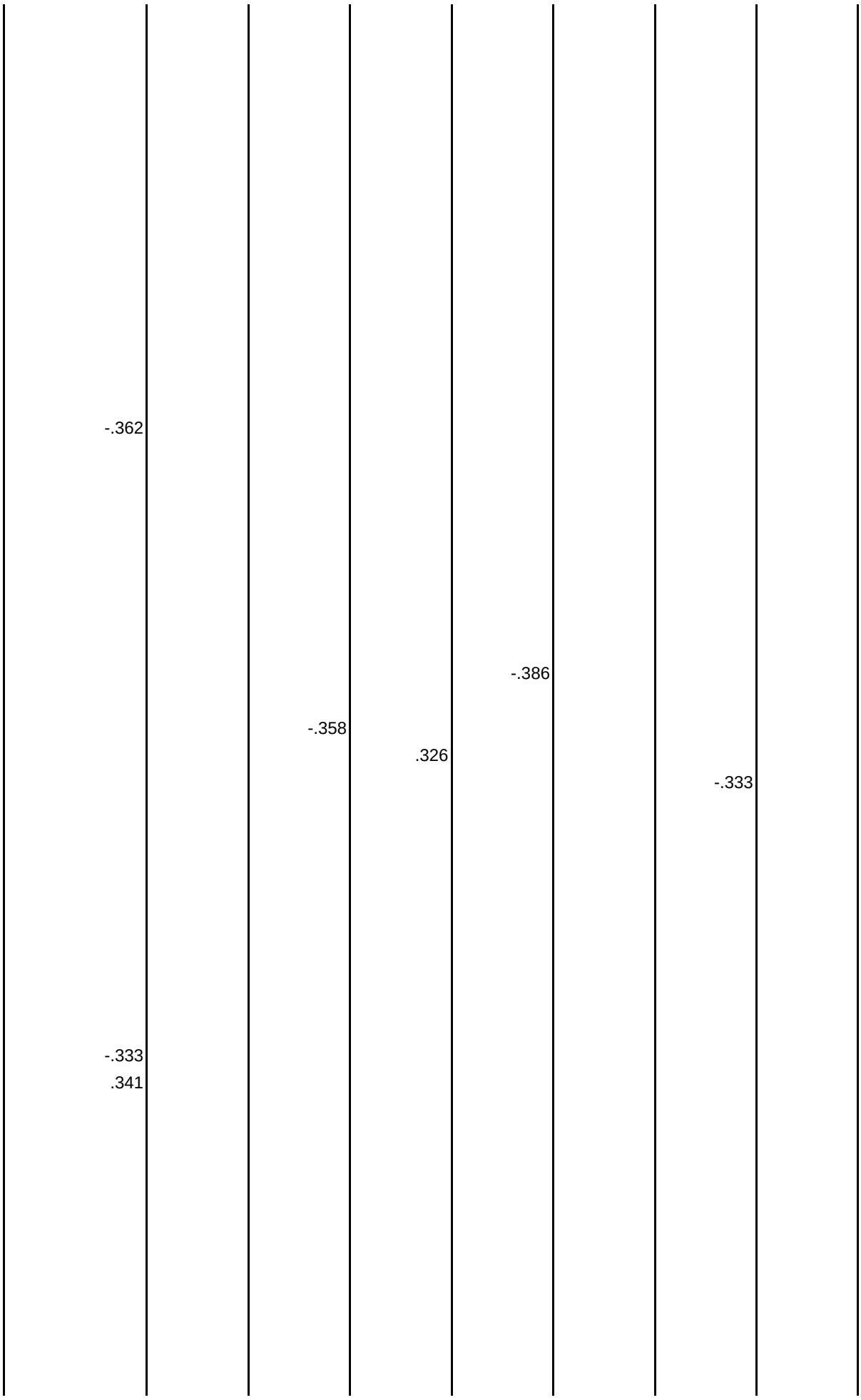
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| .291 | .175 | -.086 | .035 | .161 | .254 | .172 | .203 |
| .104 | .140 | -.005 | .034 | .136 | .245 | .293 | .150 |
| .041 | -.071 | .134 | .134 | .260 | .108 | .075 | .421 |
| .187 | .096 | .062 | -.081 | .200 | .144 | .108 | .234 |
| .168 | .108 | -.043 | .238 | .346 | .277 | .183 | .407 |
| .324 | .240 | .119 | .206 | .192 | .394 | .176 | .268 |
| .183 | .051 | .148 | .164 | .376 | .136 | .208 | .265 |
| .045 | .060 | .007 | .085 | .194 | .106 | .187 | .214 |
| .344 | .193 | .176 | .001 | .332 | .310 | .385 | .344 |
| .182 | .169 | .247 | .240 | .207 | .178 | .213 | .362 |
| .300 | .104 | .272 | .188 | .141 | .365 | .222 | .124 |
| .059 | -.018 | .005 | .037 | -.059 | .134 | -.084 | -.016 |
| .287 | .128 | .275 | .254 | .323 | .338 | .245 | .293 |
| .174 | .191 | .142 | -.025 | -.049 | .009 | .205 | -.001 |
| .129 | .106 | .022 | .280 | .262 | .079 | .294 | .261 |

| Loadings |
| --- |
| Cumulative % |
| 7.630 |
| 14.645 |
| 19.531 |
| 23.378 |
| 26.476 |
| 29.572 |
| 32.504 |
| 35.333 |
| 38.160 |
| 40.885 |
| 43.463 |
| 46.010 |
| 48.493 |
| 50.933 |
| 53.355 |
| 55.711 |
| 58.032 |
| 60.331 |
| 62.588 |
| 64.836 |
| 67.069 |
| 69.144 |
| 70.967 |



**latrix**[a]

| Component | | | | | | | |
|---|---|---|---|---|---|---|---|
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| | | | | | | | |


-.362
-.386
-.358
.326
-.333
-.333
.341

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| .325 | | | | | | | |
| | .407 | | | | | | |
| | .365 | | | | | | |
| | | .431 | | | | | |
| | | | .323 | | .511 | | |
| | | | | | | | |

**ent Matrix[a]**

| Component | | | | | | | |
|---|---|---|---|---|---|---|---|
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| | | | | | .330 | | |
| | | .418 | | | | | |
| | | | .430 | | | | |
| | | | | | | | .321 |
| .352 | | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | .319 | | |
| | .388 | | | | | | |
| | | | | .403 | | | |
| .753 | | | | | | | |
| .567 | | | | | | | |
| .482 | | | | | | | |
| | .785 | | | | | | |
| | .492 | | | | | | |
| | .461 | | | | | | |
| | | .685 | | | | | |
| | | .574 | | | | | |
| | | .485 | | | | | |
| | | | .778 | | | | |
| | | | .464 | | | | |
| | | | | .721 | | | |
| | | | | .475 | | | |
| | | | | | .657 | | |
| | | | | | .524 | | |
| | | | | | | .788 | |
| | | | | | | .497 | |
| | | | | | | | .739 |
| | | | | | | | |

**mation Matrix**

| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|
| .181 | .156 | .157 | .089 | .095 | .204 | .084 | .113 |
| -.129 | .223 | .109 | -.291 | -.158 | .073 | .317 | .057 |

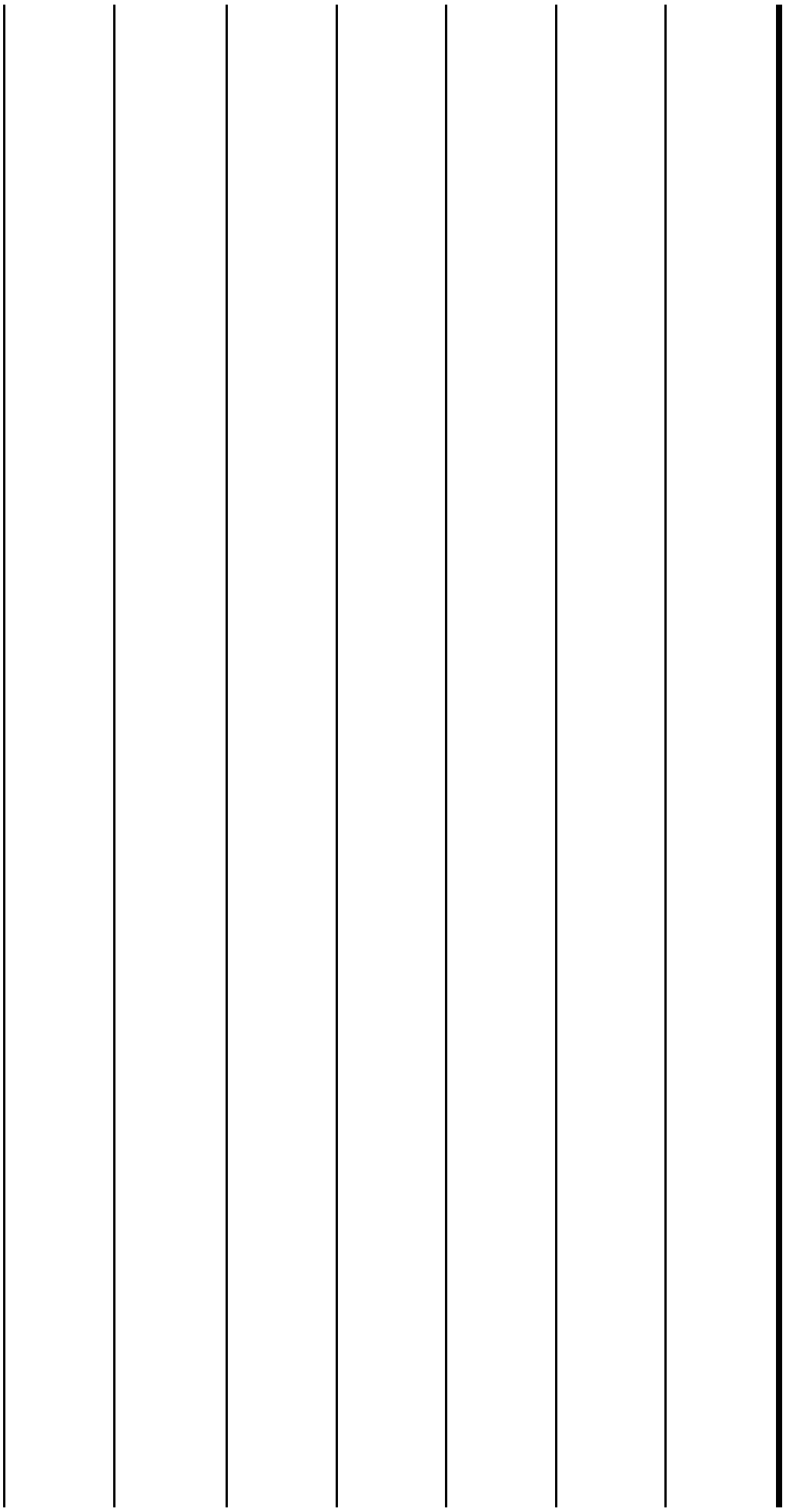
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| -.295 | .079 | .071 | .020 | -.101 | -.081 | .116 | -.075 |
| -.165 | .105 | .332 | .216 | .243 | -.068 | .133 | -.065 |
| -.387 | .018 | .239 | .006 | .211 | .075 | .056 | .179 |
| .119 | .345 | .026 | .075 | .003 | -.165 | -.076 | .587 |
| .139 | .165 | -.209 | -.127 | .410 | .046 | -.005 | .169 |
| -.103 | -.275 | -.060 | -.327 | .456 | .103 | -.048 | .146 |
| -.049 | .392 | .017 | -.124 | -.041 | .016 | .087 | .164 |
| .030 | .154 | -.370 | .327 | -.175 | -.264 | .076 | .046 |
| -.284 | .021 | -.240 | .139 | .229 | -.058 | .110 | -.001 |
| -.134 | -.124 | .464 | -.088 | .076 | -.124 | .068 | .197 |
| .327 | .106 | -.046 | .168 | .238 | .166 | .274 | .035 |
| -.115 | .273 | .006 | .451 | .105 | .068 | -.027 | -.153 |
| .256 | -.211 | .109 | .127 | .048 | .340 | -.103 | .006 |
| -.001 | .353 | .195 | .018 | .358 | -.145 | -.435 | -.394 |
| .349 | .234 | .124 | -.214 | -.022 | .268 | .375 | -.253 |
| .185 | -.088 | .029 | -.049 | .081 | -.469 | .212 | .259 |
| .062 | -.109 | -.199 | .238 | .285 | .208 | -.036 | .221 |
| -.299 | -.177 | -.273 | .079 | .044 | .203 | .272 | -.036 |
| .227 | -.163 | .100 | -.001 | -.095 | -.082 | -.385 | .111 |
| .195 | -.131 | -.098 | -.125 | .297 | -.500 | .264 | -.326 |
| .128 | -.297 | .362 | .456 | -.028 | -.080 | .257 | .014 |

| Q16 | Q17 | Q18 | Q19 | Q20 | Q21 | Q22 | Q23 | Q24 |
|---|---|---|---|---|---|---|---|---|
| .347 | .006 | .159 | .238 | .185 | .165 | .293 | .330 | .088 |
| .188 | .296 | .078 | .101 | .180 | .053 | .261 | .127 | -.054 |
| .185 | -.025 | .189 | .043 | .275 | .253 | .092 | .553 | -.079 |
| .160 | -.041 | .237 | .271 | .177 | .133 | .268 | .146 | .026 |
| .167 | .160 | .185 | .062 | .334 | .203 | .256 | .358 | -.111 |
| .322 | .286 | .212 | .126 | .147 | .070 | .187 | .205 | .071 |
| .254 | .214 | .168 | .069 | .531 | .201 | .454 | .239 | -.071 |
| .311 | .073 | .334 | .185 | .136 | .214 | .118 | .243 | .208 |
| .221 | .113 | .153 | .222 | .092 | .042 | -.059 | .087 | .092 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| .212 | .124 | .189 | .044 | .196 | .056 | .083 | .141 | .101 |
| .271 | .204 | .049 | -.014 | .174 | .096 | .324 | .152 | -.130 |
| .144 | .180 | .088 | -.015 | .362 | .159 | .249 | .199 | -.095 |
| .413 | .043 | .274 | .142 | .176 | .277 | .329 | .526 | -.001 |
| .189 | .184 | .129 | .244 | .270 | -.035 | .292 | .122 | -.019 |
| .183 | .186 | .144 | .065 | .228 | .138 | .366 | .251 | -.125 |
| 1.000 | .190 | .267 | .282 | .131 | .274 | .217 | .272 | .145 |
| .190 | 1.000 | .022 | -.076 | .073 | .038 | .147 | -.018 | -.187 |
| .267 | .022 | 1.000 | .340 | .120 | .411 | .148 | .280 | .143 |
| .282 | -.076 | .340 | 1.000 | .029 | .085 | .062 | .113 | .239 |
| .131 | .073 | .120 | .029 | 1.000 | .118 | .245 | .254 | -.003 |
| .274 | .038 | .411 | .085 | .118 | 1.000 | .117 | .325 | .195 |
| .217 | .147 | .148 | .062 | .245 | .117 | 1.000 | .170 | -.072 |
| .272 | -.018 | .280 | .113 | .254 | .325 | .170 | 1.000 | .063 |
| .145 | -.187 | .143 | .239 | -.003 | .195 | -.072 | .063 | 1.000 |
| .126 | -.104 | .223 | .208 | .448 | .168 | .114 | .275 | .055 |
| .428 | -.019 | .333 | .338 | .155 | .200 | .157 | .343 | .193 |
| .341 | .087 | .291 | .304 | .173 | .161 | .292 | .283 | .071 |
| .374 | .053 | .365 | .103 | .227 | .278 | .202 | .456 | .016 |
| .273 | .277 | .127 | -.027 | .341 | .144 | .413 | .278 | -.086 |
| .323 | .011 | .305 | .258 | .130 | .371 | .125 | .382 | .179 |
| .217 | .001 | .337 | .316 | .031 | .122 | -.023 | .130 | .183 |
| .113 | .008 | .081 | .022 | .201 | .005 | .130 | .407 | -.070 |
| .303 | .196 | .156 | -.085 | .184 | .313 | .346 | .380 | -.049 |
| .149 | .286 | .098 | -.120 | .156 | .091 | .324 | .076 | -.069 |
| .253 | .060 | .211 | .058 | .103 | .167 | .333 | .385 | -.078 |
| .394 | .090 | .251 | .438 | .051 | .151 | .148 | .082 | .243 |
| .000 | .052 | .124 | .010 | .354 | .107 | .188 | .152 | -.109 |
| .353 | .167 | .180 | .014 | .237 | .169 | .361 | .351 | -.137 |
| .196 | .304 | .094 | .036 | .312 | .180 | .312 | .085 | .021 |
| .313 | .082 | .259 | .216 | .229 | .317 | .094 | .412 | .161 |
| .101 | -.103 | .222 | .155 | .128 | .271 | .087 | .122 | .188 |
| .006 | .169 | .054 | .059 | .240 | .208 | .097 | .192 | -.080 |
| .264 | .174 | .203 | .261 | .122 | .168 | .149 | .156 | .050 |
| .220 | .139 | .075 | .023 | .072 | .129 | .094 | .093 | .021 |
| .264 | -.126 | .131 | .221 | .196 | .175 | .067 | .292 | .220 |
| .222 | -.133 | .182 | .401 | .198 | .133 | .073 | .219 | .206 |
| .125 | .176 | .151 | -.003 | .198 | .221 | .282 | .327 | -.048 |
| .419 | .080 | .215 | .196 | .113 | .131 | .077 | .171 | .232 |
| .076 | .153 | .043 | .014 | .258 | .038 | .092 | .172 | -.140 |
| .088 | -.039 | .158 | .179 | .124 | .117 | .072 | .109 | .204 |
| .153 | -.096 | .293 | .343 | .184 | .092 | .008 | .121 | .154 |
| .110 | .058 | .206 | .117 | .393 | .130 | .235 | .164 | -.038 |
| .021 | -.081 | .193 | .150 | .082 | .030 | .073 | -.039 | .043 |
| .146 | -.001 | .155 | .215 | .111 | .286 | .022 | .075 | .339 |
| .302 | -.078 | .285 | .186 | .222 | .275 | .176 | .397 | .148 |
| .045 | .159 | -.097 | -.135 | .056 | -.049 | .092 | -.062 | -.116 |
| .222 | -.025 | .318 | .245 | .324 | .243 | .204 | .286 | .218 |
| -.003 | -.063 | -.002 | .201 | -.138 | -.132 | -.030 | -.055 | .120 |
| .111 | .101 | .082 | .094 | .268 | .192 | .250 | .145 | -.058 |
| .228 | -.004 | .160 | .177 | -.017 | .130 | .170 | .106 | .139 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| .105 | .144 | .089 | .011 | .107 | .041 | .245 | .181 | -.068 |
| .119 | -.016 | .228 | .284 | .167 | .218 | .160 | .168 | .215 |
| .097 | -.067 | .173 | .303 | .192 | .157 | .311 | .155 | .028 |
| -.034 | .046 | .060 | -.058 | .265 | .111 | .202 | .239 | -.112 |
| .148 | -.167 | .264 | .138 | .170 | .178 | .160 | .159 | .188 |
| .236 | .013 | .060 | .022 | .249 | .104 | .329 | .289 | -.115 |
| .280 | .037 | .281 | .217 | .148 | .233 | .202 | .373 | .150 |
| .048 | -.117 | .221 | .186 | .402 | .257 | .224 | .226 | .027 |
| .121 | .192 | -.018 | -.043 | .139 | .053 | .118 | .213 | -.043 |
| .330 | -.005 | .268 | .256 | .318 | .213 | .272 | .327 | .139 |
| .137 | .167 | .060 | .016 | .383 | .190 | .334 | .159 | .004 |
| .192 | .151 | .227 | .154 | .134 | .072 | .207 | .272 | .144 |
| .105 | -.151 | .157 | .225 | -.038 | .139 | .064 | .097 | .184 |
| .207 | -.009 | .361 | .186 | .185 | .207 | .226 | .360 | .196 |
| .094 | -.008 | .151 | .461 | -.030 | -.095 | .062 | .008 | .369 |
| .046 | .215 | .057 | -.092 | .300 | .142 | .215 | .169 | -.071 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| | | | | | | |



| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| .624 | | | | | | |
| .586 | | | | | | |
| .507 | | | | | | |
| .375 | | | | | | |
| | .678 | | | | | |
| | .363 | | | | | |
| | .352 | | | | | |
| | .352 | | | | | |
| | | .583 | | | | |
| | | .420 | | | | |
| | | .420 | | | | |
| | | | -.622 | | | |
| | | | | .627 | | |
| | | | | .361 | | |
| | | | | | .611 | |
| | | | | | .567 | |
| | | | | | .430 | |
| | | | | | .403 | |
| | | | | | | -.324 |
| | | | | | | |

| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|
| | .455 | | | | .486 | |
| | | | | .384 | .372 | |
| | | .333 | | .371 | | |
| | | | | .387 | | |
| | | | | .369 | | -.338 |
| | | | -.329 | | | |
| .414 | | | | | | |
| | .343 | | | | | |
| .362 | | | | | | |
| .363 | | | | | | |
| .350 | | | | | | |
| | | | -.332 | | | |
| | | | | | .479 | |
| | | .382 | | | | -.321 |
| | | | | | .349 | |
| | | | | .335 | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | .454 | | | .352 | .404 | |
| | | .431 | | | | |
| .328 | | | | | | |
| .667 | | | | | | |
| .659 | | | | | | |
| .542 | | | | | | |
| .493 | | | | | | |
| | .742 | | | | | |
| | .508 | | | | .433 | |
| | .485 | | | | .442 | |
| | .473 | | | .325 | | |
| | .400 | | | | | |
| | | .639 | | | | |
| | | .544 | | | | |
| | | .496 | -.379 | | | |
| | | | -.653 | | | |
| | | | -.415 | | | |
| | | | | .636 | | |
| | | | | .435 | | -.400 |
| | | | | .401 | | |
| | | | | | .675 | |
| | | | | | .625 | |
| | | | | | .547 | |

| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|
| .096 | .149 | .208 | -.175 | .206 | .278 | -.066 |
| -.121 | .026 | .143 | -.160 | .152 | -.079 | -.053 |
| .220 | .168 | .130 | -.040 | .062 | .138 | .043 |
| -.240 | -.004 | -.099 | .104 | -.060 | -.152 | .008 |
| -.091 | -.139 | -.147 | .107 | -.129 | -.152 | .089 |
| -.025 | .076 | -.053 | -.030 | -.003 | .024 | .033 |
| .017 | .082 | .118 | -.066 | .077 | .014 | -.071 |
| .109 | .159 | .037 | .005 | .028 | .124 | -.001 |
| -.002 | .039 | .126 | -.118 | .138 | .102 | -.074 |
| .178 | .131 | -.013 | .055 | -.020 | .136 | .000 |
| -.063 | -.093 | -.169 | .049 | -.095 | -.127 | .086 |
| .099 | .131 | .126 | -.043 | .114 | .059 | -.017 |
| -.066 | -.215 | -.107 | .148 | -.235 | -.253 | .025 |
| -.007 | .005 | .087 | -.096 | .065 | .020 | -.059 |
| -.132 | -.078 | -.160 | .093 | -.145 | -.107 | .034 |
| .152 | .090 | -.020 | .090 | -.059 | .052 | .021 |

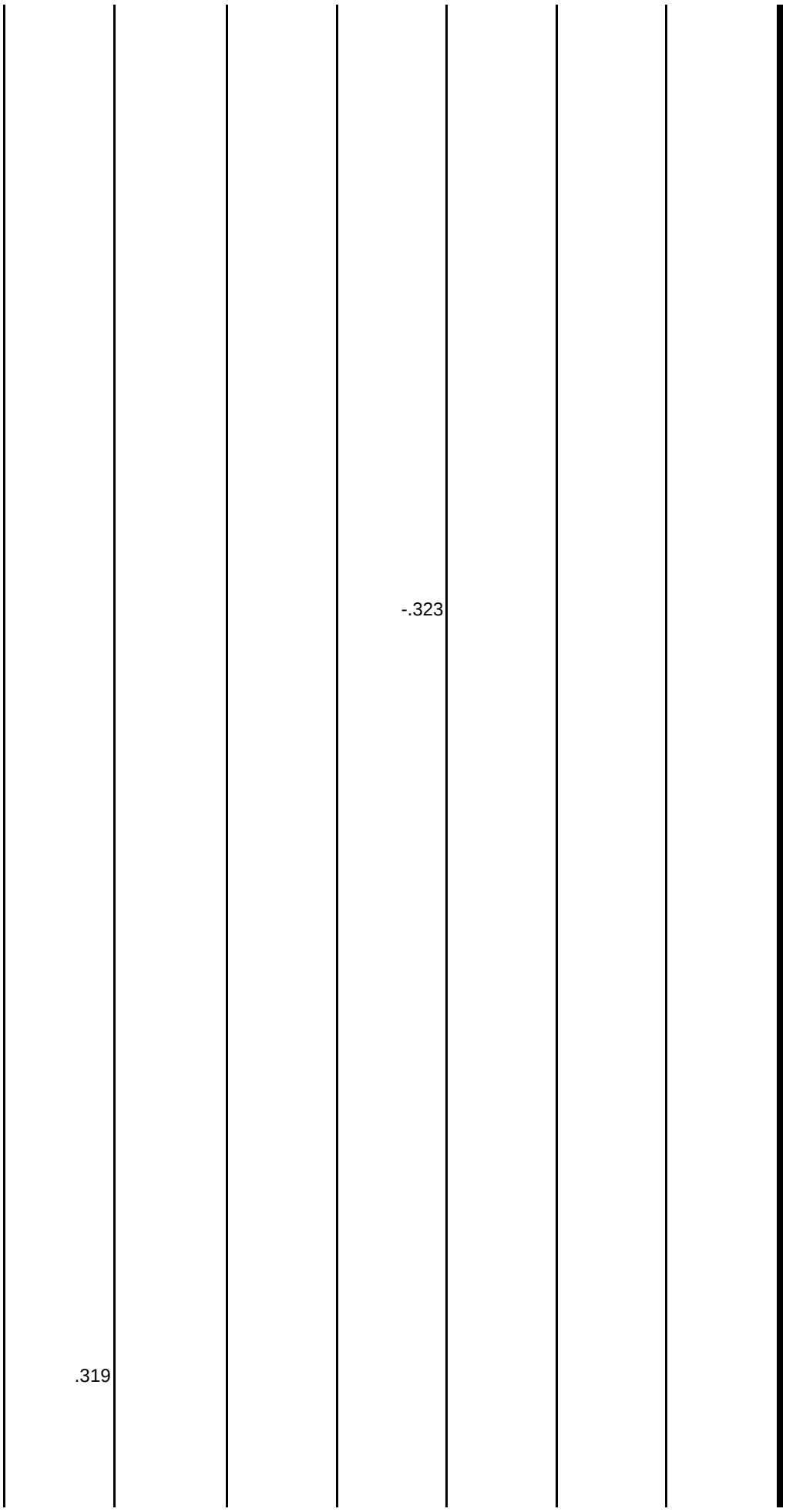
| | | | | | | |
|---|---|---|---|---|---|---|
| 1.000 | .031 | .073 | -.093 | .041 | .106 | .013 |
| .031 | 1.000 | .052 | -.061 | .156 | .205 | 6.408E-05 |
| .073 | .052 | 1.000 | -.144 | .183 | .056 | -.051 |
| -.093 | -.061 | -.144 | 1.000 | -.185 | -.011 | -.004 |
| .041 | .156 | .183 | -.185 | 1.000 | .137 | -.080 |
| .106 | .205 | .056 | -.011 | .137 | 1.000 | -.072 |
| .013 | 6.408E-05 | -.051 | -.004 | -.080 | -.072 | 1.000 |

| Q16 | Q17 | Q18 | Q19 | Q20 | Q21 | Q22 | Q23 | Q24 |
|---|---|---|---|---|---|---|---|---|
| .347 | .006 | .159 | .238 | .185 | .165 | .293 | .330 | .088 |
| .188 | .296 | .078 | .101 | .180 | .053 | .261 | .127 | -.054 |
| .185 | -.025 | .189 | .043 | .275 | .253 | .092 | .553 | -.079 |
| .160 | -.041 | .237 | .271 | .177 | .133 | .268 | .146 | .026 |
| .167 | .160 | .185 | .062 | .334 | .203 | .256 | .358 | -.111 |
| .322 | .286 | .212 | .126 | .147 | .070 | .187 | .205 | .071 |
| .254 | .214 | .168 | .069 | .531 | .201 | .454 | .239 | -.071 |
| .311 | .073 | .334 | .185 | .136 | .214 | .118 | .243 | .208 |
| .221 | .113 | .153 | .222 | .092 | .042 | -.059 | .087 | .092 |
| .212 | .124 | .189 | .044 | .196 | .056 | .083 | .141 | .101 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| .271 | .204 | .049 | -.014 | .174 | .096 | .324 | .152 | -.130 |
| .144 | .180 | .088 | -.015 | .362 | .159 | .249 | .199 | -.095 |
| .413 | .043 | .274 | .142 | .176 | .277 | .329 | .526 | -.001 |
| .189 | .184 | .129 | .244 | .270 | -.035 | .292 | .122 | -.019 |
| .183 | .186 | .144 | .065 | .228 | .138 | .366 | .251 | -.125 |
| 1.000 | .190 | .267 | .282 | .131 | .274 | .217 | .272 | .145 |
| .190 | 1.000 | .022 | -.076 | .073 | .038 | .147 | -.018 | -.187 |
| .267 | .022 | 1.000 | .340 | .120 | .411 | .148 | .280 | .143 |
| .282 | -.076 | .340 | 1.000 | .029 | .085 | .062 | .113 | .239 |
| .131 | .073 | .120 | .029 | 1.000 | .118 | .245 | .254 | -.003 |
| .274 | .038 | .411 | .085 | .118 | 1.000 | .117 | .325 | .195 |
| .217 | .147 | .148 | .062 | .245 | .117 | 1.000 | .170 | -.072 |
| .272 | -.018 | .280 | .113 | .254 | .325 | .170 | 1.000 | .063 |
| .145 | -.187 | .143 | .239 | -.003 | .195 | -.072 | .063 | 1.000 |
| .126 | -.104 | .223 | .208 | .448 | .168 | .114 | .275 | .055 |
| .428 | -.019 | .333 | .338 | .155 | .200 | .157 | .343 | .193 |
| .341 | .087 | .291 | .304 | .173 | .161 | .292 | .283 | .071 |
| .374 | .053 | .365 | .103 | .227 | .278 | .202 | .456 | .016 |
| .273 | .277 | .127 | -.027 | .341 | .144 | .413 | .278 | -.086 |
| .323 | .011 | .305 | .258 | .130 | .371 | .125 | .382 | .179 |
| .217 | .001 | .337 | .316 | .031 | .122 | -.023 | .130 | .183 |
| .113 | .008 | .081 | .022 | .201 | .005 | .130 | .407 | -.070 |
| .303 | .196 | .156 | -.085 | .184 | .313 | .346 | .380 | -.049 |
| .149 | .286 | .098 | -.120 | .156 | .091 | .324 | .076 | -.069 |
| .253 | .060 | .211 | .058 | .103 | .167 | .333 | .385 | -.078 |
| .394 | .090 | .251 | .438 | .051 | .151 | .148 | .082 | .243 |
| .000 | .052 | .124 | .010 | .354 | .107 | .188 | .152 | -.109 |
| .353 | .167 | .180 | .014 | .237 | .169 | .361 | .351 | -.137 |
| .196 | .304 | .094 | .036 | .312 | .180 | .312 | .085 | .021 |
| .313 | .082 | .259 | .216 | .229 | .317 | .094 | .412 | .161 |
| .101 | -.103 | .222 | .155 | .128 | .271 | .087 | .122 | .188 |
| .006 | .169 | .054 | .059 | .240 | .208 | .097 | .192 | -.080 |
| .264 | .174 | .203 | .261 | .122 | .168 | .149 | .156 | .050 |
| .220 | .139 | .075 | .023 | .072 | .129 | .094 | .093 | .021 |
| .264 | -.126 | .131 | .221 | .196 | .175 | .067 | .292 | .220 |
| .222 | -.133 | .182 | .401 | .198 | .133 | .073 | .219 | .206 |
| .125 | .176 | .151 | -.003 | .198 | .221 | .282 | .327 | -.048 |
| .419 | .080 | .215 | .196 | .113 | .131 | .077 | .171 | .232 |
| .076 | .153 | .043 | .014 | .258 | .038 | .092 | .172 | -.140 |
| .088 | -.039 | .158 | .179 | .124 | .117 | .072 | .109 | .204 |
| .153 | -.096 | .293 | .343 | .184 | .092 | .008 | .121 | .154 |
| .110 | .058 | .206 | .117 | .393 | .130 | .235 | .164 | -.038 |
| .021 | -.081 | .193 | .150 | .082 | .030 | .073 | -.039 | .043 |
| .146 | -.001 | .155 | .215 | .111 | .286 | .022 | .075 | .339 |
| .302 | -.078 | .285 | .186 | .222 | .275 | .176 | .397 | .148 |
| .045 | .159 | -.097 | -.135 | .056 | -.049 | .092 | -.062 | -.116 |
| .222 | -.025 | .318 | .245 | .324 | .243 | .204 | .286 | .218 |
| -.003 | -.063 | -.002 | .201 | -.138 | -.132 | -.030 | -.055 | .120 |
| .111 | .101 | .082 | .094 | .268 | .192 | .250 | .145 | -.058 |
| .228 | -.004 | .160 | .177 | -.017 | .130 | .170 | .106 | .139 |
| .105 | .144 | .089 | .011 | .107 | .041 | .245 | .181 | -.068 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| .119 | -.016 | .228 | .284 | .167 | .218 | .160 | .168 | .215 |
| .097 | -.067 | .173 | .303 | .192 | .157 | .311 | .155 | .028 |
| -.034 | .046 | .060 | -.058 | .265 | .111 | .202 | .239 | -.112 |
| .148 | -.167 | .264 | .138 | .170 | .178 | .160 | .159 | .188 |
| .236 | .013 | .060 | .022 | .249 | .104 | .329 | .289 | -.115 |
| .280 | .037 | .281 | .217 | .148 | .233 | .202 | .373 | .150 |
| .048 | -.117 | .221 | .186 | .402 | .257 | .224 | .226 | .027 |
| .121 | .192 | -.018 | -.043 | .139 | .053 | .118 | .213 | -.043 |
| .330 | -.005 | .268 | .256 | .318 | .213 | .272 | .327 | .139 |
| .137 | .167 | .060 | .016 | .383 | .190 | .334 | .159 | .004 |
| .192 | .151 | .227 | .154 | .134 | .072 | .207 | .272 | .144 |
| .105 | -.151 | .157 | .225 | -.038 | .139 | .064 | .097 | .184 |
| .207 | -.009 | .361 | .186 | .185 | .207 | .226 | .360 | .196 |
| .094 | -.008 | .151 | .461 | -.030 | -.095 | .062 | .008 | .369 |
| .046 | .215 | .057 | -.092 | .300 | .142 | .215 | .169 | -.071 |

| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|
| | | | | | -.371 | |


-.323
.319

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | .380 | | | | |

| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|
| | .362 | | | | | |
| | | | | .351 | | |
| | -.320 | | | | | |
| | | | -.393 | | | |
| | .356 | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | -.322 | | | | |
| .743 | | | | | | |
| .431 | | | | | | |
| -.382 | | | | | | |
| | .703 | | | | | |
| | | .758 | | | | |
| | | .369 | | | .339 | |
| | | | .785 | | | |
| | | | | .771 | | |
| | .335 | | | .374 | | |
| | | | | | .862 | |
| | | | | | | .754 |

| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|
| -.031 | .117 | .111 | .097 | .119 | .056 | .046 |
| .208 | .206 | .060 | .157 | .185 | .066 | .114 |

| | | | | | | |
|---|---|---|---|---|---|---|
| .014 | .040 | -.137 | .090 | -.050 | .071 | -.099 |
| .075 | -.171 | -.192 | -.009 | .029 | -.030 | -.046 |
| .255 | -.070 | .062 | .320 | .160 | -.202 | .117 |
| .263 | .104 | -.054 | -.102 | -.101 | -.340 | -.150 |
| -.440 | -.141 | .173 | -.038 | -.076 | -.048 | -.122 |
| .157 | .078 | -.419 | .186 | -.128 | .246 | .035 |
| -.027 | .191 | .264 | -.051 | .035 | .153 | -.158 |
| -.077 | .047 | -.244 | .456 | .236 | .275 | .125 |
| .004 | -.276 | .469 | .291 | -.401 | -.063 | .163 |
| -.403 | .059 | .172 | -.046 | .109 | .449 | -.130 |
| -.246 | .323 | -.099 | .239 | -.012 | -.005 | .199 |
| .241 | .021 | .004 | -.215 | -.265 | .485 | -.211 |
| .250 | .341 | .057 | .177 | -.327 | .026 | -.203 |
| -.032 | .224 | -.040 | -.088 | .126 | -.129 | .368 |
| .202 | -.437 | .010 | -.035 | -.026 | .098 | .166 |
| .152 | -.026 | -.112 | -.316 | -.273 | .190 | .430 |
| .185 | -.282 | -.007 | -.231 | .568 | .102 | -.080 |
| .052 | .420 | .214 | -.412 | .107 | -.035 | .296 |
| .247 | -.032 | .459 | .197 | .141 | .277 | .280 |
| .262 | .181 | .229 | .075 | .197 | -.072 | -.430 |
| -.124 | -.025 | .049 | .020 | .018 | -.266 | .072 |

**Correla**

| Q25 | Q26 | Q27 | Q28 | Q29 | Q30 | Q31 | Q32 | Q33 |
|---|---|---|---|---|---|---|---|---|
| .066 | .343 | .281 | .330 | .281 | .243 | .183 | .317 | .358 |
| .050 | .014 | .146 | .069 | .493 | -.046 | .027 | .107 | .175 |
| .234 | .311 | .242 | .429 | .176 | .285 | .096 | .303 | .305 |
| .254 | .375 | .342 | .214 | .181 | .263 | .149 | .184 | .205 |
| .168 | .151 | .352 | .382 | .332 | .248 | .157 | .355 | .375 |
| .094 | .217 | .334 | .196 | .302 | .128 | .140 | .064 | .168 |
| .162 | .158 | .220 | .276 | .445 | .105 | .141 | .187 | .311 |
| .122 | .445 | .222 | .227 | .121 | .309 | .320 | .000 | .141 |
| .100 | .233 | .075 | .097 | .062 | .181 | .238 | .033 | .047 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| .272 | .273 | .197 | .223 | .112 | .213 | .196 | .061 | .098 |
| -.001 | .089 | .256 | .471 | .192 | .137 | -.014 | .134 | .505 |
| .176 | .052 | .221 | .222 | .410 | .190 | .013 | .057 | .318 |
| .174 | .373 | .354 | .452 | .298 | .380 | .024 | .195 | .525 |
| .179 | .250 | .267 | .170 | .291 | .161 | .181 | .100 | .126 |
| .176 | .031 | .149 | .280 | .523 | .096 | .020 | .254 | .381 |
| .126 | .428 | .341 | .374 | .273 | .323 | .217 | .113 | .303 |
| -.104 | -.019 | .087 | .053 | .277 | .011 | .001 | .008 | .196 |
| .223 | .333 | .291 | .365 | .127 | .305 | .337 | .081 | .156 |
| .208 | .338 | .304 | .103 | -.027 | .258 | .316 | .022 | -.085 |
| .448 | .155 | .173 | .227 | .341 | .130 | .031 | .201 | .184 |
| .168 | .200 | .161 | .278 | .144 | .371 | .122 | .005 | .313 |
| .114 | .157 | .292 | .202 | .413 | .125 | -.023 | .130 | .346 |
| .275 | .343 | .283 | .456 | .278 | .382 | .130 | .407 | .380 |
| .055 | .193 | .071 | .016 | -.086 | .179 | .183 | -.070 | -.049 |
| 1.000 | .278 | .229 | .175 | .131 | .291 | .047 | .127 | .105 |
| .278 | 1.000 | .425 | .378 | .082 | .489 | .201 | .122 | .271 |
| .229 | .425 | 1.000 | .453 | .214 | .325 | .154 | .159 | .375 |
| .175 | .378 | .453 | 1.000 | .258 | .423 | .188 | .239 | .507 |
| .131 | .082 | .214 | .258 | 1.000 | .178 | .014 | .203 | .401 |
| .291 | .489 | .325 | .423 | .178 | 1.000 | .226 | .059 | .246 |
| .047 | .201 | .154 | .188 | .014 | .226 | 1.000 | -.029 | -.003 |
| .127 | .122 | .159 | .239 | .203 | .059 | -.029 | 1.000 | .316 |
| .105 | .271 | .375 | .507 | .401 | .246 | -.003 | .316 | 1.000 |
| .022 | .043 | .102 | .200 | .388 | .119 | .014 | .162 | .296 |
| .175 | .257 | .322 | .350 | .288 | .402 | .030 | .177 | .443 |
| .218 | .318 | .296 | .163 | .142 | .322 | .250 | -.062 | .101 |
| .153 | .025 | .167 | .120 | .317 | .131 | .045 | .239 | .285 |
| .179 | .249 | .310 | .455 | .385 | .294 | .036 | .318 | .480 |
| .065 | .109 | .099 | .111 | .431 | .091 | -.017 | -.021 | .204 |
| .237 | .362 | .381 | .413 | .286 | .418 | .190 | .142 | .293 |
| .158 | .186 | .144 | .127 | .133 | .229 | .164 | .025 | .092 |
| .223 | .045 | .007 | .034 | .113 | .067 | .202 | .114 | .043 |
| .243 | .349 | .339 | .263 | .277 | .280 | .127 | .158 | .278 |
| -.020 | .067 | .135 | .199 | .124 | .081 | .099 | .115 | .319 |
| .209 | .347 | .137 | .279 | .152 | .323 | .087 | .101 | .175 |
| .346 | .368 | .287 | .175 | -.002 | .283 | .203 | .060 | -.002 |
| .049 | .100 | .271 | .249 | .353 | .167 | .064 | .138 | .420 |
| .190 | .254 | .217 | .219 | .122 | .113 | .058 | .011 | .214 |
| -.022 | .166 | .135 | .231 | .142 | .100 | .029 | .163 | .292 |
| .146 | .174 | .085 | .156 | .066 | .191 | .056 | -.010 | .005 |
| .209 | .228 | .245 | .178 | .011 | .270 | .200 | .016 | -.056 |
| .380 | .100 | .211 | .185 | .352 | .121 | .076 | .105 | .171 |
| .136 | .089 | .074 | .048 | .014 | .131 | .017 | .047 | -.009 |
| .145 | .291 | .179 | .177 | .173 | .321 | .111 | -.030 | .124 |
| .213 | .345 | .433 | .514 | .227 | .462 | .098 | .174 | .289 |
| -.071 | -.090 | -.126 | .071 | .137 | -.140 | -.066 | .070 | .082 |
| .277 | .450 | .320 | .280 | .182 | .359 | .143 | .104 | .164 |
| .000 | .061 | .075 | -.055 | -.104 | .057 | -.016 | .016 | -.111 |
| .153 | .139 | .188 | .091 | .359 | .118 | .011 | .080 | .193 |
| .051 | .343 | .299 | .191 | .152 | .216 | .068 | -.009 | .061 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| .012 | .133 | .106 | .234 | .312 | .136 | .054 | .179 | .208 |
| .098 | .204 | .215 | .130 | .176 | .123 | .068 | .012 | .102 |
| .229 | .262 | .281 | .183 | .258 | .185 | .074 | .111 | .278 |
| .199 | -.040 | .109 | .198 | .290 | .029 | .002 | .260 | .159 |
| .398 | .311 | .161 | .199 | .095 | .137 | .071 | .031 | .134 |
| .130 | .183 | .177 | .252 | .357 | .152 | .055 | .165 | .294 |
| .247 | .390 | .392 | .382 | .211 | .318 | .124 | .171 | .275 |
| .503 | .089 | .248 | .298 | .233 | .189 | .103 | .134 | .153 |
| .025 | .039 | .083 | .100 | .277 | .027 | .048 | .090 | .230 |
| .420 | .410 | .269 | .263 | .352 | .262 | .197 | .150 | .242 |
| .198 | .049 | .081 | .115 | .430 | .160 | .077 | .125 | .202 |
| .295 | .326 | .315 | .311 | .202 | .319 | .104 | .108 | .217 |
| .005 | .139 | .095 | .156 | -.063 | .039 | -.004 | -.004 | .034 |
| .205 | .318 | .316 | .521 | .287 | .369 | .150 | .186 | .350 |
| .157 | .282 | .285 | .057 | -.035 | .166 | .117 | -.052 | -.120 |
| -.003 | .000 | .152 | .178 | .416 | .016 | .046 | .247 | .316 |

**Correla**

| Q25 | Q26 | Q27 | Q28 | Q29 | Q30 | Q31 | Q32 | Q33 |
|---|---|---|---|---|---|---|---|---|
| .066 | .343 | .281 | .330 | .281 | .243 | .183 | .317 | .358 |
| .050 | .014 | .146 | .069 | .493 | -.046 | .027 | .107 | .175 |
| .234 | .311 | .242 | .429 | .176 | .285 | .096 | .303 | .305 |
| .254 | .375 | .342 | .214 | .181 | .263 | .149 | .184 | .205 |
| .168 | .151 | .352 | .382 | .332 | .248 | .157 | .355 | .375 |
| .094 | .217 | .334 | .196 | .302 | .128 | .140 | .064 | .168 |
| .162 | .158 | .220 | .276 | .445 | .105 | .141 | .187 | .311 |
| .122 | .445 | .222 | .227 | .121 | .309 | .320 | .000 | .141 |
| .100 | .233 | .075 | .097 | .062 | .181 | .238 | .033 | .047 |
| .272 | .273 | .197 | .223 | .112 | .213 | .196 | .061 | .098 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| -.001 | .089 | .256 | .471 | .192 | .137 | -.014 | .134 | .505 |
| .176 | .052 | .221 | .222 | .410 | .190 | .013 | .057 | .318 |
| .174 | .373 | .354 | .452 | .298 | .380 | .024 | .195 | .525 |
| .179 | .250 | .267 | .170 | .291 | .161 | .181 | .100 | .126 |
| .176 | .031 | .149 | .280 | .523 | .096 | .020 | .254 | .381 |
| .126 | .428 | .341 | .374 | .273 | .323 | .217 | .113 | .303 |
| -.104 | -.019 | .087 | .053 | .277 | .011 | .001 | .008 | .196 |
| .223 | .333 | .291 | .365 | .127 | .305 | .337 | .081 | .156 |
| .208 | .338 | .304 | .103 | -.027 | .258 | .316 | .022 | -.085 |
| .448 | .155 | .173 | .227 | .341 | .130 | .031 | .201 | .184 |
| .168 | .200 | .161 | .278 | .144 | .371 | .122 | .005 | .313 |
| .114 | .157 | .292 | .202 | .413 | .125 | -.023 | .130 | .346 |
| .275 | .343 | .283 | .456 | .278 | .382 | .130 | .407 | .380 |
| .055 | .193 | .071 | .016 | -.086 | .179 | .183 | -.070 | -.049 |
| 1.000 | .278 | .229 | .175 | .131 | .291 | .047 | .127 | .105 |
| .278 | 1.000 | .425 | .378 | .082 | .489 | .201 | .122 | .271 |
| .229 | .425 | 1.000 | .453 | .214 | .325 | .154 | .159 | .375 |
| .175 | .378 | .453 | 1.000 | .258 | .423 | .188 | .239 | .507 |
| .131 | .082 | .214 | .258 | 1.000 | .178 | .014 | .203 | .401 |
| .291 | .489 | .325 | .423 | .178 | 1.000 | .226 | .059 | .246 |
| .047 | .201 | .154 | .188 | .014 | .226 | 1.000 | -.029 | -.003 |
| .127 | .122 | .159 | .239 | .203 | .059 | -.029 | 1.000 | .316 |
| .105 | .271 | .375 | .507 | .401 | .246 | -.003 | .316 | 1.000 |
| .022 | .043 | .102 | .200 | .388 | .119 | .014 | .162 | .296 |
| .175 | .257 | .322 | .350 | .288 | .402 | .030 | .177 | .443 |
| .218 | .318 | .296 | .163 | .142 | .322 | .250 | -.062 | .101 |
| .153 | .025 | .167 | .120 | .317 | .131 | .045 | .239 | .285 |
| .179 | .249 | .310 | .455 | .385 | .294 | .036 | .318 | .480 |
| .065 | .109 | .099 | .111 | .431 | .091 | -.017 | -.021 | .204 |
| .237 | .362 | .381 | .413 | .286 | .418 | .190 | .142 | .293 |
| .158 | .186 | .144 | .127 | .133 | .229 | .164 | .025 | .092 |
| .223 | .045 | .007 | .034 | .113 | .067 | .202 | .114 | .043 |
| .243 | .349 | .339 | .263 | .277 | .280 | .127 | .158 | .278 |
| -.020 | .067 | .135 | .199 | .124 | .081 | .099 | .115 | .319 |
| .209 | .347 | .137 | .279 | .152 | .323 | .087 | .101 | .175 |
| .346 | .368 | .287 | .175 | -.002 | .283 | .203 | .060 | -.002 |
| .049 | .100 | .271 | .249 | .353 | .167 | .064 | .138 | .420 |
| .190 | .254 | .217 | .219 | .122 | .113 | .058 | .011 | .214 |
| -.022 | .166 | .135 | .231 | .142 | .100 | .029 | .163 | .292 |
| .146 | .174 | .085 | .156 | .066 | .191 | .056 | -.010 | .005 |
| .209 | .228 | .245 | .178 | .011 | .270 | .200 | .016 | -.056 |
| .380 | .100 | .211 | .185 | .352 | .121 | .076 | .105 | .171 |
| .136 | .089 | .074 | .048 | .014 | .131 | .017 | .047 | -.009 |
| .145 | .291 | .179 | .177 | .173 | .321 | .111 | -.030 | .124 |
| .213 | .345 | .433 | .514 | .227 | .462 | .098 | .174 | .289 |
| -.071 | -.090 | -.126 | .071 | .137 | -.140 | -.066 | .070 | .082 |
| .277 | .450 | .320 | .280 | .182 | .359 | .143 | .104 | .164 |
| .000 | .061 | .075 | -.055 | -.104 | .057 | -.016 | .016 | -.111 |
| .153 | .139 | .188 | .091 | .359 | .118 | .011 | .080 | .193 |
| .051 | .343 | .299 | .191 | .152 | .216 | .068 | -.009 | .061 |
| .012 | .133 | .106 | .234 | .312 | .136 | .054 | .179 | .208 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| .098 | .204 | .215 | .130 | .176 | .123 | .068 | .012 | .102 |
| .229 | .262 | .281 | .183 | .258 | .185 | .074 | .111 | .278 |
| .199 | -.040 | .109 | .198 | .290 | .029 | .002 | .260 | .159 |
| .398 | .311 | .161 | .199 | .095 | .137 | .071 | .031 | .134 |
| .130 | .183 | .177 | .252 | .357 | .152 | .055 | .165 | .294 |
| .247 | .390 | .392 | .382 | .211 | .318 | .124 | .171 | .275 |
| .503 | .089 | .248 | .298 | .233 | .189 | .103 | .134 | .153 |
| .025 | .039 | .083 | .100 | .277 | .027 | .048 | .090 | .230 |
| .420 | .410 | .269 | .263 | .352 | .262 | .197 | .150 | .242 |
| .198 | .049 | .081 | .115 | .430 | .160 | .077 | .125 | .202 |
| .295 | .326 | .315 | .311 | .202 | .319 | .104 | .108 | .217 |
| .005 | .139 | .095 | .156 | -.063 | .039 | -.004 | -.004 | .034 |
| .205 | .318 | .316 | .521 | .287 | .369 | .150 | .186 | .350 |
| .157 | .282 | .285 | .057 | -.035 | .166 | .117 | -.052 | -.120 |
| -.003 | .000 | .152 | .178 | .416 | .016 | .046 | .247 | .316 |

**ation Matrix[a]**

| Q34 | Q35 | Q36 | Q37 | Q38 | Q39 | Q40 | Q41 | Q42 |
|---|---|---|---|---|---|---|---|---|
| .168 | .193 | .240 | .093 | .338 | .287 | .352 | .149 | -.013 |
| .286 | .044 | .118 | .102 | .308 | .531 | .146 | .147 | .134 |
| .126 | .286 | .011 | .149 | .259 | .016 | .303 | .093 | .182 |
| .105 | .106 | .341 | .020 | .176 | .154 | .230 | .195 | .126 |
| .163 | .343 | .091 | .386 | .358 | .232 | .310 | .196 | .103 |
| .121 | .145 | .191 | .143 | .179 | .179 | .262 | .065 | .161 |
| .282 | .199 | .094 | .315 | .411 | .459 | .220 | .092 | .172 |
| .162 | .239 | .300 | .105 | .153 | .213 | .214 | .341 | .133 |
| .151 | -.013 | .389 | -.029 | .121 | .109 | .196 | .061 | .044 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| .055 | .114 | .163 | .125 | .162 | -.011 | .242 | .052 | .119 |
| .237 | .357 | .131 | .241 | .456 | .159 | .178 | .020 | -.032 |
| .077 | .243 | .109 | .205 | .338 | .373 | .233 | .060 | .104 |
| .161 | .679 | .188 | .247 | .410 | .082 | .376 | .125 | .052 |
| .166 | .069 | .312 | .078 | .297 | .403 | .277 | .081 | .025 |
| .382 | .311 | .127 | .221 | .368 | .306 | .253 | .084 | .198 |
| .149 | .253 | .394 | .000 | .353 | .196 | .313 | .101 | .006 |
| .286 | .060 | .090 | .052 | .167 | .304 | .082 | -.103 | .169 |
| .098 | .211 | .251 | .124 | .180 | .094 | .259 | .222 | .054 |
| -.120 | .058 | .438 | .010 | .014 | .036 | .216 | .155 | .059 |
| .156 | .103 | .051 | .354 | .237 | .312 | .229 | .128 | .240 |
| .091 | .167 | .151 | .107 | .169 | .180 | .317 | .271 | .208 |
| .324 | .333 | .148 | .188 | .361 | .312 | .094 | .087 | .097 |
| .076 | .385 | .082 | .152 | .351 | .085 | .412 | .122 | .192 |
| -.069 | -.078 | .243 | -.109 | -.137 | .021 | .161 | .188 | -.080 |
| .022 | .175 | .218 | .153 | .179 | .065 | .237 | .158 | .223 |
| .043 | .257 | .318 | .025 | .249 | .109 | .362 | .186 | .045 |
| .102 | .322 | .296 | .167 | .310 | .099 | .381 | .144 | .007 |
| .200 | .350 | .163 | .120 | .455 | .111 | .413 | .127 | .034 |
| .388 | .288 | .142 | .317 | .385 | .431 | .286 | .133 | .113 |
| .119 | .402 | .322 | .131 | .294 | .091 | .418 | .229 | .067 |
| .014 | .030 | .250 | .045 | .036 | -.017 | .190 | .164 | .202 |
| .162 | .177 | -.062 | .239 | .318 | -.021 | .142 | .025 | .114 |
| .296 | .443 | .101 | .285 | .480 | .204 | .293 | .092 | .043 |
| 1.000 | .271 | .081 | .152 | .177 | .291 | .166 | -.005 | .136 |
| .271 | 1.000 | .123 | .281 | .350 | .125 | .335 | .091 | .097 |
| .081 | .123 | 1.000 | -.038 | .166 | .162 | .330 | .171 | .010 |
| .152 | .281 | -.038 | 1.000 | .329 | .183 | .100 | .049 | .306 |
| .177 | .350 | .166 | .329 | 1.000 | .307 | .225 | .035 | .104 |
| .291 | .125 | .162 | .183 | .307 | 1.000 | .111 | .147 | .214 |
| .166 | .335 | .330 | .100 | .225 | .111 | 1.000 | .229 | .102 |
| -.005 | .091 | .171 | .049 | .035 | .147 | .229 | 1.000 | .002 |
| .136 | .097 | .010 | .306 | .104 | .214 | .102 | .002 | 1.000 |
| .210 | .133 | .516 | -.024 | .193 | .243 | .404 | .153 | .113 |
| .159 | .193 | .117 | .116 | .230 | .078 | .141 | .152 | -.029 |
| .038 | .185 | .245 | -.050 | .229 | .031 | .325 | .288 | .041 |
| -.114 | .137 | .312 | -.024 | .018 | .013 | .354 | .288 | .143 |
| .101 | .296 | .041 | .252 | .424 | .349 | .282 | .136 | .098 |
| .016 | .094 | .354 | -.007 | .186 | .107 | .317 | .181 | -.087 |
| .041 | .234 | -.039 | .241 | .184 | .130 | .132 | .165 | -.031 |
| .025 | -.028 | .278 | -.075 | -.043 | .126 | .088 | .137 | .005 |
| -.013 | .063 | .265 | .006 | -.078 | -.002 | .290 | .339 | .065 |
| .181 | .181 | .201 | .320 | .291 | .290 | .223 | .186 | .173 |
| .083 | .176 | .081 | .134 | .048 | .015 | .071 | .106 | -.036 |
| -.017 | .111 | .205 | .018 | -.034 | .144 | .348 | .300 | .016 |
| .129 | .327 | .165 | .225 | .266 | .050 | .425 | .199 | .055 |
| .119 | .041 | -.044 | .002 | .152 | .142 | -.091 | -.220 | -.032 |
| .039 | .246 | .204 | .104 | .170 | .140 | .440 | .333 | .119 |
| -.142 | .020 | .150 | -.148 | -.009 | -.171 | -.026 | .031 | -.128 |
| .136 | .268 | .189 | .299 | .223 | .308 | .183 | .050 | .141 |
| .073 | .177 | .064 | .075 | .125 | .017 | .157 | .088 | .015 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| .361 | .220 | .068 | .186 | .249 | .270 | .038 | -.035 | .053 |
| .094 | .266 | .139 | -.015 | .070 | .237 | .259 | .380 | .066 |
| .066 | .167 | .322 | .141 | .131 | .100 | .299 | .165 | .131 |
| .240 | .214 | -.068 | .318 | .268 | .192 | .081 | -.071 | .388 |
| .044 | .164 | .123 | .004 | .061 | .031 | .173 | .153 | .047 |
| .283 | .291 | .083 | .222 | .333 | .224 | .166 | .148 | .157 |
| .119 | .349 | .268 | .020 | .256 | .210 | .454 | .252 | .067 |
| .045 | .131 | .191 | .265 | .201 | .169 | .196 | .243 | .207 |
| .270 | .219 | .047 | .239 | .302 | .310 | .101 | -.022 | .099 |
| .050 | .245 | .363 | .140 | .214 | .239 | .430 | .334 | .180 |
| .196 | .137 | .140 | .231 | .301 | .334 | .146 | .042 | .308 |
| .102 | .319 | .236 | .049 | .265 | .135 | .292 | .230 | .061 |
| -.076 | .032 | .111 | .000 | .047 | -.054 | .077 | .058 | .018 |
| .147 | .349 | .274 | .140 | .282 | .105 | .546 | .294 | .025 |
| -.133 | .049 | .389 | -.110 | -.126 | .030 | .156 | .094 | -.096 |
| .412 | .117 | -.010 | .285 | .365 | .323 | .054 | .054 | .048 |

**ation Matrix[a]**

| Q34 | Q35 | Q36 | Q37 | Q38 | Q39 | Q40 | Q41 | Q42 |
|---|---|---|---|---|---|---|---|---|
| .168 | .193 | .240 | .093 | .338 | .287 | .352 | .149 | -.013 |
| .286 | .044 | .118 | .102 | .308 | .531 | .146 | .147 | .134 |
| .126 | .286 | .011 | .149 | .259 | .016 | .303 | .093 | .182 |
| .105 | .106 | .341 | .020 | .176 | .154 | .230 | .195 | .126 |
| .163 | .343 | .091 | .386 | .358 | .232 | .310 | .196 | .103 |
| .121 | .145 | .191 | .143 | .179 | .179 | .262 | .065 | .161 |
| .282 | .199 | .094 | .315 | .411 | .459 | .220 | .092 | .172 |
| .162 | .239 | .300 | .105 | .153 | .213 | .214 | .341 | .133 |
| .151 | -.013 | .389 | -.029 | .121 | .109 | .196 | .061 | .044 |
| .055 | .114 | .163 | .125 | .162 | -.011 | .242 | .052 | .119 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| .237 | .357 | .131 | .241 | .456 | .159 | .178 | .020 | -.032 |
| .077 | .243 | .109 | .205 | .338 | .373 | .233 | .060 | .104 |
| .161 | .679 | .188 | .247 | .410 | .082 | .376 | .125 | .052 |
| .166 | .069 | .312 | .078 | .297 | .403 | .277 | .081 | .025 |
| .382 | .311 | .127 | .221 | .368 | .306 | .253 | .084 | .198 |
| .149 | .253 | .394 | .000 | .353 | .196 | .313 | .101 | .006 |
| .286 | .060 | .090 | .052 | .167 | .304 | .082 | -.103 | .169 |
| .098 | .211 | .251 | .124 | .180 | .094 | .259 | .222 | .054 |
| -.120 | .058 | .438 | .010 | .014 | .036 | .216 | .155 | .059 |
| .156 | .103 | .051 | .354 | .237 | .312 | .229 | .128 | .240 |
| .091 | .167 | .151 | .107 | .169 | .180 | .317 | .271 | .208 |
| .324 | .333 | .148 | .188 | .361 | .312 | .094 | .087 | .097 |
| .076 | .385 | .082 | .152 | .351 | .085 | .412 | .122 | .192 |
| -.069 | -.078 | .243 | -.109 | -.137 | .021 | .161 | .188 | -.080 |
| .022 | .175 | .218 | .153 | .179 | .065 | .237 | .158 | .223 |
| .043 | .257 | .318 | .025 | .249 | .109 | .362 | .186 | .045 |
| .102 | .322 | .296 | .167 | .310 | .099 | .381 | .144 | .007 |
| .200 | .350 | .163 | .120 | .455 | .111 | .413 | .127 | .034 |
| .388 | .288 | .142 | .317 | .385 | .431 | .286 | .133 | .113 |
| .119 | .402 | .322 | .131 | .294 | .091 | .418 | .229 | .067 |
| .014 | .030 | .250 | .045 | .036 | -.017 | .190 | .164 | .202 |
| .162 | .177 | -.062 | .239 | .318 | -.021 | .142 | .025 | .114 |
| .296 | .443 | .101 | .285 | .480 | .204 | .293 | .092 | .043 |
| 1.000 | .271 | .081 | .152 | .177 | .291 | .166 | -.005 | .136 |
| .271 | 1.000 | .123 | .281 | .350 | .125 | .335 | .091 | .097 |
| .081 | .123 | 1.000 | -.038 | .166 | .162 | .330 | .171 | .010 |
| .152 | .281 | -.038 | 1.000 | .329 | .183 | .100 | .049 | .306 |
| .177 | .350 | .166 | .329 | 1.000 | .307 | .225 | .035 | .104 |
| .291 | .125 | .162 | .183 | .307 | 1.000 | .111 | .147 | .214 |
| .166 | .335 | .330 | .100 | .225 | .111 | 1.000 | .229 | .102 |
| -.005 | .091 | .171 | .049 | .035 | .147 | .229 | 1.000 | .002 |
| .136 | .097 | .010 | .306 | .104 | .214 | .102 | .002 | 1.000 |
| .210 | .133 | .516 | -.024 | .193 | .243 | .404 | .153 | .113 |
| .159 | .193 | .117 | .116 | .230 | .078 | .141 | .152 | -.029 |
| .038 | .185 | .245 | -.050 | .229 | .031 | .325 | .288 | .041 |
| -.114 | .137 | .312 | -.024 | .018 | .013 | .354 | .288 | .143 |
| .101 | .296 | .041 | .252 | .424 | .349 | .282 | .136 | .098 |
| .016 | .094 | .354 | -.007 | .186 | .107 | .317 | .181 | -.087 |
| .041 | .234 | -.039 | .241 | .184 | .130 | .132 | .165 | -.031 |
| .025 | -.028 | .278 | -.075 | -.043 | .126 | .088 | .137 | .005 |
| -.013 | .063 | .265 | .006 | -.078 | -.002 | .290 | .339 | .065 |
| .181 | .181 | .201 | .320 | .291 | .290 | .223 | .186 | .173 |
| .083 | .176 | .081 | .134 | .048 | .015 | .071 | .106 | -.036 |
| -.017 | .111 | .205 | .018 | -.034 | .144 | .348 | .300 | .016 |
| .129 | .327 | .165 | .225 | .266 | .050 | .425 | .199 | .055 |
| .119 | .041 | -.044 | .002 | .152 | .142 | -.091 | -.220 | -.032 |
| .039 | .246 | .204 | .104 | .170 | .140 | .440 | .333 | .119 |
| -.142 | .020 | .150 | -.148 | -.009 | -.171 | -.026 | .031 | -.128 |
| .136 | .268 | .189 | .299 | .223 | .308 | .183 | .050 | .141 |
| .073 | .177 | .064 | .075 | .125 | .017 | .157 | .088 | .015 |
| .361 | .220 | .068 | .186 | .249 | .270 | .038 | -.035 | .053 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| .094 | .266 | .139 | -.015 | .070 | .237 | .259 | .380 | .066 |
| .066 | .167 | .322 | .141 | .131 | .100 | .299 | .165 | .131 |
| .240 | .214 | -.068 | .318 | .268 | .192 | .081 | -.071 | .388 |
| .044 | .164 | .123 | .004 | .061 | .031 | .173 | .153 | .047 |
| .283 | .291 | .083 | .222 | .333 | .224 | .166 | .148 | .157 |
| .119 | .349 | .268 | .020 | .256 | .210 | .454 | .252 | .067 |
| .045 | .131 | .191 | .265 | .201 | .169 | .196 | .243 | .207 |
| .270 | .219 | .047 | .239 | .302 | .310 | .101 | -.022 | .099 |
| .050 | .245 | .363 | .140 | .214 | .239 | .430 | .334 | .180 |
| .196 | .137 | .140 | .231 | .301 | .334 | .146 | .042 | .308 |
| .102 | .319 | .236 | .049 | .265 | .135 | .292 | .230 | .061 |
| -.076 | .032 | .111 | .000 | .047 | -.054 | .077 | .058 | .018 |
| .147 | .349 | .274 | .140 | .282 | .105 | .546 | .294 | .025 |
| -.133 | .049 | .389 | -.110 | -.126 | .030 | .156 | .094 | -.096 |
| .412 | .117 | -.010 | .285 | .365 | .323 | .054 | .054 | .048 |

| Q43 | Q44 | Q45 | Q46 | Q47 | Q48 | Q49 | Q50 | Q51 |
|---|---|---|---|---|---|---|---|---|
| .467 | .142 | .256 | .186 | .258 | .272 | .152 | -.002 | .080 |
| .169 | .054 | .150 | .012 | .302 | .029 | .131 | .099 | .047 |
| .171 | .139 | .326 | .220 | .144 | .069 | .129 | .022 | .111 |
| .464 | -.013 | .197 | .280 | .085 | .140 | .032 | .171 | .164 |
| .212 | .212 | .117 | .122 | .509 | .099 | .443 | .099 | .078 |
| .220 | .070 | .064 | .091 | .116 | .260 | .051 | .078 | .197 |
| .203 | .241 | .070 | .046 | .311 | .115 | .227 | .053 | .129 |
| .219 | .085 | .297 | .167 | .217 | .127 | .051 | .285 | .155 |
| .286 | .201 | .321 | .193 | .094 | .185 | .206 | .131 | .192 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| -.039 | .104 | .128 | .159 | .101 | .178 | .102 | .139 | .168 |
| .186 | .230 | .085 | -.135 | .239 | .184 | .314 | .012 | -.048 |
| .097 | .170 | .097 | .075 | .426 | .095 | .221 | .154 | .125 |
| .219 | .151 | .274 | .086 | .298 | .219 | .233 | .095 | .162 |
| .351 | .117 | .197 | .274 | .231 | .136 | .147 | .084 | .108 |
| .260 | .159 | .219 | -.020 | .254 | .131 | .186 | .053 | .089 |
| .264 | .220 | .264 | .222 | .125 | .419 | .076 | .088 | .153 |
| .174 | .139 | -.126 | -.133 | .176 | .080 | .153 | -.039 | -.096 |
| .203 | .075 | .131 | .182 | .151 | .215 | .043 | .158 | .293 |
| .261 | .023 | .221 | .401 | -.003 | .196 | .014 | .179 | .343 |
| .122 | .072 | .196 | .198 | .198 | .113 | .258 | .124 | .184 |
| .168 | .129 | .175 | .133 | .221 | .131 | .038 | .117 | .092 |
| .149 | .094 | .067 | .073 | .282 | .077 | .092 | .072 | .008 |
| .156 | .093 | .292 | .219 | .327 | .171 | .172 | .109 | .121 |
| .050 | .021 | .220 | .206 | -.048 | .232 | -.140 | .204 | .154 |
| .243 | -.020 | .209 | .346 | .049 | .190 | -.022 | .146 | .209 |
| .349 | .067 | .347 | .368 | .100 | .254 | .166 | .174 | .228 |
| .339 | .135 | .137 | .287 | .271 | .217 | .135 | .085 | .245 |
| .263 | .199 | .279 | .175 | .249 | .219 | .231 | .156 | .178 |
| .277 | .124 | .152 | -.002 | .353 | .122 | .142 | .066 | .011 |
| .280 | .081 | .323 | .283 | .167 | .113 | .100 | .191 | .270 |
| .127 | .099 | .087 | .203 | .064 | .058 | .029 | .056 | .200 |
| .158 | .115 | .101 | .060 | .138 | .011 | .163 | -.010 | .016 |
| .278 | .319 | .175 | -.002 | .420 | .214 | .292 | .005 | -.056 |
| .210 | .159 | .038 | -.114 | .101 | .016 | .041 | .025 | -.013 |
| .133 | .193 | .185 | .137 | .296 | .094 | .234 | -.028 | .063 |
| .516 | .117 | .245 | .312 | .041 | .354 | -.039 | .278 | .265 |
| -.024 | .116 | -.050 | -.024 | .252 | -.007 | .241 | -.075 | .006 |
| .193 | .230 | .229 | .018 | .424 | .186 | .184 | -.043 | -.078 |
| .243 | .078 | .031 | .013 | .349 | .107 | .130 | .126 | -.002 |
| .404 | .141 | .325 | .354 | .282 | .317 | .132 | .088 | .290 |
| .153 | .152 | .288 | .288 | .136 | .181 | .165 | .137 | .339 |
| .113 | -.029 | .041 | .143 | .098 | -.087 | -.031 | .005 | .065 |
| 1.000 | .070 | .289 | .323 | .148 | .280 | .147 | .145 | .145 |
| .070 | 1.000 | .014 | .027 | .303 | .215 | .280 | .011 | -.017 |
| .289 | .014 | 1.000 | .419 | .104 | .248 | .172 | .118 | .163 |
| .323 | .027 | .419 | 1.000 | .019 | .237 | .078 | .068 | .256 |
| .148 | .303 | .104 | .019 | 1.000 | .104 | .349 | .125 | -.097 |
| .280 | .215 | .248 | .237 | .104 | 1.000 | .197 | .081 | .172 |
| .147 | .280 | .172 | .078 | .349 | .197 | 1.000 | .136 | .028 |
| .145 | .011 | .118 | .068 | .125 | .081 | .136 | 1.000 | .213 |
| .145 | -.017 | .163 | .256 | -.097 | .172 | .028 | .213 | 1.000 |
| .136 | .109 | .182 | .145 | .259 | .063 | .159 | .072 | .160 |
| .088 | .007 | .160 | .215 | .068 | .150 | .137 | .005 | .064 |
| .231 | .012 | .233 | .287 | .035 | .264 | .107 | .180 | .151 |
| .275 | .079 | .246 | .226 | .217 | .134 | .177 | .189 | .305 |
| .032 | .246 | -.003 | -.074 | .074 | -.070 | .113 | -.050 | -.310 |
| .274 | .105 | .274 | .333 | .087 | .139 | .223 | .113 | .283 |
| -.030 | -.039 | -.066 | .029 | -.142 | .035 | -.150 | .085 | .167 |
| .169 | -.027 | .233 | .221 | .295 | .044 | .268 | .195 | -.040 |
| .081 | .050 | .145 | .136 | .150 | .104 | .182 | .232 | .143 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| .174 | .127 | .084 | -.034 | .167 | .041 | .183 | .093 | .052 |
| .264 | .026 | .349 | .275 | .245 | .181 | .101 | .183 | .259 |
| .457 | .029 | .130 | .309 | .147 | .162 | .044 | .119 | .228 |
| .068 | -.030 | .048 | -.062 | .204 | -.056 | .043 | .062 | -.039 |
| .099 | .053 | .284 | .289 | .062 | .245 | .080 | .251 | .246 |
| .211 | .129 | .179 | .057 | .317 | .156 | .294 | .121 | .060 |
| .369 | .077 | .399 | .315 | .239 | .225 | .136 | .243 | .374 |
| .204 | .064 | .110 | .201 | .216 | .164 | .070 | .253 | .132 |
| .072 | .035 | .005 | -.011 | .347 | -.063 | -.022 | -.200 | -.125 |
| .374 | .117 | .404 | .379 | .350 | .293 | .267 | .237 | .219 |
| .188 | .014 | .248 | .062 | .264 | .155 | .152 | .082 | .093 |
| .188 | .044 | .187 | .137 | .146 | .216 | -.040 | .270 | .300 |
| -.023 | -.048 | .140 | .092 | -.006 | .104 | .056 | .193 | .129 |
| .289 | .191 | .382 | .244 | .307 | .232 | .234 | .154 | .228 |
| .206 | -.021 | .048 | .252 | -.131 | .171 | .047 | .237 | .254 |
| .088 | .166 | .068 | -.130 | .342 | -.083 | .133 | -.039 | -.148 |

| Q43 | Q44 | Q45 | Q46 | Q47 | Q48 | Q49 | Q50 | Q51 |
|---|---|---|---|---|---|---|---|---|
| .467 | .142 | .256 | .186 | .258 | .272 | .152 | -.002 | .080 |
| .169 | .054 | .150 | .012 | .302 | .029 | .131 | .099 | .047 |
| .171 | .139 | .326 | .220 | .144 | .069 | .129 | .022 | .111 |
| .464 | -.013 | .197 | .280 | .085 | .140 | .032 | .171 | .164 |
| .212 | .212 | .117 | .122 | .509 | .099 | .443 | .099 | .078 |
| .220 | .070 | .064 | .091 | .116 | .260 | .051 | .078 | .197 |
| .203 | .241 | .070 | .046 | .311 | .115 | .227 | .053 | .129 |
| .219 | .085 | .297 | .167 | .217 | .127 | .051 | .285 | .155 |
| .286 | .201 | .321 | .193 | .094 | .185 | .206 | .131 | .192 |
| -.039 | .104 | .128 | .159 | .101 | .178 | .102 | .139 | .168 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| .186 | .230 | .085 | -.135 | .239 | .184 | .314 | .012 | -.048 |
| .097 | .170 | .097 | .075 | .426 | .095 | .221 | .154 | .125 |
| .219 | .151 | .274 | .086 | .298 | .219 | .233 | .095 | .162 |
| .351 | .117 | .197 | .274 | .231 | .136 | .147 | .084 | .108 |
| .260 | .159 | .219 | -.020 | .254 | .131 | .186 | .053 | .089 |
| .264 | .220 | .264 | .222 | .125 | .419 | .076 | .088 | .153 |
| .174 | .139 | -.126 | -.133 | .176 | .080 | .153 | -.039 | -.096 |
| .203 | .075 | .131 | .182 | .151 | .215 | .043 | .158 | .293 |
| .261 | .023 | .221 | .401 | -.003 | .196 | .014 | .179 | .343 |
| .122 | .072 | .196 | .198 | .198 | .113 | .258 | .124 | .184 |
| .168 | .129 | .175 | .133 | .221 | .131 | .038 | .117 | .092 |
| .149 | .094 | .067 | .073 | .282 | .077 | .092 | .072 | .008 |
| .156 | .093 | .292 | .219 | .327 | .171 | .172 | .109 | .121 |
| .050 | .021 | .220 | .206 | -.048 | .232 | -.140 | .204 | .154 |
| .243 | -.020 | .209 | .346 | .049 | .190 | -.022 | .146 | .209 |
| .349 | .067 | .347 | .368 | .100 | .254 | .166 | .174 | .228 |
| .339 | .135 | .137 | .287 | .271 | .217 | .135 | .085 | .245 |
| .263 | .199 | .279 | .175 | .249 | .219 | .231 | .156 | .178 |
| .277 | .124 | .152 | -.002 | .353 | .122 | .142 | .066 | .011 |
| .280 | .081 | .323 | .283 | .167 | .113 | .100 | .191 | .270 |
| .127 | .099 | .087 | .203 | .064 | .058 | .029 | .056 | .200 |
| .158 | .115 | .101 | .060 | .138 | .011 | .163 | -.010 | .016 |
| .278 | .319 | .175 | -.002 | .420 | .214 | .292 | .005 | -.056 |
| .210 | .159 | .038 | -.114 | .101 | .016 | .041 | .025 | -.013 |
| .133 | .193 | .185 | .137 | .296 | .094 | .234 | -.028 | .063 |
| .516 | .117 | .245 | .312 | .041 | .354 | -.039 | .278 | .265 |
| -.024 | .116 | -.050 | -.024 | .252 | -.007 | .241 | -.075 | .006 |
| .193 | .230 | .229 | .018 | .424 | .186 | .184 | -.043 | -.078 |
| .243 | .078 | .031 | .013 | .349 | .107 | .130 | .126 | -.002 |
| .404 | .141 | .325 | .354 | .282 | .317 | .132 | .088 | .290 |
| .153 | .152 | .288 | .288 | .136 | .181 | .165 | .137 | .339 |
| .113 | -.029 | .041 | .143 | .098 | -.087 | -.031 | .005 | .065 |
| 1.000 | .070 | .289 | .323 | .148 | .280 | .147 | .145 | .145 |
| .070 | 1.000 | .014 | .027 | .303 | .215 | .280 | .011 | -.017 |
| .289 | .014 | 1.000 | .419 | .104 | .248 | .172 | .118 | .163 |
| .323 | .027 | .419 | 1.000 | .019 | .237 | .078 | .068 | .256 |
| .148 | .303 | .104 | .019 | 1.000 | .104 | .349 | .125 | -.097 |
| .280 | .215 | .248 | .237 | .104 | 1.000 | .197 | .081 | .172 |
| .147 | .280 | .172 | .078 | .349 | .197 | 1.000 | .136 | .028 |
| .145 | .011 | .118 | .068 | .125 | .081 | .136 | 1.000 | .213 |
| .145 | -.017 | .163 | .256 | -.097 | .172 | .028 | .213 | 1.000 |
| .136 | .109 | .182 | .145 | .259 | .063 | .159 | .072 | .160 |
| .088 | .007 | .160 | .215 | .068 | .150 | .137 | .005 | .064 |
| .231 | .012 | .233 | .287 | .035 | .264 | .107 | .180 | .151 |
| .275 | .079 | .246 | .226 | .217 | .134 | .177 | .189 | .305 |
| .032 | .246 | -.003 | -.074 | .074 | -.070 | .113 | -.050 | -.310 |
| .274 | .105 | .274 | .333 | .087 | .139 | .223 | .113 | .283 |
| -.030 | -.039 | -.066 | .029 | -.142 | .035 | -.150 | .085 | .167 |
| .169 | -.027 | .233 | .221 | .295 | .044 | .268 | .195 | -.040 |
| .081 | .050 | .145 | .136 | .150 | .104 | .182 | .232 | .143 |
| .174 | .127 | .084 | -.034 | .167 | .041 | .183 | .093 | .052 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| .264 | .026 | .349 | .275 | .245 | .181 | .101 | .183 | .259 |
| .457 | .029 | .130 | .309 | .147 | .162 | .044 | .119 | .228 |
| .068 | -.030 | .048 | -.062 | .204 | -.056 | .043 | .062 | -.039 |
| .099 | .053 | .284 | .289 | .062 | .245 | .080 | .251 | .246 |
| .211 | .129 | .179 | .057 | .317 | .156 | .294 | .121 | .060 |
| .369 | .077 | .399 | .315 | .239 | .225 | .136 | .243 | .374 |
| .204 | .064 | .110 | .201 | .216 | .164 | .070 | .253 | .132 |
| .072 | .035 | .005 | -.011 | .347 | -.063 | -.022 | -.200 | -.125 |
| .374 | .117 | .404 | .379 | .350 | .293 | .267 | .237 | .219 |
| .188 | .014 | .248 | .062 | .264 | .155 | .152 | .082 | .093 |
| .188 | .044 | .187 | .137 | .146 | .216 | -.040 | .270 | .300 |
| -.023 | -.048 | .140 | .092 | -.006 | .104 | .056 | .193 | .129 |
| .289 | .191 | .382 | .244 | .307 | .232 | .234 | .154 | .228 |
| .206 | -.021 | .048 | .252 | -.131 | .171 | .047 | .237 | .254 |
| .088 | .166 | .068 | -.130 | .342 | -.083 | .133 | -.039 | -.148 |

| Q52 | Q53 | Q54 | Q55 | Q56 | Q57 | Q58 | Q59 | Q60 |
|---|---|---|---|---|---|---|---|---|
| .047 | .183 | .173 | .342 | .065 | .293 | -.088 | .073 | .094 |
| .298 | .001 | .143 | .018 | .116 | .084 | -.177 | .232 | .116 |
| .303 | -.015 | .054 | .327 | .041 | .258 | -.036 | .101 | .077 |
| .051 | .158 | .146 | .197 | -.046 | .337 | -.054 | .103 | .003 |
| .281 | -.040 | .112 | .292 | .073 | .206 | -.114 | .352 | .142 |
| .073 | .196 | .180 | .181 | -.164 | .283 | .051 | .079 | .177 |
| .335 | -.028 | .082 | .247 | .172 | .277 | -.204 | .242 | .010 |
| .105 | .068 | .202 | .229 | -.039 | .227 | .042 | .121 | .154 |
| .190 | .144 | .188 | .044 | .160 | .062 | .068 | .083 | .148 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| .125 | -.053 | .020 | .139 | .100 | .213 | .143 | .109 | .159 |
| .134 | .069 | .005 | .271 | .174 | .069 | -.067 | .264 | .024 |
| .326 | .114 | .220 | .186 | .099 | .169 | -.099 | .289 | -.019 |
| .148 | .195 | .191 | .434 | -.073 | .291 | .093 | .201 | .242 |
| .207 | .206 | .089 | .182 | .115 | .262 | -.090 | .242 | .031 |
| .315 | .055 | .113 | .087 | .202 | .106 | -.121 | .241 | .057 |
| .110 | .021 | .146 | .302 | .045 | .222 | -.003 | .111 | .228 |
| .058 | -.081 | -.001 | -.078 | .159 | -.025 | -.063 | .101 | -.004 |
| .206 | .193 | .155 | .285 | -.097 | .318 | -.002 | .082 | .160 |
| .117 | .150 | .215 | .186 | -.135 | .245 | .201 | .094 | .177 |
| .393 | .082 | .111 | .222 | .056 | .324 | -.138 | .268 | -.017 |
| .130 | .030 | .286 | .275 | -.049 | .243 | -.132 | .192 | .130 |
| .235 | .073 | .022 | .176 | .092 | .204 | -.030 | .250 | .170 |
| .164 | -.039 | .075 | .397 | -.062 | .286 | -.055 | .145 | .106 |
| -.038 | .043 | .339 | .148 | -.116 | .218 | .120 | -.058 | .139 |
| .380 | .136 | .145 | .213 | -.071 | .277 | .000 | .153 | .051 |
| .100 | .089 | .291 | .345 | -.090 | .450 | .061 | .139 | .343 |
| .211 | .074 | .179 | .433 | -.126 | .320 | .075 | .188 | .299 |
| .185 | .048 | .177 | .514 | .071 | .280 | -.055 | .091 | .191 |
| .352 | .014 | .173 | .227 | .137 | .182 | -.104 | .359 | .152 |
| .121 | .131 | .321 | .462 | -.140 | .359 | .057 | .118 | .216 |
| .076 | .017 | .111 | .098 | -.066 | .143 | -.016 | .011 | .068 |
| .105 | .047 | -.030 | .174 | .070 | .104 | .016 | .080 | -.009 |
| .171 | -.009 | .124 | .289 | .082 | .164 | -.111 | .193 | .061 |
| .181 | .083 | -.017 | .129 | .119 | .039 | -.142 | .136 | .073 |
| .181 | .176 | .111 | .327 | .041 | .246 | .020 | .268 | .177 |
| .201 | .081 | .205 | .165 | -.044 | .204 | .150 | .189 | .064 |
| .320 | .134 | .018 | .225 | .002 | .104 | -.148 | .299 | .075 |
| .291 | .048 | -.034 | .266 | .152 | .170 | -.009 | .223 | .125 |
| .290 | .015 | .144 | .050 | .142 | .140 | -.171 | .308 | .017 |
| .223 | .071 | .348 | .425 | -.091 | .440 | -.026 | .183 | .157 |
| .186 | .106 | .300 | .199 | -.220 | .333 | .031 | .050 | .088 |
| .173 | -.036 | .016 | .055 | -.032 | .119 | -.128 | .141 | .015 |
| .136 | .088 | .231 | .275 | .032 | .274 | -.030 | .169 | .081 |
| .109 | .007 | .012 | .079 | .246 | .105 | -.039 | -.027 | .050 |
| .182 | .160 | .233 | .246 | -.003 | .274 | -.066 | .233 | .145 |
| .145 | .215 | .287 | .226 | -.074 | .333 | .029 | .221 | .136 |
| .259 | .068 | .035 | .217 | .074 | .087 | -.142 | .295 | .150 |
| .063 | .150 | .264 | .134 | -.070 | .139 | .035 | .044 | .104 |
| .159 | .137 | .107 | .177 | .113 | .223 | -.150 | .268 | .182 |
| .072 | .005 | .180 | .189 | -.050 | .113 | .085 | .195 | .232 |
| .160 | .064 | .151 | .305 | -.310 | .283 | .167 | -.040 | .143 |
| 1.000 | .004 | .004 | .090 | .131 | .123 | -.092 | .168 | .095 |
| .004 | 1.000 | .247 | .142 | -.066 | .146 | .055 | .153 | .104 |
| .004 | .247 | 1.000 | .214 | -.144 | .210 | .108 | .097 | .223 |
| .090 | .142 | .214 | 1.000 | -.120 | .391 | .020 | .167 | .285 |
| .131 | -.066 | -.144 | -.120 | 1.000 | -.060 | -.164 | .026 | .042 |
| .123 | .146 | .210 | .391 | -.060 | 1.000 | -.032 | .101 | .281 |
| -.092 | .055 | .108 | .020 | -.164 | -.032 | 1.000 | -.140 | .026 |
| .168 | .153 | .097 | .167 | .026 | .101 | -.140 | 1.000 | .032 |
| .095 | .104 | .223 | .285 | .042 | .281 | .026 | .032 | 1.000 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| .089 | .127 | -.045 | .231 | .172 | .050 | -.188 | .301 | .020 |
| .149 | .225 | .307 | .247 | -.098 | .246 | .016 | .223 | .168 |
| .257 | .137 | .199 | .207 | -.055 | .212 | .057 | .146 | .044 |
| .188 | .012 | .045 | .217 | .160 | .037 | -.161 | .249 | .060 |
| .252 | .148 | .201 | .173 | -.054 | .179 | -.070 | .065 | .131 |
| .157 | .099 | .084 | .355 | .050 | .214 | -.231 | .275 | .126 |
| .304 | .003 | .176 | .381 | .022 | .312 | .108 | .200 | .208 |
| .341 | .144 | .234 | .199 | .042 | .169 | -.040 | .235 | .032 |
| .141 | -.129 | -.220 | .065 | .082 | .023 | -.137 | .163 | -.002 |
| .376 | .147 | .351 | .236 | -.050 | .360 | -.085 | .259 | .175 |
| .288 | -.053 | .118 | .167 | .126 | .161 | -.158 | .226 | .077 |
| .221 | .044 | .205 | .195 | -.027 | .191 | .205 | .091 | .150 |
| .028 | .037 | .105 | .197 | -.117 | .147 | .069 | .021 | .169 |
| .299 | .143 | .238 | .419 | -.033 | .407 | .013 | .165 | .109 |
| .004 | -.005 | .199 | .108 | -.064 | .180 | .233 | -.014 | .154 |
| .237 | .119 | -.070 | .144 | .153 | .026 | -.158 | .294 | -.051 |

| Q52 | Q53 | Q54 | Q55 | Q56 | Q57 | Q58 | Q59 | Q60 |
|---|---|---|---|---|---|---|---|---|
| .047 | .183 | .173 | .342 | .065 | .293 | -.088 | .073 | .094 |
| .298 | .001 | .143 | .018 | .116 | .084 | -.177 | .232 | .116 |
| .303 | -.015 | .054 | .327 | .041 | .258 | -.036 | .101 | .077 |
| .051 | .158 | .146 | .197 | -.046 | .337 | -.054 | .103 | .003 |
| .281 | -.040 | .112 | .292 | .073 | .206 | -.114 | .352 | .142 |
| .073 | .196 | .180 | .181 | -.164 | .283 | .051 | .079 | .177 |
| .335 | -.028 | .082 | .247 | .172 | .277 | -.204 | .242 | .010 |
| .105 | .068 | .202 | .229 | -.039 | .227 | .042 | .121 | .154 |
| .190 | .144 | .188 | .044 | .160 | .062 | .068 | .083 | .148 |
| .125 | -.053 | .020 | .139 | .100 | .213 | .143 | .109 | .159 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| .134 | .069 | .005 | .271 | .174 | .069 | -.067 | .264 | .024 |
| .326 | .114 | .220 | .186 | .099 | .169 | -.099 | .289 | -.019 |
| .148 | .195 | .191 | .434 | -.073 | .291 | .093 | .201 | .242 |
| .207 | .206 | .089 | .182 | .115 | .262 | -.090 | .242 | .031 |
| .315 | .055 | .113 | .087 | .202 | .106 | -.121 | .241 | .057 |
| .110 | .021 | .146 | .302 | .045 | .222 | -.003 | .111 | .228 |
| .058 | -.081 | -.001 | -.078 | .159 | -.025 | -.063 | .101 | -.004 |
| .206 | .193 | .155 | .285 | -.097 | .318 | -.002 | .082 | .160 |
| .117 | .150 | .215 | .186 | -.135 | .245 | .201 | .094 | .177 |
| .393 | .082 | .111 | .222 | .056 | .324 | -.138 | .268 | -.017 |
| .130 | .030 | .286 | .275 | -.049 | .243 | -.132 | .192 | .130 |
| .235 | .073 | .022 | .176 | .092 | .204 | -.030 | .250 | .170 |
| .164 | -.039 | .075 | .397 | -.062 | .286 | -.055 | .145 | .106 |
| -.038 | .043 | .339 | .148 | -.116 | .218 | .120 | -.058 | .139 |
| .380 | .136 | .145 | .213 | -.071 | .277 | .000 | .153 | .051 |
| .100 | .089 | .291 | .345 | -.090 | .450 | .061 | .139 | .343 |
| .211 | .074 | .179 | .433 | -.126 | .320 | .075 | .188 | .299 |
| .185 | .048 | .177 | .514 | .071 | .280 | -.055 | .091 | .191 |
| .352 | .014 | .173 | .227 | .137 | .182 | -.104 | .359 | .152 |
| .121 | .131 | .321 | .462 | -.140 | .359 | .057 | .118 | .216 |
| .076 | .017 | .111 | .098 | -.066 | .143 | -.016 | .011 | .068 |
| .105 | .047 | -.030 | .174 | .070 | .104 | .016 | .080 | -.009 |
| .171 | -.009 | .124 | .289 | .082 | .164 | -.111 | .193 | .061 |
| .181 | .083 | -.017 | .129 | .119 | .039 | -.142 | .136 | .073 |
| .181 | .176 | .111 | .327 | .041 | .246 | .020 | .268 | .177 |
| .201 | .081 | .205 | .165 | -.044 | .204 | .150 | .189 | .064 |
| .320 | .134 | .018 | .225 | .002 | .104 | -.148 | .299 | .075 |
| .291 | .048 | -.034 | .266 | .152 | .170 | -.009 | .223 | .125 |
| .290 | .015 | .144 | .050 | .142 | .140 | -.171 | .308 | .017 |
| .223 | .071 | .348 | .425 | -.091 | .440 | -.026 | .183 | .157 |
| .186 | .106 | .300 | .199 | -.220 | .333 | .031 | .050 | .088 |
| .173 | -.036 | .016 | .055 | -.032 | .119 | -.128 | .141 | .015 |
| .136 | .088 | .231 | .275 | .032 | .274 | -.030 | .169 | .081 |
| .109 | .007 | .012 | .079 | .246 | .105 | -.039 | -.027 | .050 |
| .182 | .160 | .233 | .246 | -.003 | .274 | -.066 | .233 | .145 |
| .145 | .215 | .287 | .226 | -.074 | .333 | .029 | .221 | .136 |
| .259 | .068 | .035 | .217 | .074 | .087 | -.142 | .295 | .150 |
| .063 | .150 | .264 | .134 | -.070 | .139 | .035 | .044 | .104 |
| .159 | .137 | .107 | .177 | .113 | .223 | -.150 | .268 | .182 |
| .072 | .005 | .180 | .189 | -.050 | .113 | .085 | .195 | .232 |
| .160 | .064 | .151 | .305 | -.310 | .283 | .167 | -.040 | .143 |
| 1.000 | .004 | .004 | .090 | .131 | .123 | -.092 | .168 | .095 |
| .004 | 1.000 | .247 | .142 | -.066 | .146 | .055 | .153 | .104 |
| .004 | .247 | 1.000 | .214 | -.144 | .210 | .108 | .097 | .223 |
| .090 | .142 | .214 | 1.000 | -.120 | .391 | .020 | .167 | .285 |
| .131 | -.066 | -.144 | -.120 | 1.000 | -.060 | -.164 | .026 | .042 |
| .123 | .146 | .210 | .391 | -.060 | 1.000 | -.032 | .101 | .281 |
| -.092 | .055 | .108 | .020 | -.164 | -.032 | 1.000 | -.140 | .026 |
| .168 | .153 | .097 | .167 | .026 | .101 | -.140 | 1.000 | .032 |
| .095 | .104 | .223 | .285 | .042 | .281 | .026 | .032 | 1.000 |
| .089 | .127 | -.045 | .231 | .172 | .050 | -.188 | .301 | .020 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| .149 | .225 | .307 | .247 | -.098 | .246 | .016 | .223 | .168 |
| .257 | .137 | .199 | .207 | -.055 | .212 | .057 | .146 | .044 |
| .188 | .012 | .045 | .217 | .160 | .037 | -.161 | .249 | .060 |
| .252 | .148 | .201 | .173 | -.054 | .179 | -.070 | .065 | .131 |
| .157 | .099 | .084 | .355 | .050 | .214 | -.231 | .275 | .126 |
| .304 | .003 | .176 | .381 | .022 | .312 | .108 | .200 | .208 |
| .341 | .144 | .234 | .199 | .042 | .169 | -.040 | .235 | .032 |
| .141 | -.129 | -.220 | .065 | .082 | .023 | -.137 | .163 | -.002 |
| .376 | .147 | .351 | .236 | -.050 | .360 | -.085 | .259 | .175 |
| .288 | -.053 | .118 | .167 | .126 | .161 | -.158 | .226 | .077 |
| .221 | .044 | .205 | .195 | -.027 | .191 | .205 | .091 | .150 |
| .028 | .037 | .105 | .197 | -.117 | .147 | .069 | .021 | .169 |
| .299 | .143 | .238 | .419 | -.033 | .407 | .013 | .165 | .109 |
| .004 | -.005 | .199 | .108 | -.064 | .180 | .233 | -.014 | .154 |
| .237 | .119 | -.070 | .144 | .153 | .026 | -.158 | .294 | -.051 |

| Q61 | Q62 | Q63 | Q64 | Q65 | Q66 | Q67 | Q68 | Q69 |
|---|---|---|---|---|---|---|---|---|
| .314 | .187 | .318 | .080 | .017 | .226 | .304 | .195 | .154 |
| .231 | .231 | .108 | .191 | .020 | .327 | .211 | .114 | .283 |
| .192 | .154 | .105 | .132 | .194 | .266 | .334 | .135 | .090 |
| .173 | .187 | .486 | .034 | .112 | .127 | .147 | .180 | -.027 |
| .212 | .120 | .227 | .234 | -.006 | .275 | .207 | .296 | .150 |
| .107 | .221 | .035 | .082 | .091 | .207 | .170 | .129 | .122 |
| .347 | .124 | .215 | .238 | .087 | .385 | .157 | .290 | .251 |
| .080 | .291 | .104 | .041 | .187 | .168 | .324 | .183 | .045 |
| .167 | .175 | .140 | -.071 | .096 | .108 | .240 | .051 | .060 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| -.012 | -.086 | -.005 | .134 | .062 | -.043 | .119 | .148 | .007 |
| .252 | .035 | .034 | .134 | -.081 | .238 | .206 | .164 | .085 |
| .179 | .161 | .136 | .260 | .200 | .346 | .192 | .376 | .194 |
| .168 | .254 | .245 | .108 | .144 | .277 | .394 | .136 | .106 |
| .347 | .172 | .293 | .075 | .108 | .183 | .176 | .208 | .187 |
| .282 | .203 | .150 | .421 | .234 | .407 | .268 | .265 | .214 |
| .105 | .119 | .097 | -.034 | .148 | .236 | .280 | .048 | .121 |
| .144 | -.016 | -.067 | .046 | -.167 | .013 | .037 | -.117 | .192 |
| .089 | .228 | .173 | .060 | .264 | .060 | .281 | .221 | -.018 |
| .011 | .284 | .303 | -.058 | .138 | .022 | .217 | .186 | -.043 |
| .107 | .167 | .192 | .265 | .170 | .249 | .148 | .402 | .139 |
| .041 | .218 | .157 | .111 | .178 | .104 | .233 | .257 | .053 |
| .245 | .160 | .311 | .202 | .160 | .329 | .202 | .224 | .118 |
| .181 | .168 | .155 | .239 | .159 | .289 | .373 | .226 | .213 |
| -.068 | .215 | .028 | -.112 | .188 | -.115 | .150 | .027 | -.043 |
| .012 | .098 | .229 | .199 | .398 | .130 | .247 | .503 | .025 |
| .133 | .204 | .262 | -.040 | .311 | .183 | .390 | .089 | .039 |
| .106 | .215 | .281 | .109 | .161 | .177 | .392 | .248 | .083 |
| .234 | .130 | .183 | .198 | .199 | .252 | .382 | .298 | .100 |
| .312 | .176 | .258 | .290 | .095 | .357 | .211 | .233 | .277 |
| .136 | .123 | .185 | .029 | .137 | .152 | .318 | .189 | .027 |
| .054 | .068 | .074 | .002 | .071 | .055 | .124 | .103 | .048 |
| .179 | .012 | .111 | .260 | .031 | .165 | .171 | .134 | .090 |
| .208 | .102 | .278 | .159 | .134 | .294 | .275 | .153 | .230 |
| .361 | .094 | .066 | .240 | .044 | .283 | .119 | .045 | .270 |
| .220 | .266 | .167 | .214 | .164 | .291 | .349 | .131 | .219 |
| .068 | .139 | .322 | -.068 | .123 | .083 | .268 | .191 | .047 |
| .186 | -.015 | .141 | .318 | .004 | .222 | .020 | .265 | .239 |
| .249 | .070 | .131 | .268 | .061 | .333 | .256 | .201 | .302 |
| .270 | .237 | .100 | .192 | .031 | .224 | .210 | .169 | .310 |
| .038 | .259 | .299 | .081 | .173 | .166 | .454 | .196 | .101 |
| -.035 | .380 | .165 | -.071 | .153 | .148 | .252 | .243 | -.022 |
| .053 | .066 | .131 | .388 | .047 | .157 | .067 | .207 | .099 |
| .174 | .264 | .457 | .068 | .099 | .211 | .369 | .204 | .072 |
| .127 | .026 | .029 | -.030 | .053 | .129 | .077 | .064 | .035 |
| .084 | .349 | .130 | .048 | .284 | .179 | .399 | .110 | .005 |
| -.034 | .275 | .309 | -.062 | .289 | .057 | .315 | .201 | -.011 |
| .167 | .245 | .147 | .204 | .062 | .317 | .239 | .216 | .347 |
| .041 | .181 | .162 | -.056 | .245 | .156 | .225 | .164 | -.063 |
| .183 | .101 | .044 | .043 | .080 | .294 | .136 | .070 | -.022 |
| .093 | .183 | .119 | .062 | .251 | .121 | .243 | .253 | -.200 |
| .052 | .259 | .228 | -.039 | .246 | .060 | .374 | .132 | -.125 |
| .089 | .149 | .257 | .188 | .252 | .157 | .304 | .341 | .141 |
| .127 | .225 | .137 | .012 | .148 | .099 | .003 | .144 | -.129 |
| -.045 | .307 | .199 | .045 | .201 | .084 | .176 | .234 | -.220 |
| .231 | .247 | .207 | .217 | .173 | .355 | .381 | .199 | .065 |
| .172 | -.098 | -.055 | .160 | -.054 | .050 | .022 | .042 | .082 |
| .050 | .246 | .212 | .037 | .179 | .214 | .312 | .169 | .023 |
| -.188 | .016 | .057 | -.161 | -.070 | -.231 | .108 | -.040 | -.137 |
| .301 | .223 | .146 | .249 | .065 | .275 | .200 | .235 | .163 |
| .020 | .168 | .044 | .060 | .131 | .126 | .208 | .032 | -.002 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1.000 | .062 | .123 | .229 | .031 | .283 | .164 | .073 | .214 |
| .062 | 1.000 | .203 | .014 | .280 | .251 | .423 | .177 | .055 |
| .123 | .203 | 1.000 | .123 | .176 | .072 | .286 | .263 | .066 |
| .229 | .014 | .123 | 1.000 | .137 | .307 | .128 | .321 | .116 |
| .031 | .280 | .176 | .137 | 1.000 | .191 | .313 | .336 | .046 |
| .283 | .251 | .072 | .307 | .191 | 1.000 | .208 | .197 | .131 |
| .164 | .423 | .286 | .128 | .313 | .208 | 1.000 | .169 | .063 |
| .073 | .177 | .263 | .321 | .336 | .197 | .169 | 1.000 | .018 |
| .214 | .055 | .066 | .116 | .046 | .131 | .063 | .018 | 1.000 |
| .065 | .353 | .306 | .197 | .448 | .349 | .370 | .358 | .089 |
| .096 | .136 | .115 | .427 | .052 | .305 | .225 | .213 | .046 |
| .028 | .234 | .115 | .126 | .177 | .162 | .379 | .200 | -.036 |
| -.089 | .136 | .092 | -.009 | .165 | -.004 | .168 | -.013 | -.149 |
| .095 | .249 | .217 | .179 | .252 | .233 | .383 | .332 | .059 |
| -.005 | .148 | .064 | -.130 | .147 | -.060 | .201 | .136 | -.125 |
| .429 | .147 | .070 | .327 | -.122 | .237 | .018 | .146 | .343 |

| Q61 | Q62 | Q63 | Q64 | Q65 | Q66 | Q67 | Q68 | Q69 |
|---|---|---|---|---|---|---|---|---|
| .314 | .187 | .318 | .080 | .017 | .226 | .304 | .195 | .154 |
| .231 | .231 | .108 | .191 | .020 | .327 | .211 | .114 | .283 |
| .192 | .154 | .105 | .132 | .194 | .266 | .334 | .135 | .090 |
| .173 | .187 | .486 | .034 | .112 | .127 | .147 | .180 | -.027 |
| .212 | .120 | .227 | .234 | -.006 | .275 | .207 | .296 | .150 |
| .107 | .221 | .035 | .082 | .091 | .207 | .170 | .129 | .122 |
| .347 | .124 | .215 | .238 | .087 | .385 | .157 | .290 | .251 |
| .080 | .291 | .104 | .041 | .187 | .168 | .324 | .183 | .045 |
| .167 | .175 | .140 | -.071 | .096 | .108 | .240 | .051 | .060 |
| -.012 | -.086 | -.005 | .134 | .062 | -.043 | .119 | .148 | .007 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| .252 | .035 | .034 | .134 | -.081 | .238 | .206 | .164 | .085 |
| .179 | .161 | .136 | .260 | .200 | .346 | .192 | .376 | .194 |
| .168 | .254 | .245 | .108 | .144 | .277 | .394 | .136 | .106 |
| .347 | .172 | .293 | .075 | .108 | .183 | .176 | .208 | .187 |
| .282 | .203 | .150 | .421 | .234 | .407 | .268 | .265 | .214 |
| .105 | .119 | .097 | -.034 | .148 | .236 | .280 | .048 | .121 |
| .144 | -.016 | -.067 | .046 | -.167 | .013 | .037 | -.117 | .192 |
| .089 | .228 | .173 | .060 | .264 | .060 | .281 | .221 | -.018 |
| .011 | .284 | .303 | -.058 | .138 | .022 | .217 | .186 | -.043 |
| .107 | .167 | .192 | .265 | .170 | .249 | .148 | .402 | .139 |
| .041 | .218 | .157 | .111 | .178 | .104 | .233 | .257 | .053 |
| .245 | .160 | .311 | .202 | .160 | .329 | .202 | .224 | .118 |
| .181 | .168 | .155 | .239 | .159 | .289 | .373 | .226 | .213 |
| -.068 | .215 | .028 | -.112 | .188 | -.115 | .150 | .027 | -.043 |
| .012 | .098 | .229 | .199 | .398 | .130 | .247 | .503 | .025 |
| .133 | .204 | .262 | -.040 | .311 | .183 | .390 | .089 | .039 |
| .106 | .215 | .281 | .109 | .161 | .177 | .392 | .248 | .083 |
| .234 | .130 | .183 | .198 | .199 | .252 | .382 | .298 | .100 |
| .312 | .176 | .258 | .290 | .095 | .357 | .211 | .233 | .277 |
| .136 | .123 | .185 | .029 | .137 | .152 | .318 | .189 | .027 |
| .054 | .068 | .074 | .002 | .071 | .055 | .124 | .103 | .048 |
| .179 | .012 | .111 | .260 | .031 | .165 | .171 | .134 | .090 |
| .208 | .102 | .278 | .159 | .134 | .294 | .275 | .153 | .230 |
| .361 | .094 | .066 | .240 | .044 | .283 | .119 | .045 | .270 |
| .220 | .266 | .167 | .214 | .164 | .291 | .349 | .131 | .219 |
| .068 | .139 | .322 | -.068 | .123 | .083 | .268 | .191 | .047 |
| .186 | -.015 | .141 | .318 | .004 | .222 | .020 | .265 | .239 |
| .249 | .070 | .131 | .268 | .061 | .333 | .256 | .201 | .302 |
| .270 | .237 | .100 | .192 | .031 | .224 | .210 | .169 | .310 |
| .038 | .259 | .299 | .081 | .173 | .166 | .454 | .196 | .101 |
| -.035 | .380 | .165 | -.071 | .153 | .148 | .252 | .243 | -.022 |
| .053 | .066 | .131 | .388 | .047 | .157 | .067 | .207 | .099 |
| .174 | .264 | .457 | .068 | .099 | .211 | .369 | .204 | .072 |
| .127 | .026 | .029 | -.030 | .053 | .129 | .077 | .064 | .035 |
| .084 | .349 | .130 | .048 | .284 | .179 | .399 | .110 | .005 |
| -.034 | .275 | .309 | -.062 | .289 | .057 | .315 | .201 | -.011 |
| .167 | .245 | .147 | .204 | .062 | .317 | .239 | .216 | .347 |
| .041 | .181 | .162 | -.056 | .245 | .156 | .225 | .164 | -.063 |
| .183 | .101 | .044 | .043 | .080 | .294 | .136 | .070 | -.022 |
| .093 | .183 | .119 | .062 | .251 | .121 | .243 | .253 | -.200 |
| .052 | .259 | .228 | -.039 | .246 | .060 | .374 | .132 | -.125 |
| .089 | .149 | .257 | .188 | .252 | .157 | .304 | .341 | .141 |
| .127 | .225 | .137 | .012 | .148 | .099 | .003 | .144 | -.129 |
| -.045 | .307 | .199 | .045 | .201 | .084 | .176 | .234 | -.220 |
| .231 | .247 | .207 | .217 | .173 | .355 | .381 | .199 | .065 |
| .172 | -.098 | -.055 | .160 | -.054 | .050 | .022 | .042 | .082 |
| .050 | .246 | .212 | .037 | .179 | .214 | .312 | .169 | .023 |
| -.188 | .016 | .057 | -.161 | -.070 | -.231 | .108 | -.040 | -.137 |
| .301 | .223 | .146 | .249 | .065 | .275 | .200 | .235 | .163 |
| .020 | .168 | .044 | .060 | .131 | .126 | .208 | .032 | -.002 |
| 1.000 | .062 | .123 | .229 | .031 | .283 | .164 | .073 | .214 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| .062 | 1.000 | .203 | .014 | .280 | .251 | .423 | .177 | .055 |
| .123 | .203 | 1.000 | .123 | .176 | .072 | .286 | .263 | .066 |
| .229 | .014 | .123 | 1.000 | .137 | .307 | .128 | .321 | .116 |
| .031 | .280 | .176 | .137 | 1.000 | .191 | .313 | .336 | .046 |
| .283 | .251 | .072 | .307 | .191 | 1.000 | .208 | .197 | .131 |
| .164 | .423 | .286 | .128 | .313 | .208 | 1.000 | .169 | .063 |
| .073 | .177 | .263 | .321 | .336 | .197 | .169 | 1.000 | .018 |
| .214 | .055 | .066 | .116 | .046 | .131 | .063 | .018 | 1.000 |
| .065 | .353 | .306 | .197 | .448 | .349 | .370 | .358 | .089 |
| .096 | .136 | .115 | .427 | .052 | .305 | .225 | .213 | .046 |
| .028 | .234 | .115 | .126 | .177 | .162 | .379 | .200 | -.036 |
| -.089 | .136 | .092 | -.009 | .165 | -.004 | .168 | -.013 | -.149 |
| .095 | .249 | .217 | .179 | .252 | .233 | .383 | .332 | .059 |
| -.005 | .148 | .064 | -.130 | .147 | -.060 | .201 | .136 | -.125 |
| .429 | .147 | .070 | .327 | -.122 | .237 | .018 | .146 | .343 |

| Q70 | Q71 | Q72 | Q73 | Q74 | Q75 | Q76 |
|---|---|---|---|---|---|---|
| .291 | .167 | .110 | .033 | .244 | .163 | .250 |
| .337 | .203 | .109 | .014 | .192 | -.004 | .400 |
| .234 | .211 | .196 | .099 | .205 | -.123 | .138 |
| .282 | .092 | .107 | .058 | .218 | .149 | .145 |
| .330 | .220 | .152 | .009 | .341 | .017 | .361 |
| .228 | .151 | .249 | .000 | .278 | .204 | .145 |
| .257 | .289 | .118 | -.073 | .280 | -.070 | .443 |
| .344 | .182 | .300 | .059 | .287 | .174 | .129 |
| .193 | .169 | .104 | -.018 | .128 | .191 | .106 |

| | | | | | | |
|---|---|---|---|---|---|---|
| .176 | .247 | .272 | .005 | .275 | .142 | .022 |
| .001 | .240 | .188 | .037 | .254 | -.025 | .280 |
| .332 | .207 | .141 | -.059 | .323 | -.049 | .262 |
| .310 | .178 | .365 | .134 | .338 | .009 | .079 |
| .385 | .213 | .222 | -.084 | .245 | .205 | .294 |
| .344 | .362 | .124 | -.016 | .293 | -.001 | .261 |
| .330 | .137 | .192 | .105 | .207 | .094 | .046 |
| -.005 | .167 | .151 | -.151 | -.009 | -.008 | .215 |
| .268 | .060 | .227 | .157 | .361 | .151 | .057 |
| .256 | .016 | .154 | .225 | .186 | .461 | -.092 |
| .318 | .383 | .134 | -.038 | .185 | -.030 | .300 |
| .213 | .190 | .072 | .139 | .207 | -.095 | .142 |
| .272 | .334 | .207 | .064 | .226 | .062 | .215 |
| .327 | .159 | .272 | .097 | .360 | .008 | .169 |
| .139 | .004 | .144 | .184 | .196 | .369 | -.071 |
| .420 | .198 | .295 | .005 | .205 | .157 | -.003 |
| .410 | .049 | .326 | .139 | .318 | .282 | .000 |
| .269 | .081 | .315 | .095 | .316 | .285 | .152 |
| .263 | .115 | .311 | .156 | .521 | .057 | .178 |
| .352 | .430 | .202 | -.063 | .287 | -.035 | .416 |
| .262 | .160 | .319 | .039 | .369 | .166 | .016 |
| .197 | .077 | .104 | -.004 | .150 | .117 | .046 |
| .150 | .125 | .108 | -.004 | .186 | -.052 | .247 |
| .242 | .202 | .217 | .034 | .350 | -.120 | .316 |
| .050 | .196 | .102 | -.076 | .147 | -.133 | .412 |
| .245 | .137 | .319 | .032 | .349 | .049 | .117 |
| .363 | .140 | .236 | .111 | .274 | .389 | -.010 |
| .140 | .231 | .049 | .000 | .140 | -.110 | .285 |
| .214 | .301 | .265 | .047 | .282 | -.126 | .365 |
| .239 | .334 | .135 | -.054 | .105 | .030 | .323 |
| .430 | .146 | .292 | .077 | .546 | .156 | .054 |
| .334 | .042 | .230 | .058 | .294 | .094 | .054 |
| .180 | .308 | .061 | .018 | .025 | -.096 | .048 |
| .374 | .188 | .188 | -.023 | .289 | .206 | .088 |
| .117 | .014 | .044 | -.048 | .191 | -.021 | .166 |
| .404 | .248 | .187 | .140 | .382 | .048 | .068 |
| .379 | .062 | .137 | .092 | .244 | .252 | -.130 |
| .350 | .264 | .146 | -.006 | .307 | -.131 | .342 |
| .293 | .155 | .216 | .104 | .232 | .171 | -.083 |
| .267 | .152 | -.040 | .056 | .234 | .047 | .133 |
| .237 | .082 | .270 | .193 | .154 | .237 | -.039 |
| .219 | .093 | .300 | .129 | .228 | .254 | -.148 |
| .376 | .288 | .221 | .028 | .299 | .004 | .237 |
| .147 | -.053 | .044 | .037 | .143 | -.005 | .119 |
| .351 | .118 | .205 | .105 | .238 | .199 | -.070 |
| .236 | .167 | .195 | .197 | .419 | .108 | .144 |
| -.050 | .126 | -.027 | -.117 | -.033 | -.064 | .153 |
| .360 | .161 | .191 | .147 | .407 | .180 | .026 |
| -.085 | -.158 | .205 | .069 | .013 | .233 | -.158 |
| .259 | .226 | .091 | .021 | .165 | -.014 | .294 |
| .175 | .077 | .150 | .169 | .109 | .154 | -.051 |

| | | | | | | |
|---|---|---|---|---|---|---|
| .065 | .096 | .028 | -.089 | .095 | -.005 | .429 |
| .353 | .136 | .234 | .136 | .249 | .148 | .147 |
| .306 | .115 | .115 | .092 | .217 | .064 | .070 |
| .197 | .427 | .126 | -.009 | .179 | -.130 | .327 |
| .448 | .052 | .177 | .165 | .252 | .147 | -.122 |
| .349 | .305 | .162 | -.004 | .233 | -.060 | .237 |
| .370 | .225 | .379 | .168 | .383 | .201 | .018 |
| .358 | .213 | .200 | -.013 | .332 | .136 | .146 |
| .089 | .046 | -.036 | -.149 | .059 | -.125 | .343 |
| 1.000 | .263 | .319 | .144 | .448 | .186 | .112 |
| .263 | 1.000 | .246 | .016 | .132 | .011 | .218 |
| .319 | .246 | 1.000 | .227 | .254 | .279 | -.038 |
| .144 | .016 | .227 | 1.000 | .118 | .081 | -.103 |
| .448 | .132 | .254 | .118 | 1.000 | .148 | .237 |
| .186 | .011 | .279 | .081 | .148 | 1.000 | -.140 |
| .112 | .218 | -.038 | -.103 | .237 | -.140 | 1.000 |

| Q70 | Q71 | Q72 | Q73 | Q74 | Q75 | Q76 |
|---|---|---|---|---|---|---|
| .291 | .167 | .110 | .033 | .244 | .163 | .250 |
| .337 | .203 | .109 | .014 | .192 | -.004 | .400 |
| .234 | .211 | .196 | .099 | .205 | -.123 | .138 |
| .282 | .092 | .107 | .058 | .218 | .149 | .145 |
| .330 | .220 | .152 | .009 | .341 | .017 | .361 |
| .228 | .151 | .249 | .000 | .278 | .204 | .145 |
| .257 | .289 | .118 | -.073 | .280 | -.070 | .443 |
| .344 | .182 | .300 | .059 | .287 | .174 | .129 |
| .193 | .169 | .104 | -.018 | .128 | .191 | .106 |
| .176 | .247 | .272 | .005 | .275 | .142 | .022 |

| | | | | | | |
|---|---|---|---|---|---|---|
| .001 | .240 | .188 | .037 | .254 | -.025 | .280 |
| .332 | .207 | .141 | -.059 | .323 | -.049 | .262 |
| .310 | .178 | .365 | .134 | .338 | .009 | .079 |
| .385 | .213 | .222 | -.084 | .245 | .205 | .294 |
| .344 | .362 | .124 | -.016 | .293 | -.001 | .261 |
| .330 | .137 | .192 | .105 | .207 | .094 | .046 |
| -.005 | .167 | .151 | -.151 | -.009 | -.008 | .215 |
| .268 | .060 | .227 | .157 | .361 | .151 | .057 |
| .256 | .016 | .154 | .225 | .186 | .461 | -.092 |
| .318 | .383 | .134 | -.038 | .185 | -.030 | .300 |
| .213 | .190 | .072 | .139 | .207 | -.095 | .142 |
| .272 | .334 | .207 | .064 | .226 | .062 | .215 |
| .327 | .159 | .272 | .097 | .360 | .008 | .169 |
| .139 | .004 | .144 | .184 | .196 | .369 | -.071 |
| .420 | .198 | .295 | .005 | .205 | .157 | -.003 |
| .410 | .049 | .326 | .139 | .318 | .282 | .000 |
| .269 | .081 | .315 | .095 | .316 | .285 | .152 |
| .263 | .115 | .311 | .156 | .521 | .057 | .178 |
| .352 | .430 | .202 | -.063 | .287 | -.035 | .416 |
| .262 | .160 | .319 | .039 | .369 | .166 | .016 |
| .197 | .077 | .104 | -.004 | .150 | .117 | .046 |
| .150 | .125 | .108 | -.004 | .186 | -.052 | .247 |
| .242 | .202 | .217 | .034 | .350 | -.120 | .316 |
| .050 | .196 | .102 | -.076 | .147 | -.133 | .412 |
| .245 | .137 | .319 | .032 | .349 | .049 | .117 |
| .363 | .140 | .236 | .111 | .274 | .389 | -.010 |
| .140 | .231 | .049 | .000 | .140 | -.110 | .285 |
| .214 | .301 | .265 | .047 | .282 | -.126 | .365 |
| .239 | .334 | .135 | -.054 | .105 | .030 | .323 |
| .430 | .146 | .292 | .077 | .546 | .156 | .054 |
| .334 | .042 | .230 | .058 | .294 | .094 | .054 |
| .180 | .308 | .061 | .018 | .025 | -.096 | .048 |
| .374 | .188 | .188 | -.023 | .289 | .206 | .088 |
| .117 | .014 | .044 | -.048 | .191 | -.021 | .166 |
| .404 | .248 | .187 | .140 | .382 | .048 | .068 |
| .379 | .062 | .137 | .092 | .244 | .252 | -.130 |
| .350 | .264 | .146 | -.006 | .307 | -.131 | .342 |
| .293 | .155 | .216 | .104 | .232 | .171 | -.083 |
| .267 | .152 | -.040 | .056 | .234 | .047 | .133 |
| .237 | .082 | .270 | .193 | .154 | .237 | -.039 |
| .219 | .093 | .300 | .129 | .228 | .254 | -.148 |
| .376 | .288 | .221 | .028 | .299 | .004 | .237 |
| .147 | -.053 | .044 | .037 | .143 | -.005 | .119 |
| .351 | .118 | .205 | .105 | .238 | .199 | -.070 |
| .236 | .167 | .195 | .197 | .419 | .108 | .144 |
| -.050 | .126 | -.027 | -.117 | -.033 | -.064 | .153 |
| .360 | .161 | .191 | .147 | .407 | .180 | .026 |
| -.085 | -.158 | .205 | .069 | .013 | .233 | -.158 |
| .259 | .226 | .091 | .021 | .165 | -.014 | .294 |
| .175 | .077 | .150 | .169 | .109 | .154 | -.051 |
| .065 | .096 | .028 | -.089 | .095 | -.005 | .429 |

| | | | | | | |
|---|---|---|---|---|---|---|
| .353 | .136 | .234 | .136 | .249 | .148 | .147 |
| .306 | .115 | .115 | .092 | .217 | .064 | .070 |
| .197 | .427 | .126 | -.009 | .179 | -.130 | .327 |
| .448 | .052 | .177 | .165 | .252 | .147 | -.122 |
| .349 | .305 | .162 | -.004 | .233 | -.060 | .237 |
| .370 | .225 | .379 | .168 | .383 | .201 | .018 |
| .358 | .213 | .200 | -.013 | .332 | .136 | .146 |
| .089 | .046 | -.036 | -.149 | .059 | -.125 | .343 |
| 1.000 | .263 | .319 | .144 | .448 | .186 | .112 |
| .263 | 1.000 | .246 | .016 | .132 | .011 | .218 |
| .319 | .246 | 1.000 | .227 | .254 | .279 | -.038 |
| .144 | .016 | .227 | 1.000 | .118 | .081 | -.103 |
| .448 | .132 | .254 | .118 | 1.000 | .148 | .237 |
| .186 | .011 | .279 | .081 | .148 | 1.000 | -.140 |
| .112 | .218 | -.038 | -.103 | .237 | -.140 | 1.000 |

```
FACTOR
  /VARIABLES Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12 Q13 Q14 Q15 Q16 Q17 Q18
    Q25 Q26 Q27 Q28 Q29 Q30 Q31 Q32 Q33 Q34 Q35 Q36 Q37 Q38 Q39 Q40 Q41 Q42
    Q50 Q51 Q52 Q53 Q54 Q55 Q56 Q57 Q58 Q59 Q60 Q61 Q62 Q63 Q64 Q65 Q66 Q67
    Q75 Q76
  /MISSING LISTWISE
  /ANALYSIS Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12 Q13 Q14 Q15 Q16 Q17 Q18 Q
    Q25 Q26 Q27 Q28 Q29 Q30 Q31 Q32 Q33 Q34 Q35 Q36 Q37 Q38 Q39 Q40 Q41 Q42
    Q50 Q51 Q52 Q53 Q54 Q55 Q56 Q57 Q58 Q59 Q60 Q61 Q62 Q63 Q64 Q65 Q66 Q67
    Q75 Q76
  /PRINT INITIAL CORRELATION DET KMO EXTRACTION ROTATION
  /FORMAT SORT BLANK(.316)
  /CRITERIA MINEIGEN(1) ITERATE(500)
  /EXTRACTION PAF
  /CRITERIA ITERATE(500) DELTA(0)
  /ROTATION OBLIMIN
  /METHOD=CORRELATION.
```

# Factor Analysis

**Notes**

| | | |
|---|---|---|
| Output Created | | 15-AUG-2017 10:00:10 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\PRE_POST_2016 (Fixed).sav |
| | Active Dataset | DataSet1 |
| | Filter | GRADE = 3 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 98 |
| Missing Value Handling | Definition of Missing | MISSING=EXCLUDE: User-defined missing values are treated as missing. |
| | Cases Used | LISTWISE: Statistics are based on cases with no missing values for any variable used. |

| | | |
|---|---|---|
| Syntax | | FACTOR<br>/VARIABLES Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12 Q13 Q14 Q15 Q16 Q17 Q18 Q19 Q20 Q21 Q22 Q23 Q24<br>Q25 Q26 Q27 Q28 Q29 Q30 Q31 Q32 Q33 Q34 Q35 Q36 Q37 Q38 Q39 Q40 Q41 Q42 Q43 Q44 Q45 Q46 Q47 Q48 Q49<br>Q50 Q51 Q52 Q53 Q54 Q55 Q56 Q57 Q58 Q59 Q60 Q61 Q62 Q63 Q64 Q65 Q66 Q67 Q68 Q69 Q70 Q71 Q72 Q73 Q74<br>Q75 Q76<br>/MISSING LISTWISE<br>/ANALYSIS Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12 Q13 Q14 Q15 Q16 Q17 Q18 Q19 Q20 Q21 Q22 Q23 Q24<br>Q25 Q26 Q27 Q28 Q29 Q30 Q31 Q32 Q33 Q34 Q35 Q36 Q37 Q38 Q39 Q40 Q41 Q42 Q43 Q44 Q45 Q46 Q47 Q48 Q49<br>Q50 Q51 Q52 Q53 Q54 Q55 Q56 Q57 Q58 Q59 Q60 Q61 Q62 Q63 Q64 Q65 Q66 Q67 Q68 Q69 Q70 Q71 Q72 Q73 Q74<br>Q75 Q76<br>/PRINT INITIAL CORRELATION DET KMO |
| Resources | Processor Time | 00:00:00.20 |
| | Elapsed Time | 00:00:00.17 |
| | Maximum Memory Required | 644384 (629.281K) bytes |

| | | Q1 | Q2 |
|---|---|---|---|
| Correlation | Q1 | 1.000 | 0.297 |
| | Q2 | 0.297 | 1.000 |
| | Q3 | -0.069 | -0.100 |
| | Q4 | 0.397 | 0.140 |
| | Q5 | 0.263 | 0.347 |
| | Q6 | 0.253 | 0.401 |
| | Q7 | 0.446 | 0.430 |
| | Q8 | 0.171 | -0.037 |
| | Q9 | 0.151 | 0.060 |
| | Q10 | -0.168 | 0.027 |
| | Q11 | 0.295 | 0.165 |
| | Q12 | 0.237 | 0.377 |
| | Q13 | 0.294 | 0.164 |
| | Q14 | 0.616 | 0.458 |

| | | |
|---|---|---|
| Q15 | 0.278 | 0.336 |
| Q16 | 0.287 | 0.324 |
| Q17 | -0.018 | 0.397 |
| Q18 | 0.194 | 0.121 |
| Q19 | 0.322 | 0.146 |
| Q20 | 0.148 | -0.034 |
| Q21 | 0.089 | -0.049 |
| Q22 | 0.388 | 0.155 |
| Q23 | 0.235 | 0.192 |
| Q24 | -0.054 | -0.108 |
| Q25 | -0.086 | -0.093 |
| Q26 | 0.335 | 0.052 |
| Q27 | 0.308 | 0.154 |
| Q28 | 0.231 | 0.109 |
| Q29 | 0.236 | 0.499 |
| Q30 | 0.205 | 0.034 |
| Q31 | 0.235 | 0.095 |
| Q32 | 0.181 | 0.184 |
| Q33 | 0.341 | 0.261 |
| Q34 | 0.212 | 0.258 |
| Q35 | 0.258 | 0.150 |
| Q36 | 0.397 | 0.165 |
| Q37 | 0.111 | 0.024 |
| Q38 | 0.270 | 0.339 |
| Q39 | 0.340 | 0.472 |
| Q40 | 0.351 | 0.166 |
| Q41 | 0.210 | -0.006 |
| Q42 | 0.000 | 0.047 |
| Q43 | 0.495 | 0.198 |
| Q44 | 0.207 | -0.027 |
| Q45 | 0.237 | 0.114 |
| Q46 | 0.252 | 0.013 |
| Q47 | 0.378 | 0.308 |
| Q48 | 0.247 | 0.092 |
| Q49 | 0.259 | 0.154 |
| Q50 | 0.041 | -0.076 |
| Q51 | 0.068 | -0.070 |
| Q52 | 0.135 | 0.145 |
| Q53 | 0.282 | 0.038 |
| Q54 | 0.057 | 0.141 |
| Q55 | 0.220 | 0.063 |
| Q56 | 0.064 | 0.135 |
| Q57 | 0.353 | 0.073 |
| Q58 | -0.085 | -0.074 |
| Q59 | 0.178 | 0.176 |

| | | | |
|---|---|---|---|
| | Q60 | 0.107 | 0.038 |
| | Q61 | 0.288 | 0.321 |
| | Q62 | 0.192 | 0.163 |
| | Q63 | 0.328 | 0.038 |
| | Q64 | 0.013 | 0.073 |
| | Q65 | 0.036 | -0.063 |
| | Q66 | 0.272 | 0.358 |
| | Q67 | 0.224 | 0.135 |
| | Q68 | 0.182 | -0.066 |
| | Q69 | 0.211 | 0.311 |
| | Q70 | 0.363 | 0.194 |
| | Q71 | 0.036 | 0.035 |
| | Q72 | -0.010 | 0.005 |
| | Q73 | -0.157 | -0.135 |
| | Q74 | 0.235 | 0.170 |
| | Q75 | 0.182 | 0.068 |
| | Q76 | 0.275 | 0.358 |

a. Determinant = 1.661E-36

**KMO and Bartlett's Test**

| | | | |
|---|---|---|---|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | 0.299 | **Don't use KMO t** |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 4847.016 | |
| | df | 2850 | |
| | Sig. | 0.000 | |

**Communalities**

| | Initial | Extraction |
|---|---|---|
| Q1 | 0.926 | 0.737 |
| Q2 | 0.956 | 0.719 |
| Q3 | 0.910 | 0.549 |
| Q4 | 0.921 | 0.577 |
| Q5 | 0.969 | 0.858 |
| Q6 | 0.935 | 0.655 |
| Q7 | 0.900 | 0.755 |
| Q8 | 0.934 | 0.759 |
| Q9 | 0.950 | 0.686 |
| Q10 | 0.888 | 0.682 |
| Q11 | 0.915 | 0.603 |
| Q12 | 0.978 | 0.631 |
| Q13 | 0.958 | 0.788 |
| Q14 | 0.961 | 0.686 |
| Q15 | 0.980 | 0.762 |
| Q16 | 0.936 | 0.798 |
| Q17 | 0.870 | 0.669 |

| | | |
|---|---|---|
| Q18 | 0.937 | 0.731 |
| Q19 | 0.896 | 0.679 |
| Q20 | 0.893 | 0.781 |
| Q21 | 0.933 | 0.616 |
| Q22 | 0.941 | 0.638 |
| Q23 | 0.918 | 0.783 |
| Q24 | 0.885 | 0.609 |
| Q25 | 0.930 | 0.726 |
| Q26 | 0.923 | 0.750 |
| Q27 | 0.969 | 0.688 |
| Q28 | 0.961 | 0.732 |
| Q29 | 0.964 | 0.720 |
| Q30 | 0.925 | 0.790 |
| Q31 | 0.925 | 0.575 |
| Q32 | 0.928 | 0.593 |
| Q33 | 0.944 | 0.778 |
| Q34 | 0.945 | 0.662 |
| Q35 | 0.930 | 0.756 |
| Q36 | 0.969 | 0.749 |
| Q37 | 0.967 | 0.698 |
| Q38 | 0.966 | 0.883 |
| Q39 | 0.918 | 0.789 |
| Q40 | 0.940 | 0.726 |
| Q41 | 0.903 | 0.575 |
| Q42 | 0.904 | 0.756 |
| Q43 | 0.938 | 0.808 |
| Q44 | 0.961 | 0.616 |
| Q45 | 0.973 | 0.811 |
| Q46 | 0.936 | 0.645 |
| Q47 | 0.970 | 0.771 |
| Q48 | 0.942 | 0.595 |
| Q49 | 0.931 | 0.863 |
| Q50 | 0.930 | 0.570 |
| Q51 | 0.898 | 0.705 |
| Q52 | 0.967 | 0.758 |
| Q53 | 0.940 | 0.653 |
| Q54 | 0.945 | 0.674 |
| Q55 | 0.932 | 0.641 |
| Q56 | 0.857 | 0.490 |
| Q57 | 0.925 | 0.706 |
| Q58 | 0.837 | 0.470 |
| Q59 | 0.970 | 0.647 |
| Q60 | 0.917 | 0.550 |
| Q61 | 0.948 | 0.533 |
| Q62 | 0.915 | 0.591 |

| | | |
|---|---|---|
| Q63 | 0.952 | 0.739 |
| Q64 | 0.942 | 0.550 |
| Q65 | 0.971 | 0.795 |
| Q66 | 0.956 | 0.636 |
| Q67 | 0.894 | 0.636 |
| Q68 | 0.889 | 0.511 |
| Q69 | 0.912 | 0.699 |
| Q70 | 0.952 | 0.753 |
| Q71 | 0.936 | 0.833 |
| Q72 | 0.900 | 0.671 |
| Q73 | 0.913 | 0.420 |
| Q74 | 0.980 | 0.744 |
| Q75 | 0.941 | 0.786 |
| Q76 | 0.969 | 0.670 |

Extraction Method: Principal Axis Factoring.

**Total Variance Explained**

| | Initial Eigenvalues | | |
|---|---|---|---|
| Factor | Total | % of Variance | Cumulative % |
| 1 | 14.318 | 18.839 | 18.839 |
| 2 | 6.817 | 8.970 | 27.809 |
| 3 | 3.777 | 4.970 | 32.778 |
| 4 | 2.986 | 3.929 | 36.707 |
| 5 | 2.516 | 3.310 | 40.017 |
| 6 | 2.426 | 3.192 | 43.210 |
| 7 | 2.304 | 3.031 | 46.240 |
| 8 | 2.148 | 2.827 | 49.067 |
| 9 | 2.081 | 2.739 | 51.806 |
| 10 | 1.876 | 2.468 | 54.274 |
| 11 | 1.813 | 2.386 | 56.660 |
| 12 | 1.733 | 2.281 | 58.941 |
| 13 | 1.693 | 2.227 | 61.168 |
| 14 | 1.586 | 2.087 | 63.255 |
| 15 | 1.516 | 1.995 | 65.251 |
| 16 | 1.448 | 1.905 | 67.155 |
| 17 | 1.360 | 1.789 | 68.945 |
| 18 | 1.266 | 1.665 | 70.610 |
| 19 | 1.239 | 1.631 | 72.241 |
| 20 | 1.173 | 1.544 | 73.784 |
| 21 | 1.142 | 1.503 | 75.287 |
| 22 | 1.116 | 1.469 | 76.756 |
| 23 | 1.024 | 1.348 | 78.104 |

| | | | |
|---|---|---|---|
| 24 | 0.994 | 1.308 | 79.412 |
| 25 | 0.970 | 1.276 | 80.688 |
| 26 | 0.883 | 1.161 | 81.849 |
| 27 | 0.830 | 1.093 | 82.942 |
| 28 | 0.767 | 1.009 | 83.951 |
| 29 | 0.723 | 0.952 | 84.903 |
| 30 | 0.699 | 0.919 | 85.822 |
| 31 | 0.698 | 0.918 | 86.741 |
| 32 | 0.645 | 0.849 | 87.590 |
| 33 | 0.631 | 0.831 | 88.420 |
| 34 | 0.585 | 0.770 | 89.191 |
| 35 | 0.575 | 0.756 | 89.947 |
| 36 | 0.530 | 0.697 | 90.645 |
| 37 | 0.505 | 0.665 | 91.309 |
| 38 | 0.491 | 0.645 | 91.955 |
| 39 | 0.479 | 0.631 | 92.586 |
| 40 | 0.419 | 0.552 | 93.137 |
| 41 | 0.409 | 0.538 | 93.675 |
| 42 | 0.390 | 0.513 | 94.189 |
| 43 | 0.372 | 0.490 | 94.679 |
| 44 | 0.341 | 0.448 | 95.127 |
| 45 | 0.330 | 0.434 | 95.561 |
| 46 | 0.311 | 0.410 | 95.971 |
| 47 | 0.286 | 0.376 | 96.347 |
| 48 | 0.266 | 0.350 | 96.697 |
| 49 | 0.243 | 0.320 | 97.017 |
| 50 | 0.238 | 0.313 | 97.330 |
| 51 | 0.219 | 0.288 | 97.618 |
| 52 | 0.191 | 0.251 | 97.868 |
| 53 | 0.170 | 0.223 | 98.092 |
| 54 | 0.164 | 0.215 | 98.307 |
| 55 | 0.148 | 0.194 | 98.501 |
| 56 | 0.144 | 0.190 | 98.691 |
| 57 | 0.122 | 0.161 | 98.852 |
| 58 | 0.114 | 0.150 | 99.003 |
| 59 | 0.105 | 0.138 | 99.140 |
| 60 | 0.093 | 0.123 | 99.263 |
| 61 | 0.084 | 0.111 | 99.374 |
| 62 | 0.076 | 0.099 | 99.473 |
| 63 | 0.074 | 0.097 | 99.571 |
| 64 | 0.054 | 0.072 | 99.642 |
| 65 | 0.047 | 0.062 | 99.704 |
| 66 | 0.045 | 0.059 | 99.762 |
| 67 | 0.039 | 0.051 | 99.814 |
| 68 | 0.035 | 0.046 | 99.859 |

| | | | |
|---|---|---|---|
| 69 | 0.024 | 0.032 | 99.891 |
| 70 | 0.023 | 0.031 | 99.922 |
| 71 | 0.017 | 0.023 | 99.945 |
| 72 | 0.017 | 0.022 | 99.967 |
| 73 | 0.010 | 0.014 | 99.980 |
| 74 | 0.007 | 0.010 | 99.990 |
| 75 | 0.006 | 0.007 | 99.997 |
| 76 | 0.002 | 0.003 | 100.000 |

Extraction Method: Principal Axis Factoring.

a. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.

| | 1 | 2 | 3 |
|---|---|---|---|
| Q13 | 0.738 | | |
| Q27 | 0.691 | | |
| Q70 | 0.648 | 0.327 | |
| Q35 | 0.644 | | |
| Q74 | 0.635 | | |
| Q33 | 0.619 | -0.359 | |
| Q5 | 0.618 | -0.352 | |
| Q28 | 0.591 | | |
| Q23 | 0.577 | | |
| Q26 | 0.564 | | |
| Q66 | 0.560 | | |
| Q38 | 0.559 | -0.362 | |
| Q36 | 0.548 | | |
| Q55 | 0.546 | | |
| Q1 | 0.546 | | 0.440 |
| Q22 | 0.540 | | |
| Q29 | 0.534 | -0.378 | |
| Q47 | 0.534 | -0.412 | |
| Q67 | 0.530 | | |
| Q40 | 0.527 | | |
| Q30 | 0.519 | 0.337 | |
| Q16 | 0.503 | | |
| Q43 | 0.498 | | 0.454 |
| Q18 | 0.494 | | |
| Q12 | 0.492 | | |
| Q57 | 0.484 | | |
| Q15 | 0.463 | | |
| Q52 | 0.456 | | |
| Q59 | 0.453 | | |
| Q6 | 0.452 | | |
| Q45 | 0.443 | 0.427 | |

| | | | |
|---|---|---|---|
| Q11 | 0.428 | -0.376 | |
| Q4 | 0.423 | | |
| Q62 | 0.415 | | |
| Q63 | 0.405 | | |
| Q72 | 0.401 | | |
| Q8 | 0.391 | | |
| Q41 | 0.387 | | |
| Q64 | 0.383 | | -0.369 |
| Q21 | 0.356 | | |
| Q32 | 0.347 | | |
| Q68 | 0.327 | | |
| Q60 | | | |
| Q46 | 0.346 | 0.568 | |
| Q76 | 0.343 | -0.568 | |
| Q7 | 0.511 | -0.553 | |
| Q17 | | -0.501 | 0.368 |
| Q69 | | -0.494 | |
| Q65 | | 0.488 | |
| Q51 | | 0.475 | |
| Q24 | | 0.455 | |
| Q39 | 0.344 | -0.428 | |
| Q73 | | 0.421 | |
| Q37 | 0.363 | -0.416 | -0.378 |
| Q19 | 0.386 | 0.398 | |
| Q56 | | -0.375 | |
| Q34 | | -0.369 | |
| Q54 | | 0.319 | |
| Q14 | 0.464 | | 0.492 |
| Q25 | 0.332 | | -0.439 |
| Q2 | 0.370 | -0.370 | 0.389 |
| Q20 | 0.373 | | -0.387 |
| Q3 | | | |
| Q10 | | | |
| Q9 | | | |
| Q44 | | | |
| Q31 | | | |
| Q48 | 0.347 | | |
| Q61 | | -0.331 | |
| Q75 | | 0.326 | |
| Q50 | | | |
| Q58 | | | |
| Q71 | 0.323 | | |
| Q49 | 0.382 | | |
| Q42 | | | |
| Q53 | | | |

Extraction Method: Principal Axis Factoring.
a. 23 factors extracted. 13 iterations required.

| | 1 | 2 | 3 |
|---|---|---|---|
| Q40 | 0.719 | | |
| Q74 | 0.589 | | |
| Q67 | 0.385 | | |
| Q45 | | 0.785 | |
| Q65 | | 0.364 | |
| Q46 | | | |
| Q27 | | | |
| Q43 | | | 0.749 |
| Q4 | | | 0.628 |
| Q63 | | | 0.500 |
| Q1 | | | 0.463 |
| Q14 | | | 0.350 |
| Q9 | | | |
| Q31 | | | |
| Q10 | | | |
| Q2 | | | |
| Q39 | | | |
| Q17 | | | |
| Q29 | | | |
| Q12 | | | |
| Q6 | | | |
| Q16 | | | |
| Q48 | | | |
| Q44 | | | |
| Q26 | | 0.326 | |
| Q70 | | | |
| Q58 | | | |
| Q69 | | | |
| Q54 | | | |
| Q71 | | | |
| Q20 | | | |
| Q52 | | | |
| Q68 | | | |
| Q8 | | | |
| Q50 | | | |
| Q15 | | | |
| Q34 | | | |
| Q22 | | | |
| Q61 | | | |

| | | | |
|---|---|---|---|
| Q42 | | | |
| Q66 | | | |
| Q64 | | | |
| Q35 | | | |
| Q24 | | | |
| Q60 | | | |
| Q57 | | | |
| Q55 | | | |
| Q75 | | | |
| Q19 | | | |
| Q36 | | | 0.322 |
| Q41 | | | |
| Q62 | | | |
| Q53 | | | |
| Q37 | | | |
| Q18 | | | |
| Q28 | | | |
| Q73 | | | |
| Q3 | | | |
| Q59 | | | |
| Q51 | | | |
| Q21 | | | |
| Q47 | 0.339 | | |
| Q30 | | | |
| Q25 | | | |
| Q56 | | | |
| Q72 | | | |
| Q13 | | | |
| Q38 | | | |
| Q33 | | | |
| Q11 | | | |
| Q49 | | | |
| Q32 | | | |
| Q5 | | | |
| Q7 | | | |
| Q23 | | | |
| Q76 | | | |

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.
a. Rotation converged in 72 iterations.

| | 1 | 2 | 3 |
|---|---|---|---|
| Q40 | 0.781 | | |

| | | | |
|---|---|---|---|
| Q74 | 0.712 | | |
| Q67 | 0.506 | 0.465 | |
| Q27 | 0.462 | | |
| Q70 | 0.447 | 0.412 | |
| Q45 | | 0.824 | |
| Q65 | | 0.500 | |
| Q46 | | 0.481 | 0.356 |
| Q26 | | 0.473 | 0.365 |
| Q43 | | | 0.791 |
| Q4 | | | 0.672 |
| Q63 | | | 0.601 |
| Q1 | | | 0.596 |
| Q14 | | | 0.499 |
| Q9 | | | |
| Q31 | | | |
| Q10 | | | |
| Q2 | | | |
| Q39 | | | |
| Q17 | | | |
| Q29 | | | |
| Q6 | | | |
| Q12 | 0.377 | | |
| Q16 | | | |
| Q48 | | | |
| Q44 | | | |
| Q58 | | | |
| Q69 | | | |
| Q54 | | | |
| Q71 | | | |
| Q20 | | | |
| Q52 | | | |
| Q68 | | | |
| Q25 | | | |
| Q8 | | | |
| Q50 | | | |
| Q15 | | | |
| Q34 | | | |
| Q22 | | | 0.334 |
| Q61 | | | |
| Q42 | | | |
| Q66 | | | |
| Q64 | | | |
| Q35 | 0.405 | | |
| Q60 | | | |
| Q57 | | | 0.363 |

| | | | |
|---|---|---|---|
| Q55 | 0.386 | | |
| Q24 | | | |
| Q75 | | | |
| Q19 | | | 0.319 |
| Q36 | 0.329 | | 0.432 |
| Q41 | | | |
| Q62 | | | |
| Q53 | | | |
| Q18 | | | |
| Q28 | 0.407 | | |
| Q73 | | | |
| Q3 | | | |
| Q59 | | | |
| Q47 | 0.429 | | |
| Q21 | | | |
| Q51 | | 0.320 | |
| Q30 | | | |
| Q72 | | 0.356 | |
| Q23 | 0.373 | | |
| Q56 | | | |
| Q13 | 0.408 | | |
| Q38 | | | |
| Q33 | 0.322 | | |
| Q11 | | | |
| Q37 | | | |
| Q49 | | | |
| Q32 | | | |
| Q5 | 0.456 | | |
| Q7 | | | |
| Q76 | | | |

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.

| Factor | 1 | 2 | 3 |
|---|---|---|---|
| 1 | 1.000 | 0.160 | 0.105 |
| 2 | 0.160 | 1.000 | 0.087 |
| 3 | 0.105 | 0.087 | 1.000 |
| 4 | -0.018 | 0.047 | 0.090 |
| 5 | -0.111 | 0.070 | -0.114 |
| 6 | -0.179 | -0.114 | -0.120 |
| 7 | 0.025 | 0.068 | -0.048 |
| 8 | 0.137 | 0.003 | -0.003 |
| 9 | 0.142 | 0.015 | 0.045 |
| 10 | 0.069 | 0.112 | 0.007 |

| | | | |
|---|---|---|---|
| 11 | 0.104 | -0.039 | 0.101 |
| 12 | -0.112 | -0.055 | -0.017 |
| 13 | 0.140 | 0.155 | 0.090 |
| 14 | -0.142 | -0.245 | -0.124 |
| 15 | 0.179 | 0.162 | 0.150 |
| 16 | -0.154 | -0.081 | -0.184 |
| 17 | -0.128 | -0.230 | -0.069 |
| 18 | -0.073 | -0.012 | 0.044 |
| 19 | 0.089 | 0.008 | 0.148 |
| 20 | -0.228 | -0.250 | -0.040 |
| 21 | 0.165 | -0.055 | 0.070 |
| 22 | -0.123 | 0.143 | -0.049 |
| 23 | -0.158 | 0.017 | -0.064 |

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.

Q19 Q20 Q21 Q22 Q23 Q24
Q43 Q44 Q45 Q46 Q47 Q48 Q49
Q68 Q69 Q70 Q71 Q72 Q73 Q74

Q19 Q20 Q21 Q22 Q23 Q24
Q43 Q44 Q45 Q46 Q47 Q48 Q49
Q68 Q69 Q70 Q71 Q72 Q73 Q74

| Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 |
|---|---|---|---|---|---|---|
| -0.069 | 0.397 | 0.263 | 0.253 | 0.446 | 0.171 | 0.151 |
| -0.100 | 0.140 | 0.347 | 0.401 | 0.430 | -0.037 | 0.060 |
| 1.000 | 0.030 | 0.082 | 0.078 | -0.014 | 0.181 | 0.135 |
| 0.030 | 1.000 | 0.144 | 0.117 | 0.136 | 0.217 | 0.101 |
| 0.082 | 0.144 | 1.000 | 0.180 | 0.456 | 0.163 | 0.072 |
| 0.078 | 0.117 | 0.180 | 1.000 | 0.247 | 0.037 | -0.033 |
| -0.014 | 0.136 | 0.456 | 0.247 | 1.000 | 0.163 | -0.043 |
| 0.181 | 0.217 | 0.163 | 0.037 | 0.163 | 1.000 | 0.297 |
| 0.135 | 0.101 | 0.072 | -0.033 | -0.043 | 0.297 | 1.000 |
| 0.235 | 0.008 | 0.132 | -0.046 | 0.016 | 0.243 | 0.352 |
| 0.060 | 0.157 | 0.357 | 0.118 | 0.415 | 0.247 | 0.012 |
| 0.075 | 0.015 | 0.446 | 0.379 | 0.591 | 0.035 | -0.001 |
| 0.231 | 0.225 | 0.528 | 0.271 | 0.364 | 0.169 | 0.002 |
| 0.008 | 0.305 | 0.289 | 0.338 | 0.342 | 0.025 | 0.233 |

| | | | | | | |
|---|---|---|---|---|---|---|
| -0.030 | 0.162 | 0.341 | 0.307 | 0.340 | -0.015 | -0.011 |
| 0.005 | 0.202 | 0.170 | 0.299 | 0.261 | 0.404 | 0.152 |
| -0.147 | -0.105 | 0.079 | 0.324 | 0.245 | -0.058 | -0.005 |
| 0.208 | 0.293 | 0.213 | 0.238 | 0.145 | 0.283 | 0.173 |
| 0.104 | 0.281 | 0.050 | 0.065 | 0.110 | 0.089 | 0.170 |
| 0.162 | -0.020 | 0.412 | 0.253 | 0.360 | 0.146 | -0.056 |
| 0.129 | 0.191 | 0.183 | -0.064 | 0.026 | 0.080 | -0.117 |
| 0.199 | 0.357 | 0.204 | 0.241 | 0.381 | 0.139 | 0.067 |
| 0.395 | 0.051 | 0.416 | 0.217 | 0.177 | 0.201 | 0.012 |
| 0.065 | -0.102 | -0.184 | -0.133 | -0.211 | 0.170 | 0.218 |
| 0.288 | 0.229 | 0.192 | 0.084 | 0.054 | 0.012 | -0.122 |
| 0.283 | 0.372 | 0.075 | 0.197 | 0.155 | 0.407 | 0.177 |
| 0.208 | 0.345 | 0.363 | 0.329 | 0.292 | 0.267 | 0.057 |
| 0.235 | 0.213 | 0.399 | 0.202 | 0.231 | 0.268 | 0.048 |
| 0.070 | 0.181 | 0.394 | 0.455 | 0.452 | 0.101 | 0.046 |
| 0.196 | 0.311 | 0.218 | 0.104 | 0.025 | 0.176 | 0.167 |
| 0.170 | 0.130 | 0.147 | 0.153 | 0.134 | 0.272 | 0.399 |
| 0.037 | 0.184 | 0.556 | 0.069 | 0.369 | 0.246 | 0.059 |
| 0.161 | 0.215 | 0.475 | 0.233 | 0.507 | 0.166 | -0.059 |
| 0.044 | 0.120 | 0.207 | 0.086 | 0.276 | 0.167 | 0.222 |
| 0.159 | 0.273 | 0.423 | 0.277 | 0.303 | 0.209 | -0.080 |
| 0.043 | 0.306 | 0.112 | 0.174 | 0.140 | 0.297 | 0.364 |
| 0.206 | 0.013 | 0.474 | 0.249 | 0.379 | 0.119 | 0.085 |
| 0.094 | 0.239 | 0.333 | 0.226 | 0.488 | 0.154 | 0.047 |
| 0.022 | 0.138 | 0.249 | 0.263 | 0.487 | 0.241 | -0.027 |
| 0.128 | 0.211 | 0.309 | 0.199 | 0.024 | 0.093 | 0.130 |
| 0.082 | 0.185 | 0.152 | 0.116 | 0.068 | 0.234 | 0.025 |
| 0.184 | 0.148 | 0.316 | 0.130 | 0.195 | 0.144 | -0.045 |
| -0.011 | 0.555 | 0.176 | 0.278 | 0.211 | 0.156 | 0.053 |
| 0.098 | -0.013 | 0.163 | 0.039 | 0.249 | 0.126 | 0.192 |
| 0.309 | 0.204 | 0.116 | 0.096 | -0.037 | 0.284 | 0.218 |
| 0.152 | 0.304 | 0.012 | 0.084 | -0.152 | 0.074 | 0.142 |
| 0.072 | 0.132 | 0.642 | 0.126 | 0.483 | 0.277 | 0.012 |
| 0.055 | 0.130 | 0.108 | 0.241 | 0.076 | 0.084 | 0.002 |
| -0.036 | 0.113 | 0.541 | 0.234 | 0.206 | 0.109 | 0.041 |
| 0.020 | 0.122 | 0.147 | 0.010 | -0.092 | 0.362 | 0.137 |
| 0.078 | 0.011 | 0.092 | 0.162 | 0.023 | 0.126 | 0.131 |
| 0.417 | 0.019 | 0.286 | 0.200 | 0.342 | 0.155 | 0.136 |
| -0.066 | 0.310 | 0.143 | 0.204 | 0.028 | 0.054 | 0.125 |
| -0.090 | 0.144 | 0.065 | 0.132 | -0.078 | -0.015 | 0.066 |
| 0.174 | 0.132 | 0.313 | 0.196 | 0.246 | 0.212 | -0.063 |
| -0.119 | 0.003 | -0.034 | -0.181 | 0.092 | -0.015 | 0.126 |
| 0.223 | 0.380 | 0.198 | 0.274 | 0.077 | 0.111 | -0.033 |
| 0.001 | 0.014 | -0.005 | -0.046 | -0.039 | 0.026 | 0.145 |
| 0.164 | 0.100 | 0.451 | 0.142 | 0.143 | 0.189 | -0.042 |

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| 0.126 | 0.067 | 0.165 | 0.071 | 0.026 | 0.004 | 0.091 |
| 0.118 | 0.096 | 0.271 | 0.101 | 0.385 | 0.202 | 0.203 |
| 0.173 | 0.244 | 0.141 | 0.285 | 0.074 | 0.159 | -0.024 |
| -0.097 | 0.485 | 0.184 | 0.083 | 0.096 | 0.078 | 0.133 |
| 0.033 | 0.003 | 0.379 | 0.072 | 0.255 | 0.103 | -0.131 |
| 0.161 | 0.093 | -0.124 | 0.113 | 0.000 | 0.165 | 0.049 |
| 0.205 | 0.139 | 0.326 | 0.335 | 0.371 | 0.204 | -0.117 |
| 0.260 | 0.151 | 0.238 | 0.114 | 0.060 | 0.268 | 0.141 |
| 0.083 | 0.103 | 0.253 | 0.158 | 0.186 | 0.125 | -0.007 |
| 0.032 | -0.085 | 0.262 | 0.231 | 0.429 | -0.003 | -0.019 |
| 0.122 | 0.274 | 0.302 | 0.329 | 0.191 | 0.274 | 0.074 |
| 0.199 | 0.089 | 0.116 | 0.145 | 0.157 | 0.206 | 0.051 |
| 0.123 | 0.075 | 0.110 | 0.201 | -0.017 | 0.274 | 0.035 |
| 0.106 | -0.036 | -0.077 | -0.137 | -0.246 | 0.032 | -0.088 |
| 0.160 | 0.272 | 0.417 | 0.323 | 0.215 | 0.269 | 0.140 |
| 0.057 | 0.026 | -0.122 | 0.245 | -0.185 | 0.112 | 0.308 |
| 0.077 | 0.121 | 0.406 | 0.225 | 0.478 | 0.184 | 0.053 |

**too low**

| Extraction Sums of Squared Loadings | | | Rotation Sums of Squared Loadings[a] |
|---|---|---|---|
| Total | % of Variance | Cumulative % | Total |
| 14.035 | 18.467 | 18.467 | 5.318 |
| 6.507 | 8.562 | 27.029 | 3.918 |
| 3.471 | 4.568 | 31.597 | 3.960 |
| 2.676 | 3.521 | 35.118 | 2.192 |
| 2.209 | 2.906 | 38.024 | 4.017 |
| 2.100 | 2.763 | 40.787 | 3.635 |
| 1.953 | 2.570 | 43.357 | 2.358 |
| 1.882 | 2.476 | 45.833 | 2.958 |
| 1.766 | 2.324 | 48.157 | 3.992 |
| 1.566 | 2.060 | 50.217 | 2.794 |
| 1.521 | 2.001 | 52.218 | 4.372 |
| 1.426 | 1.876 | 54.093 | 3.157 |
| 1.392 | 1.831 | 55.925 | 3.102 |
| 1.264 | 1.663 | 57.587 | 3.586 |
| 1.229 | 1.617 | 59.205 | 3.701 |
| 1.107 | 1.456 | 60.661 | 3.275 |
| 1.031 | 1.356 | 62.017 | 3.782 |
| 0.952 | 1.253 | 63.270 | 2.119 |
| 0.921 | 1.212 | 64.481 | 3.282 |
| 0.869 | 1.144 | 65.625 | 4.187 |
| 0.836 | 1.100 | 66.725 | 4.904 |
| 0.790 | 1.040 | 67.765 | 3.083 |
| 0.737 | 0.969 | 68.735 | 4.267 |

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**Factor Matrix[a]**

| Factor | | | | | | |
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| | | | -0.340 | | | |
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| | | | | 0.340 | 0.393 | |
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| -0.368 | | | | | | |
| | -0.388 | | | | | |
| 0.389 | | | | | | |
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| | | | 0.331 | | | |
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| | | | -0.430 | | | |
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| 0.318 | | | | | | |
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| 0.585 | | | | | | |
| 0.459 | | | | | | |
| | 0.323 | | | | | |
| | | | | | | |
| | | -0.468 | | | | |
| | | 0.352 | | | | |
| | | 0.335 | | | | |
| | | | 0.435 | | | 0.352 |
| | | | 0.417 | | | |
| | -0.341 | | | 0.495 | | |
| | | | 0.333 | -0.408 | | |
| | | 0.369 | | | | -0.340 |
| -0.317 | | | | | | |

**Pattern Matrix[a]**

| Factor | | | | | | |
|---|---|---|---|---|---|---|
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
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| 0.705 | | | | | | |
| 0.578 | | | | | | |
| 0.472 | | | | | | |
| | -0.683 | | | | | |
| | -0.647 | | | | | |
| | -0.519 | | | | | |
| | -0.479 | | | 0.325 | | |
| | -0.447 | | | | | |
| | -0.437 | | | | | |
| | | -0.717 | | | | |
| | | -0.582 | | | | |
| | | -0.427 | | | | |
| | | -0.329 | | | | |
| | | | | | | |
| | | | 0.656 | | | |
| | | | -0.525 | | | |
| | | | 0.368 | | | |
| | | | | 0.860 | | |
| | | | | | 0.728 | |
| | | | | | 0.691 | |
| | | | | | 0.452 | |
| | | | | | | 0.782 |
| | | | | | | 0.386 |
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**Structure Matrix**

| | | | Factor | | | |
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| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
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| | | -0.325 | | | 0.354 | |
| | | -0.411 | | | | |
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| | | | | | 0.384 | |
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| | | -0.443 | | | | |
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| | -0.422 | | | | | |
| 0.739 | | | | | | |
| 0.589 | | | | | | |
| 0.465 | | | | 0.375 | | |
| | -0.731 | | | | | |
| | -0.708 | | | | | 0.340 |
| | -0.615 | | | | | |
| | -0.607 | | | 0.452 | | |
| | -0.509 | | | | | |
| | -0.479 | | | | 0.398 | |
| | | -0.754 | | | | 0.327 |
| | | -0.646 | | | | |
| | | -0.447 | | | | |
| | | | 0.644 | | | |
| | | | -0.601 | | | |
| | | | 0.411 | | | |
| | | | | 0.877 | | |
| | | | | | 0.750 | |
| | | | | | 0.740 | |
| | | | | | 0.533 | |
| | | | | | 0.529 | |
| | | | | | | 0.807 |
| | | | 0.343 | | | 0.457 |
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| | | -0.337 | | | | |
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| | | | | 0.325 | | |
| | | | | 0.325 | 0.375 | |
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| | -0.445 | | | | 0.365 | |
| | -0.350 | | | | | |

**Factor Correlation Matrix**

| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|
| -0.018 | -0.111 | -0.179 | 0.025 | 0.137 | 0.142 | 0.069 |
| 0.047 | 0.070 | -0.114 | 0.068 | 0.003 | 0.015 | 0.112 |
| 0.090 | -0.114 | -0.120 | -0.048 | -0.003 | 0.045 | 0.007 |
| 1.000 | 0.012 | -0.083 | -0.028 | 0.003 | -0.009 | 0.085 |
| 0.012 | 1.000 | 0.054 | 0.163 | -0.091 | -0.035 | -0.059 |
| -0.083 | 0.054 | 1.000 | 0.004 | -0.111 | -0.061 | -0.036 |
| -0.028 | 0.163 | 0.004 | 1.000 | 0.046 | 0.008 | 0.018 |
| 0.003 | -0.091 | -0.111 | 0.046 | 1.000 | 0.105 | 0.091 |
| -0.009 | -0.035 | -0.061 | 0.008 | 0.105 | 1.000 | 0.056 |
| 0.085 | -0.059 | -0.036 | 0.018 | 0.091 | 0.056 | 1.000 |

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|---|---|---|---|---|---|---|
| 0.033 | -0.269 | -0.076 | -0.079 | 0.112 | 0.047 | 0.117 |
| 0.073 | 0.001 | 0.025 | 0.026 | -0.118 | -0.164 | 0.008 |
| 0.023 | 0.049 | -0.143 | -0.033 | 0.040 | 0.080 | 0.050 |
| -0.103 | 0.055 | 0.060 | -0.012 | -0.020 | -0.022 | -0.124 |
| -0.067 | -0.010 | -0.165 | 0.054 | 0.014 | 0.149 | 0.092 |
| 0.042 | 0.086 | 0.085 | -0.016 | -0.048 | -0.117 | -0.042 |
| -0.047 | -0.062 | 0.160 | -0.085 | -0.031 | -0.107 | -0.121 |
| -0.043 | 0.002 | 0.026 | 0.147 | -0.071 | -0.103 | -0.096 |
| -0.008 | -0.089 | -0.033 | -0.045 | 0.112 | 0.111 | 0.126 |
| 0.038 | -0.040 | 0.099 | -0.104 | -0.114 | -0.122 | -0.123 |
| 0.018 | -0.105 | -0.165 | -0.104 | 0.154 | 0.207 | 0.101 |
| -0.003 | 0.134 | 0.089 | 0.047 | -0.067 | -0.044 | -0.096 |
| -0.041 | 0.108 | 0.008 | 0.082 | -0.069 | -0.149 | -0.125 |

| Q10 | Q11 | Q12 | Q13 | Q14 | Q15 | Q16 | Q17 | Q18 |
|---|---|---|---|---|---|---|---|---|
| -0.168 | 0.295 | 0.237 | 0.294 | 0.616 | 0.278 | 0.287 | -0.018 | 0.194 |
| 0.027 | 0.165 | 0.377 | 0.164 | 0.458 | 0.336 | 0.324 | 0.397 | 0.121 |
| 0.235 | 0.060 | 0.075 | 0.231 | 0.008 | -0.030 | 0.005 | -0.147 | 0.208 |
| 0.008 | 0.157 | 0.015 | 0.225 | 0.305 | 0.162 | 0.202 | -0.105 | 0.293 |
| 0.132 | 0.357 | 0.446 | 0.528 | 0.289 | 0.341 | 0.170 | 0.079 | 0.213 |
| -0.046 | 0.118 | 0.379 | 0.271 | 0.338 | 0.307 | 0.299 | 0.324 | 0.238 |
| 0.016 | 0.415 | 0.591 | 0.364 | 0.342 | 0.340 | 0.261 | 0.245 | 0.145 |
| 0.243 | 0.247 | 0.035 | 0.169 | 0.025 | -0.015 | 0.404 | -0.058 | 0.283 |
| 0.352 | 0.012 | -0.001 | 0.002 | 0.233 | -0.011 | 0.152 | -0.005 | 0.173 |
| 1.000 | 0.181 | 0.039 | 0.087 | -0.060 | 0.143 | 0.222 | 0.035 | 0.097 |
| 0.181 | 1.000 | 0.284 | 0.380 | 0.120 | 0.263 | 0.235 | 0.115 | 0.043 |
| 0.039 | 0.284 | 1.000 | 0.338 | 0.155 | 0.190 | 0.211 | 0.215 | 0.102 |
| 0.087 | 0.380 | 0.338 | 1.000 | 0.199 | 0.365 | 0.344 | -0.084 | 0.254 |
| -0.060 | 0.120 | 0.155 | 0.199 | 1.000 | 0.236 | 0.119 | 0.187 | 0.233 |

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|---|---|---|---|---|---|---|---|---|
| 0.143 | 0.263 | 0.190 | 0.365 | 0.236 | 1.000 | 0.302 | 0.248 | 0.112 |
| 0.222 | 0.235 | 0.211 | 0.344 | 0.119 | 0.302 | 1.000 | 0.187 | 0.230 |
| 0.035 | 0.115 | 0.215 | -0.084 | 0.187 | 0.248 | 0.187 | 1.000 | -0.052 |
| 0.097 | 0.043 | 0.102 | 0.254 | 0.233 | 0.112 | 0.230 | -0.052 | 1.000 |
| -0.038 | -0.029 | 0.027 | 0.194 | 0.207 | 0.116 | 0.210 | -0.220 | 0.390 |
| -0.038 | 0.296 | 0.372 | 0.302 | 0.064 | 0.030 | 0.052 | 0.055 | 0.120 |
| 0.114 | 0.023 | 0.126 | 0.351 | -0.077 | 0.098 | 0.230 | -0.241 | 0.396 |
| 0.070 | 0.303 | 0.136 | 0.460 | 0.299 | 0.442 | 0.262 | -0.005 | 0.284 |
| 0.081 | 0.157 | 0.159 | 0.616 | 0.165 | 0.213 | 0.267 | -0.128 | 0.246 |
| 0.103 | -0.196 | -0.173 | 0.020 | -0.118 | -0.231 | 0.221 | -0.295 | 0.073 |
| 0.100 | 0.020 | 0.124 | 0.305 | -0.064 | 0.032 | 0.046 | -0.228 | 0.112 |
| 0.143 | 0.087 | 0.081 | 0.432 | 0.267 | 0.165 | 0.484 | -0.117 | 0.440 |
| 0.130 | 0.281 | 0.377 | 0.434 | 0.262 | 0.311 | 0.394 | -0.034 | 0.460 |
| 0.223 | 0.367 | 0.243 | 0.348 | 0.221 | 0.313 | 0.356 | 0.030 | 0.486 |
| 0.080 | 0.210 | 0.370 | 0.386 | 0.315 | 0.458 | 0.377 | 0.357 | 0.146 |
| 0.120 | 0.059 | 0.179 | 0.412 | 0.198 | 0.126 | 0.239 | -0.137 | 0.242 |
| 0.223 | 0.063 | 0.022 | 0.071 | 0.296 | 0.081 | 0.194 | 0.004 | 0.324 |
| 0.127 | 0.165 | 0.234 | 0.248 | 0.146 | 0.231 | 0.121 | -0.011 | 0.154 |
| 0.196 | 0.552 | 0.460 | 0.595 | 0.199 | 0.446 | 0.326 | 0.090 | 0.192 |
| 0.077 | 0.164 | 0.126 | 0.193 | 0.230 | 0.471 | 0.238 | 0.359 | 0.083 |
| -0.025 | 0.355 | 0.336 | 0.704 | 0.131 | 0.395 | 0.235 | -0.078 | 0.200 |
| 0.204 | 0.169 | 0.172 | 0.316 | 0.348 | 0.218 | 0.360 | -0.003 | 0.283 |
| 0.132 | 0.367 | 0.269 | 0.379 | 0.153 | 0.072 | 0.014 | -0.059 | 0.084 |
| 0.271 | 0.540 | 0.379 | 0.370 | 0.315 | 0.353 | 0.290 | 0.060 | 0.173 |
| -0.150 | 0.228 | 0.346 | 0.143 | 0.375 | 0.173 | 0.284 | 0.350 | 0.069 |
| 0.122 | 0.162 | 0.290 | 0.388 | 0.304 | 0.233 | 0.175 | 0.003 | 0.122 |
| -0.006 | 0.082 | 0.100 | 0.209 | 0.129 | 0.074 | 0.148 | -0.203 | 0.228 |
| 0.019 | 0.047 | 0.116 | 0.194 | 0.033 | 0.181 | -0.010 | 0.045 | 0.033 |
| -0.194 | 0.120 | 0.177 | 0.319 | 0.430 | 0.286 | 0.199 | 0.197 | 0.317 |
| 0.124 | 0.289 | 0.171 | 0.115 | 0.092 | 0.116 | 0.256 | 0.057 | -0.012 |
| 0.237 | 0.012 | 0.039 | 0.412 | 0.185 | 0.152 | 0.316 | -0.207 | 0.196 |
| -0.055 | -0.190 | 0.015 | 0.261 | 0.241 | -0.050 | 0.206 | -0.279 | 0.261 |
| 0.073 | 0.360 | 0.425 | 0.355 | 0.311 | 0.122 | 0.162 | 0.100 | 0.134 |
| 0.076 | 0.242 | 0.133 | 0.277 | 0.108 | 0.115 | 0.493 | 0.016 | 0.114 |
| -0.049 | 0.274 | 0.260 | 0.361 | 0.167 | 0.144 | 0.084 | 0.122 | 0.205 |
| -0.045 | -0.006 | 0.055 | 0.082 | -0.003 | -0.058 | 0.030 | -0.110 | 0.120 |
| 0.029 | 0.037 | 0.152 | 0.283 | -0.033 | 0.107 | 0.094 | -0.203 | 0.200 |
| 0.181 | 0.236 | 0.348 | 0.228 | 0.112 | 0.124 | 0.153 | -0.086 | 0.278 |
| -0.088 | 0.069 | 0.127 | 0.276 | 0.295 | 0.079 | 0.101 | -0.026 | 0.287 |
| -0.055 | -0.067 | 0.250 | 0.190 | 0.035 | 0.046 | 0.136 | 0.000 | 0.106 |
| 0.018 | 0.226 | 0.265 | 0.450 | 0.176 | 0.048 | 0.207 | -0.149 | 0.306 |
| 0.109 | 0.147 | -0.029 | -0.186 | 0.066 | 0.071 | -0.004 | 0.153 | -0.133 |
| -0.058 | 0.013 | 0.168 | 0.351 | 0.254 | 0.041 | 0.181 | -0.188 | 0.334 |
| 0.189 | 0.019 | 0.090 | 0.051 | -0.155 | 0.004 | -0.080 | -0.125 | -0.020 |
| 0.046 | 0.317 | 0.174 | 0.373 | 0.128 | 0.197 | 0.104 | -0.019 | 0.175 |

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| 0.041 | -0.098 | 0.098 | 0.260 | 0.064 | 0.138 | 0.221 | -0.088 | 0.167 |
| -0.087 | 0.201 | 0.085 | 0.165 | 0.463 | 0.275 | 0.134 | 0.203 | 0.209 |
| -0.111 | 0.055 | 0.207 | 0.310 | 0.148 | 0.164 | 0.078 | -0.128 | 0.268 |
| -0.094 | -0.011 | 0.060 | 0.288 | 0.271 | 0.041 | 0.055 | -0.250 | 0.236 |
| 0.130 | 0.156 | 0.260 | 0.259 | 0.027 | 0.363 | 0.134 | -0.064 | 0.141 |
| -0.018 | -0.091 | 0.080 | 0.172 | 0.045 | 0.039 | 0.255 | -0.279 | 0.339 |
| 0.081 | 0.301 | 0.311 | 0.401 | 0.203 | 0.388 | 0.309 | 0.033 | 0.078 |
| 0.019 | 0.118 | 0.168 | 0.342 | 0.216 | 0.181 | 0.182 | -0.169 | 0.266 |
| 0.008 | 0.190 | 0.322 | 0.201 | 0.059 | 0.048 | -0.006 | -0.228 | 0.105 |
| 0.024 | 0.171 | 0.237 | 0.191 | 0.307 | 0.194 | 0.088 | 0.253 | -0.059 |
| 0.094 | 0.021 | 0.259 | 0.466 | 0.275 | 0.171 | 0.394 | -0.114 | 0.394 |
| 0.316 | 0.303 | 0.031 | 0.268 | 0.097 | 0.238 | 0.166 | -0.049 | -0.031 |
| 0.158 | 0.251 | 0.120 | 0.355 | 0.067 | 0.194 | 0.180 | 0.000 | 0.133 |
| 0.058 | -0.139 | -0.154 | -0.031 | -0.164 | -0.110 | -0.003 | -0.293 | 0.186 |
| 0.304 | 0.260 | 0.317 | 0.441 | 0.221 | 0.259 | 0.260 | -0.059 | 0.496 |
| -0.068 | -0.066 | -0.067 | -0.008 | 0.110 | 0.113 | 0.085 | 0.009 | 0.109 |
| 0.131 | 0.296 | 0.202 | 0.173 | 0.312 | 0.194 | 0.119 | 0.210 | 0.189 |

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| | 0.322 | 0.363 | | | | | | |
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| | | | -0.466 | | | | | |
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| | | | | 0.486 | -0.376 | | | |
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| | | 0.333 | | 0.382 | | -0.426 | | 0.435 |
| | | | -0.353 | 0.382 | | | | -0.428 |
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| 0.104 | -0.112 | 0.140 | -0.142 | 0.179 | -0.154 | -0.128 | -0.073 | 0.089 |
| -0.039 | -0.055 | 0.155 | -0.245 | 0.162 | -0.081 | -0.230 | -0.012 | 0.008 |
| 0.101 | -0.017 | 0.090 | -0.124 | 0.150 | -0.184 | -0.069 | 0.044 | 0.148 |
| 0.033 | 0.073 | 0.023 | -0.103 | -0.067 | 0.042 | -0.047 | -0.043 | -0.008 |
| -0.269 | 0.001 | 0.049 | 0.055 | -0.010 | 0.086 | -0.062 | 0.002 | -0.089 |
| -0.076 | 0.025 | -0.143 | 0.060 | -0.165 | 0.085 | 0.160 | 0.026 | -0.033 |
| -0.079 | 0.026 | -0.033 | -0.012 | 0.054 | -0.016 | -0.085 | 0.147 | -0.045 |
| 0.112 | -0.118 | 0.040 | -0.020 | 0.014 | -0.048 | -0.031 | -0.071 | 0.112 |
| 0.047 | -0.164 | 0.080 | -0.022 | 0.149 | -0.117 | -0.107 | -0.103 | 0.111 |
| 0.117 | 0.008 | 0.050 | -0.124 | 0.092 | -0.042 | -0.121 | -0.096 | 0.126 |

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| 1.000 | -0.086 | 0.029 | -0.060 | -0.027 | -0.088 | -0.015 | -0.115 | 0.163 |
| -0.086 | 1.000 | -0.021 | 0.037 | -0.104 | 0.104 | 0.115 | 0.084 | -0.089 |
| 0.029 | -0.021 | 1.000 | -0.115 | 0.111 | -0.117 | -0.159 | -0.053 | 0.111 |
| -0.060 | 0.037 | -0.115 | 1.000 | -0.168 | 0.124 | 0.137 | -0.009 | 0.036 |
| -0.027 | -0.104 | 0.111 | -0.168 | 1.000 | -0.175 | -0.149 | 0.017 | 0.111 |
| -0.088 | 0.104 | -0.117 | 0.124 | -0.175 | 1.000 | 0.080 | 0.024 | -0.050 |
| -0.015 | 0.115 | -0.159 | 0.137 | -0.149 | 0.080 | 1.000 | 0.024 | -0.036 |
| -0.115 | 0.084 | -0.053 | -0.009 | 0.017 | 0.024 | 0.024 | 1.000 | -0.074 |
| 0.163 | -0.089 | 0.111 | 0.036 | 0.111 | -0.050 | -0.036 | -0.074 | 1.000 |
| 0.003 | 0.130 | -0.163 | 0.167 | -0.170 | 0.091 | 0.228 | 0.054 | -0.026 |
| 0.251 | -0.073 | 0.041 | 0.019 | 0.042 | -0.025 | -0.060 | -0.155 | 0.153 |
| -0.113 | 0.085 | 0.039 | -0.023 | -0.027 | 0.040 | -0.002 | 0.048 | -0.092 |
| -0.167 | 0.197 | -0.065 | 0.067 | -0.081 | 0.176 | 0.077 | 0.084 | -0.196 |

| Q19 | Q20 | Q21 | Q22 | Q23 | Q24 | Q25 | Q26 | Q27 |
|---|---|---|---|---|---|---|---|---|
| 0.322 | 0.148 | 0.089 | 0.388 | 0.235 | -0.054 | -0.086 | 0.335 | 0.308 |
| 0.146 | -0.034 | -0.049 | 0.155 | 0.192 | -0.108 | -0.093 | 0.052 | 0.154 |
| 0.104 | 0.162 | 0.129 | 0.199 | 0.395 | 0.065 | 0.288 | 0.283 | 0.208 |
| 0.281 | -0.020 | 0.191 | 0.357 | 0.051 | -0.102 | 0.229 | 0.372 | 0.345 |
| 0.050 | 0.412 | 0.183 | 0.204 | 0.416 | -0.184 | 0.192 | 0.075 | 0.363 |
| 0.065 | 0.253 | -0.064 | 0.241 | 0.217 | -0.133 | 0.084 | 0.197 | 0.329 |
| 0.110 | 0.360 | 0.026 | 0.381 | 0.177 | -0.211 | 0.054 | 0.155 | 0.292 |
| 0.089 | 0.146 | 0.080 | 0.139 | 0.201 | 0.170 | 0.012 | 0.407 | 0.267 |
| 0.170 | -0.056 | -0.117 | 0.067 | 0.012 | 0.218 | -0.122 | 0.177 | 0.057 |
| -0.038 | -0.038 | 0.114 | 0.070 | 0.081 | 0.103 | 0.100 | 0.143 | 0.130 |
| -0.029 | 0.296 | 0.023 | 0.303 | 0.157 | -0.196 | 0.020 | 0.087 | 0.281 |
| 0.027 | 0.372 | 0.126 | 0.136 | 0.159 | -0.173 | 0.124 | 0.081 | 0.377 |
| 0.194 | 0.302 | 0.351 | 0.460 | 0.616 | 0.020 | 0.305 | 0.432 | 0.434 |
| 0.207 | 0.064 | -0.077 | 0.299 | 0.165 | -0.118 | -0.064 | 0.267 | 0.262 |

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| 0.116 | 0.030 | 0.098 | 0.442 | 0.213 | -0.231 | 0.032 | 0.165 | 0.311 |
| 0.210 | 0.052 | 0.230 | 0.262 | 0.267 | 0.221 | 0.046 | 0.484 | 0.394 |
| -0.220 | 0.055 | -0.241 | -0.005 | -0.128 | -0.295 | -0.228 | -0.117 | -0.034 |
| 0.390 | 0.120 | 0.396 | 0.284 | 0.246 | 0.073 | 0.112 | 0.440 | 0.460 |
| 1.000 | -0.083 | 0.143 | 0.303 | 0.294 | 0.161 | 0.128 | 0.408 | 0.303 |
| -0.083 | 1.000 | 0.124 | 0.223 | 0.190 | -0.044 | 0.338 | 0.074 | 0.256 |
| 0.143 | 0.124 | 1.000 | 0.234 | 0.278 | 0.122 | 0.282 | 0.197 | 0.266 |
| 0.303 | 0.223 | 0.234 | 1.000 | 0.175 | -0.049 | 0.134 | 0.218 | 0.417 |
| 0.294 | 0.190 | 0.278 | 0.175 | 1.000 | 0.084 | 0.325 | 0.385 | 0.385 |
| 0.161 | -0.044 | 0.122 | -0.049 | 0.084 | 1.000 | -0.053 | 0.174 | -0.005 |
| 0.128 | 0.338 | 0.282 | 0.134 | 0.325 | -0.053 | 1.000 | 0.251 | 0.314 |
| 0.408 | 0.074 | 0.197 | 0.218 | 0.385 | 0.174 | 0.251 | 1.000 | 0.369 |
| 0.303 | 0.256 | 0.266 | 0.417 | 0.385 | -0.005 | 0.314 | 0.369 | 1.000 |
| 0.176 | 0.165 | 0.314 | 0.204 | 0.380 | -0.046 | 0.158 | 0.391 | 0.514 |
| 0.012 | 0.220 | 0.137 | 0.361 | 0.211 | -0.173 | 0.016 | 0.099 | 0.359 |
| 0.247 | -0.006 | 0.296 | 0.187 | 0.450 | 0.194 | 0.375 | 0.432 | 0.345 |
| 0.330 | -0.020 | 0.000 | 0.169 | 0.136 | 0.119 | 0.020 | 0.234 | 0.200 |
| 0.233 | 0.220 | -0.017 | 0.098 | 0.293 | -0.089 | 0.059 | 0.125 | 0.232 |
| -0.052 | 0.273 | 0.322 | 0.438 | 0.297 | -0.131 | 0.086 | 0.265 | 0.472 |
| -0.108 | 0.046 | -0.037 | 0.345 | 0.078 | -0.129 | -0.067 | 0.099 | 0.119 |
| 0.194 | 0.154 | 0.236 | 0.355 | 0.467 | -0.017 | 0.244 | 0.324 | 0.431 |
| 0.377 | 0.049 | 0.218 | 0.348 | 0.235 | 0.153 | 0.056 | 0.393 | 0.376 |
| -0.067 | 0.385 | 0.000 | 0.174 | 0.182 | -0.210 | 0.097 | 0.038 | 0.335 |
| -0.001 | 0.160 | 0.151 | 0.267 | 0.230 | -0.207 | 0.212 | 0.283 | 0.395 |
| -0.016 | 0.257 | 0.079 | 0.226 | 0.092 | -0.091 | -0.127 | 0.142 | 0.087 |
| 0.222 | 0.032 | 0.174 | 0.097 | 0.376 | 0.082 | 0.144 | 0.227 | 0.362 |
| 0.173 | 0.131 | 0.298 | 0.214 | 0.196 | 0.162 | 0.223 | 0.173 | 0.257 |
| 0.152 | 0.151 | -0.045 | 0.121 | 0.211 | -0.321 | 0.234 | 0.133 | 0.061 |
| 0.260 | 0.060 | 0.062 | 0.268 | 0.166 | -0.145 | 0.134 | 0.372 | 0.379 |
| 0.036 | 0.051 | 0.025 | 0.184 | 0.017 | -0.074 | -0.059 | 0.120 | 0.118 |
| 0.232 | 0.039 | 0.221 | 0.158 | 0.367 | 0.249 | 0.190 | 0.475 | 0.160 |
| 0.399 | -0.014 | 0.236 | 0.176 | 0.252 | 0.252 | 0.267 | 0.361 | 0.254 |
| 0.040 | 0.311 | 0.207 | 0.247 | 0.269 | -0.090 | 0.035 | 0.038 | 0.386 |
| 0.155 | 0.028 | 0.113 | 0.152 | 0.142 | 0.126 | 0.053 | 0.240 | 0.223 |
| 0.066 | 0.226 | 0.048 | 0.079 | 0.230 | -0.172 | -0.081 | 0.223 | 0.144 |
| 0.131 | -0.006 | 0.150 | 0.056 | 0.091 | 0.124 | -0.003 | 0.064 | -0.035 |
| 0.259 | 0.144 | 0.061 | 0.123 | 0.168 | 0.168 | 0.214 | 0.184 | 0.245 |
| 0.181 | 0.491 | 0.204 | 0.260 | 0.286 | 0.041 | 0.422 | 0.275 | 0.349 |
| 0.211 | 0.180 | 0.117 | 0.222 | -0.060 | 0.032 | 0.124 | 0.265 | 0.242 |
| 0.176 | -0.039 | 0.181 | 0.065 | -0.006 | 0.126 | 0.059 | 0.097 | 0.082 |
| 0.144 | 0.234 | 0.257 | 0.261 | 0.378 | 0.175 | 0.280 | 0.253 | 0.513 |
| -0.168 | -0.057 | -0.119 | 0.000 | -0.226 | -0.051 | -0.292 | -0.036 | -0.149 |
| 0.256 | 0.226 | 0.262 | 0.202 | 0.279 | 0.179 | 0.184 | 0.357 | 0.315 |
| 0.078 | -0.025 | -0.067 | 0.158 | -0.066 | 0.047 | 0.110 | -0.030 | 0.020 |
| 0.102 | 0.248 | 0.273 | 0.223 | 0.312 | -0.100 | 0.167 | 0.197 | 0.242 |

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|---|---|---|---|---|---|---|---|---|
| 0.131 | 0.003 | 0.247 | 0.277 | 0.175 | 0.223 | 0.060 | 0.344 | 0.261 |
| 0.021 | 0.026 | 0.045 | 0.212 | 0.165 | -0.053 | 0.019 | 0.165 | 0.071 |
| 0.300 | 0.136 | 0.200 | 0.261 | 0.275 | 0.071 | 0.106 | 0.221 | 0.282 |
| 0.354 | 0.127 | 0.137 | 0.312 | 0.027 | -0.004 | 0.273 | 0.305 | 0.300 |
| 0.097 | 0.371 | 0.094 | 0.148 | 0.235 | -0.164 | 0.253 | 0.075 | 0.282 |
| 0.308 | 0.111 | 0.307 | 0.152 | 0.044 | 0.213 | 0.356 | 0.416 | 0.251 |
| 0.133 | 0.122 | 0.094 | 0.370 | 0.335 | -0.110 | 0.150 | 0.187 | 0.383 |
| 0.206 | 0.170 | 0.219 | 0.227 | 0.399 | 0.126 | 0.292 | 0.305 | 0.421 |
| 0.202 | 0.384 | 0.238 | 0.217 | 0.203 | -0.120 | 0.368 | 0.006 | 0.326 |
| -0.088 | 0.220 | -0.086 | 0.119 | 0.184 | -0.028 | 0.025 | 0.025 | 0.192 |
| 0.413 | 0.183 | 0.266 | 0.241 | 0.352 | 0.122 | 0.294 | 0.484 | 0.329 |
| 0.043 | 0.317 | 0.065 | 0.355 | 0.110 | 0.045 | 0.130 | 0.056 | 0.126 |
| 0.164 | 0.060 | 0.117 | 0.108 | 0.288 | 0.237 | 0.233 | 0.222 | 0.236 |
| 0.225 | -0.105 | 0.145 | -0.091 | 0.042 | 0.212 | 0.032 | 0.116 | 0.038 |
| 0.309 | 0.059 | 0.152 | 0.194 | 0.386 | 0.074 | 0.113 | 0.403 | 0.443 |
| 0.424 | -0.087 | -0.051 | 0.064 | 0.171 | 0.321 | -0.103 | 0.197 | 0.226 |
| -0.079 | 0.330 | -0.010 | 0.226 | 0.212 | -0.121 | -0.065 | 0.114 | 0.227 |

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| -0.479 | | | -0.451 |
| 0.454 | | | |
| -0.432 | | -0.324 | -0.340 |
| | 0.866 | | |
| | 0.636 | -0.385 | |
| | 0.554 | -0.359 | |
| | 0.439 | -0.409 | -0.379 |
| | | -0.870 | |
| | | | -0.696 |
| | | -0.527 | -0.647 |
| | 0.539 | | -0.545 |
| | 0.324 | | -0.468 |

| 20 | 21 | 22 | 23 |
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| -0.228 | 0.165 | -0.123 | -0.158 |
| -0.250 | -0.055 | 0.143 | 0.017 |
| -0.040 | 0.070 | -0.049 | -0.064 |
| 0.038 | 0.018 | -0.003 | -0.041 |
| -0.040 | -0.105 | 0.134 | 0.108 |
| 0.099 | -0.165 | 0.089 | 0.008 |
| -0.104 | -0.104 | 0.047 | 0.082 |
| -0.114 | 0.154 | -0.067 | -0.069 |
| -0.122 | 0.207 | -0.044 | -0.149 |
| -0.123 | 0.101 | -0.096 | -0.125 |

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| 0.003 | 0.251 | -0.113 | -0.167 |
| 0.130 | -0.073 | 0.085 | 0.197 |
| -0.163 | 0.041 | 0.039 | -0.065 |
| 0.167 | 0.019 | -0.023 | 0.067 |
| -0.170 | 0.042 | -0.027 | -0.081 |
| 0.091 | -0.025 | 0.040 | 0.176 |
| 0.228 | -0.060 | -0.002 | 0.077 |
| 0.054 | -0.155 | 0.048 | 0.084 |
| -0.026 | 0.153 | -0.092 | -0.196 |
| 1.000 | 0.012 | -0.015 | 0.030 |
| 0.012 | 1.000 | -0.178 | -0.211 |
| -0.015 | -0.178 | 1.000 | 0.178 |
| 0.030 | -0.211 | 0.178 | 1.000 |

**Correlation Matrix[a]**

| Q28 | Q29 | Q30 | Q31 | Q32 | Q33 | Q34 | Q35 | Q36 |
|---|---|---|---|---|---|---|---|---|
| 0.231 | 0.236 | 0.205 | 0.235 | 0.181 | 0.341 | 0.212 | 0.258 | 0.397 |
| 0.109 | 0.499 | 0.034 | 0.095 | 0.184 | 0.261 | 0.258 | 0.150 | 0.165 |
| 0.235 | 0.070 | 0.196 | 0.170 | 0.037 | 0.161 | 0.044 | 0.159 | 0.043 |
| 0.213 | 0.181 | 0.311 | 0.130 | 0.184 | 0.215 | 0.120 | 0.273 | 0.306 |
| 0.399 | 0.394 | 0.218 | 0.147 | 0.556 | 0.475 | 0.207 | 0.423 | 0.112 |
| 0.202 | 0.455 | 0.104 | 0.153 | 0.069 | 0.233 | 0.086 | 0.277 | 0.174 |
| 0.231 | 0.452 | 0.025 | 0.134 | 0.369 | 0.507 | 0.276 | 0.303 | 0.140 |
| 0.268 | 0.101 | 0.176 | 0.272 | 0.246 | 0.166 | 0.167 | 0.209 | 0.297 |
| 0.048 | 0.046 | 0.167 | 0.399 | 0.059 | -0.059 | 0.222 | -0.080 | 0.364 |
| 0.223 | 0.080 | 0.120 | 0.223 | 0.127 | 0.196 | 0.077 | -0.025 | 0.204 |
| 0.367 | 0.210 | 0.059 | 0.063 | 0.165 | 0.552 | 0.164 | 0.355 | 0.169 |
| 0.243 | 0.370 | 0.179 | 0.022 | 0.234 | 0.460 | 0.126 | 0.336 | 0.172 |
| 0.348 | 0.386 | 0.412 | 0.071 | 0.248 | 0.595 | 0.193 | 0.704 | 0.316 |
| 0.221 | 0.315 | 0.198 | 0.296 | 0.146 | 0.199 | 0.230 | 0.131 | 0.348 |

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|---|---|---|---|---|---|---|---|---|
| 0.313 | 0.458 | 0.126 | 0.081 | 0.231 | 0.446 | 0.471 | 0.395 | 0.218 |
| 0.356 | 0.377 | 0.239 | 0.194 | 0.121 | 0.326 | 0.238 | 0.235 | 0.360 |
| 0.030 | 0.357 | -0.137 | 0.004 | -0.011 | 0.090 | 0.359 | -0.078 | -0.003 |
| 0.486 | 0.146 | 0.242 | 0.324 | 0.154 | 0.192 | 0.083 | 0.200 | 0.283 |
| 0.176 | 0.012 | 0.247 | 0.330 | 0.233 | -0.052 | -0.108 | 0.194 | 0.377 |
| 0.165 | 0.220 | -0.006 | -0.020 | 0.220 | 0.273 | 0.046 | 0.154 | 0.049 |
| 0.314 | 0.137 | 0.296 | 0.000 | -0.017 | 0.322 | -0.037 | 0.236 | 0.218 |
| 0.204 | 0.361 | 0.187 | 0.169 | 0.098 | 0.438 | 0.345 | 0.355 | 0.348 |
| 0.380 | 0.211 | 0.450 | 0.136 | 0.293 | 0.297 | 0.078 | 0.467 | 0.235 |
| -0.046 | -0.173 | 0.194 | 0.119 | -0.089 | -0.131 | -0.129 | -0.017 | 0.153 |
| 0.158 | 0.016 | 0.375 | 0.020 | 0.059 | 0.086 | -0.067 | 0.244 | 0.056 |
| 0.391 | 0.099 | 0.432 | 0.234 | 0.125 | 0.265 | 0.099 | 0.324 | 0.393 |
| 0.514 | 0.359 | 0.345 | 0.200 | 0.232 | 0.472 | 0.119 | 0.431 | 0.376 |
| 1.000 | 0.240 | 0.363 | 0.164 | 0.154 | 0.416 | 0.159 | 0.230 | 0.232 |
| 0.240 | 1.000 | 0.218 | 0.036 | 0.084 | 0.449 | 0.322 | 0.287 | 0.331 |
| 0.363 | 0.218 | 1.000 | 0.147 | 0.091 | 0.156 | 0.113 | 0.349 | 0.485 |
| 0.164 | 0.036 | 0.147 | 1.000 | 0.191 | 0.028 | 0.086 | 0.137 | 0.244 |
| 0.154 | 0.084 | 0.091 | 0.191 | 1.000 | 0.173 | 0.172 | 0.226 | -0.029 |
| 0.416 | 0.449 | 0.156 | 0.028 | 0.173 | 1.000 | 0.257 | 0.442 | 0.187 |
| 0.159 | 0.322 | 0.113 | 0.086 | 0.172 | 0.257 | 1.000 | 0.237 | 0.088 |
| 0.230 | 0.287 | 0.349 | 0.137 | 0.226 | 0.442 | 0.237 | 1.000 | 0.251 |
| 0.232 | 0.331 | 0.485 | 0.244 | -0.029 | 0.187 | 0.088 | 0.251 | 1.000 |
| 0.084 | 0.344 | 0.045 | 0.063 | 0.431 | 0.407 | 0.064 | 0.283 | 0.036 |
| 0.489 | 0.367 | 0.319 | -0.002 | 0.153 | 0.626 | 0.099 | 0.344 | 0.262 |
| 0.179 | 0.534 | 0.101 | -0.103 | 0.021 | 0.260 | 0.244 | 0.105 | 0.194 |
| 0.345 | 0.247 | 0.314 | 0.186 | -0.002 | 0.231 | 0.069 | 0.382 | 0.397 |
| 0.197 | 0.124 | 0.339 | 0.211 | 0.056 | 0.127 | -0.166 | 0.169 | 0.133 |
| 0.051 | 0.139 | 0.052 | 0.166 | 0.231 | 0.043 | 0.024 | 0.398 | 0.009 |
| 0.227 | 0.336 | 0.343 | 0.016 | 0.115 | 0.234 | 0.136 | 0.224 | 0.506 |
| 0.184 | 0.109 | -0.067 | 0.137 | 0.078 | 0.351 | 0.046 | 0.134 | 0.030 |
| 0.241 | 0.064 | 0.361 | 0.098 | -0.020 | 0.182 | -0.071 | 0.187 | 0.296 |
| 0.106 | 0.044 | 0.310 | 0.132 | 0.017 | -0.015 | -0.156 | 0.163 | 0.238 |
| 0.322 | 0.348 | 0.114 | 0.106 | 0.192 | 0.531 | 0.098 | 0.363 | 0.211 |
| 0.319 | 0.118 | 0.095 | -0.032 | 0.008 | 0.291 | -0.077 | 0.074 | 0.263 |
| 0.240 | 0.145 | 0.143 | 0.181 | 0.405 | 0.353 | -0.055 | 0.336 | 0.096 |
| 0.224 | -0.054 | 0.251 | 0.119 | 0.125 | 0.003 | -0.051 | 0.034 | 0.250 |
| 0.263 | -0.031 | 0.339 | 0.130 | 0.097 | -0.083 | -0.073 | 0.192 | 0.157 |
| 0.316 | 0.269 | 0.257 | 0.259 | 0.112 | 0.275 | 0.095 | 0.139 | 0.248 |
| 0.037 | 0.036 | 0.174 | 0.040 | 0.167 | 0.122 | 0.152 | 0.200 | 0.122 |
| 0.017 | 0.211 | 0.217 | -0.015 | 0.033 | 0.033 | -0.031 | 0.066 | 0.242 |
| 0.403 | 0.182 | 0.414 | 0.011 | 0.203 | 0.283 | 0.040 | 0.418 | 0.236 |
| 0.019 | 0.072 | -0.290 | -0.050 | -0.052 | 0.124 | 0.213 | -0.117 | -0.061 |
| 0.215 | 0.186 | 0.383 | 0.057 | -0.002 | 0.116 | -0.083 | 0.365 | 0.299 |
| -0.030 | -0.024 | 0.047 | -0.084 | 0.120 | -0.010 | -0.084 | -0.002 | 0.130 |
| 0.141 | 0.321 | 0.173 | 0.036 | 0.185 | 0.322 | 0.092 | 0.397 | 0.278 |

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| 0.255 | 0.206 | 0.259 | -0.025 | 0.034 | 0.146 | 0.080 | 0.220 | 0.061 |
| 0.152 | 0.255 | 0.039 | 0.227 | 0.152 | 0.149 | 0.396 | 0.209 | 0.087 |
| 0.161 | 0.114 | 0.104 | 0.049 | 0.099 | 0.099 | -0.007 | 0.420 | 0.093 |
| 0.061 | 0.171 | 0.216 | 0.084 | 0.054 | 0.223 | 0.013 | 0.175 | 0.358 |
| 0.213 | 0.183 | 0.081 | 0.030 | 0.283 | 0.233 | 0.095 | 0.370 | 0.150 |
| 0.232 | -0.113 | 0.145 | 0.201 | -0.050 | 0.097 | -0.073 | 0.103 | 0.158 |
| 0.238 | 0.369 | 0.180 | 0.112 | 0.260 | 0.397 | 0.179 | 0.525 | 0.187 |
| 0.371 | 0.147 | 0.313 | 0.122 | 0.174 | 0.205 | 0.094 | 0.348 | 0.291 |
| 0.248 | 0.024 | 0.074 | 0.021 | 0.103 | 0.190 | -0.123 | 0.090 | 0.168 |
| 0.089 | 0.302 | 0.002 | 0.093 | 0.080 | 0.278 | 0.295 | 0.224 | 0.017 |
| 0.333 | 0.240 | 0.319 | 0.333 | 0.169 | 0.174 | -0.055 | 0.349 | 0.544 |
| 0.084 | 0.458 | 0.139 | 0.057 | 0.073 | 0.202 | 0.053 | 0.167 | 0.369 |
| 0.322 | 0.157 | 0.410 | 0.137 | 0.042 | 0.180 | 0.024 | 0.322 | 0.324 |
| 0.168 | -0.237 | 0.092 | 0.035 | -0.066 | -0.044 | -0.163 | 0.025 | 0.031 |
| 0.548 | 0.170 | 0.358 | 0.155 | 0.150 | 0.356 | -0.007 | 0.395 | 0.393 |
| 0.108 | 0.101 | 0.218 | 0.189 | 0.016 | -0.142 | 0.021 | 0.141 | 0.410 |
| 0.146 | 0.353 | -0.033 | 0.138 | 0.324 | 0.332 | 0.351 | 0.206 | 0.001 |

| Q37 | Q38 | Q39 | Q40 | Q41 | Q42 | Q43 | Q44 | Q45 |
|---|---|---|---|---|---|---|---|---|
| 0.111 | 0.270 | 0.340 | 0.351 | 0.210 | 0.000 | 0.495 | 0.207 | 0.237 |
| 0.024 | 0.339 | 0.472 | 0.166 | -0.006 | 0.047 | 0.198 | -0.027 | 0.114 |
| 0.206 | 0.094 | 0.022 | 0.128 | 0.082 | 0.184 | -0.011 | 0.098 | 0.309 |
| 0.013 | 0.239 | 0.138 | 0.211 | 0.185 | 0.148 | 0.555 | -0.013 | 0.204 |
| 0.474 | 0.333 | 0.249 | 0.309 | 0.152 | 0.316 | 0.176 | 0.163 | 0.116 |
| 0.249 | 0.226 | 0.263 | 0.199 | 0.116 | 0.130 | 0.278 | 0.039 | 0.096 |
| 0.379 | 0.488 | 0.487 | 0.024 | 0.068 | 0.195 | 0.211 | 0.249 | -0.037 |
| 0.119 | 0.154 | 0.241 | 0.093 | 0.234 | 0.144 | 0.156 | 0.126 | 0.284 |
| 0.085 | 0.047 | -0.027 | 0.130 | 0.025 | -0.045 | 0.053 | 0.192 | 0.218 |
| 0.132 | 0.271 | -0.150 | 0.122 | -0.006 | 0.019 | -0.194 | 0.124 | 0.237 |
| 0.367 | 0.540 | 0.228 | 0.162 | 0.082 | 0.047 | 0.120 | 0.289 | 0.012 |
| 0.269 | 0.379 | 0.346 | 0.290 | 0.100 | 0.116 | 0.177 | 0.171 | 0.039 |
| 0.379 | 0.370 | 0.143 | 0.388 | 0.209 | 0.194 | 0.319 | 0.115 | 0.412 |
| 0.153 | 0.315 | 0.375 | 0.304 | 0.129 | 0.033 | 0.430 | 0.092 | 0.185 |

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| 0.072 | 0.353 | 0.173 | 0.233 | 0.074 | 0.181 | 0.286 | 0.116 | 0.152 |
| 0.014 | 0.290 | 0.284 | 0.175 | 0.148 | -0.010 | 0.199 | 0.256 | 0.316 |
| -0.059 | 0.060 | 0.350 | 0.003 | -0.203 | 0.045 | 0.197 | 0.057 | -0.207 |
| 0.084 | 0.173 | 0.069 | 0.122 | 0.228 | 0.033 | 0.317 | -0.012 | 0.196 |
| -0.067 | -0.001 | -0.016 | 0.222 | 0.173 | 0.152 | 0.260 | 0.036 | 0.232 |
| 0.385 | 0.160 | 0.257 | 0.032 | 0.131 | 0.151 | 0.060 | 0.051 | 0.039 |
| 0.000 | 0.151 | 0.079 | 0.174 | 0.298 | -0.045 | 0.062 | 0.025 | 0.221 |
| 0.174 | 0.267 | 0.226 | 0.097 | 0.214 | 0.121 | 0.268 | 0.184 | 0.158 |
| 0.182 | 0.230 | 0.092 | 0.376 | 0.196 | 0.211 | 0.166 | 0.017 | 0.367 |
| -0.210 | -0.207 | -0.091 | 0.082 | 0.162 | -0.321 | -0.145 | -0.074 | 0.249 |
| 0.097 | 0.212 | -0.127 | 0.144 | 0.223 | 0.234 | 0.134 | -0.059 | 0.190 |
| 0.038 | 0.283 | 0.142 | 0.227 | 0.173 | 0.133 | 0.372 | 0.120 | 0.475 |
| 0.335 | 0.395 | 0.087 | 0.362 | 0.257 | 0.061 | 0.379 | 0.118 | 0.160 |
| 0.084 | 0.489 | 0.179 | 0.345 | 0.197 | 0.051 | 0.227 | 0.184 | 0.241 |
| 0.344 | 0.367 | 0.534 | 0.247 | 0.124 | 0.139 | 0.336 | 0.109 | 0.064 |
| 0.045 | 0.319 | 0.101 | 0.314 | 0.339 | 0.052 | 0.343 | -0.067 | 0.361 |
| 0.063 | -0.002 | -0.103 | 0.186 | 0.211 | 0.166 | 0.016 | 0.137 | 0.098 |
| 0.431 | 0.153 | 0.021 | -0.002 | 0.056 | 0.231 | 0.115 | 0.078 | -0.020 |
| 0.407 | 0.626 | 0.260 | 0.231 | 0.127 | 0.043 | 0.234 | 0.351 | 0.182 |
| 0.064 | 0.099 | 0.244 | 0.069 | -0.166 | 0.024 | 0.136 | 0.046 | -0.071 |
| 0.283 | 0.344 | 0.105 | 0.382 | 0.169 | 0.398 | 0.224 | 0.134 | 0.187 |
| 0.036 | 0.262 | 0.194 | 0.397 | 0.133 | 0.009 | 0.506 | 0.030 | 0.296 |
| 1.000 | 0.401 | 0.048 | -0.095 | 0.021 | 0.227 | -0.017 | 0.231 | -0.141 |
| 0.401 | 1.000 | 0.311 | 0.132 | 0.109 | 0.171 | 0.163 | 0.306 | 0.224 |
| 0.048 | 0.311 | 1.000 | 0.044 | 0.088 | 0.104 | 0.269 | 0.047 | 0.019 |
| -0.095 | 0.132 | 0.044 | 1.000 | 0.275 | 0.042 | 0.356 | 0.026 | 0.336 |
| 0.021 | 0.109 | 0.088 | 0.275 | 1.000 | 0.091 | 0.169 | 0.090 | 0.285 |
| 0.227 | 0.171 | 0.104 | 0.042 | 0.091 | 1.000 | 0.065 | 0.102 | 0.101 |
| -0.017 | 0.163 | 0.269 | 0.356 | 0.169 | 0.065 | 1.000 | 0.001 | 0.207 |
| 0.231 | 0.306 | 0.047 | 0.026 | 0.090 | 0.102 | 0.001 | 1.000 | -0.146 |
| -0.141 | 0.224 | 0.019 | 0.336 | 0.285 | 0.101 | 0.207 | -0.146 | 1.000 |
| -0.221 | -0.067 | -0.071 | 0.387 | 0.358 | -0.080 | 0.344 | 0.068 | 0.473 |
| 0.353 | 0.460 | 0.382 | 0.289 | 0.195 | 0.211 | 0.149 | 0.407 | 0.058 |
| -0.030 | 0.216 | 0.014 | 0.327 | 0.269 | -0.129 | 0.273 | 0.226 | 0.311 |
| 0.389 | 0.235 | 0.117 | 0.096 | 0.138 | 0.288 | 0.198 | 0.372 | -0.009 |
| -0.125 | -0.057 | 0.076 | 0.024 | 0.096 | 0.031 | 0.114 | -0.155 | 0.140 |
| -0.020 | -0.088 | -0.125 | 0.275 | 0.361 | -0.010 | 0.125 | -0.144 | 0.272 |
| 0.322 | 0.335 | 0.189 | 0.197 | 0.163 | 0.138 | 0.026 | 0.031 | 0.113 |
| 0.118 | 0.021 | -0.021 | 0.137 | 0.173 | -0.117 | 0.245 | 0.009 | 0.125 |
| -0.131 | -0.153 | 0.114 | 0.308 | 0.310 | -0.080 | 0.181 | -0.107 | 0.084 |
| 0.215 | 0.274 | 0.057 | 0.310 | 0.169 | 0.056 | 0.219 | 0.003 | 0.219 |
| 0.015 | 0.156 | 0.193 | -0.139 | -0.195 | -0.132 | -0.050 | 0.231 | -0.217 |
| 0.093 | 0.093 | 0.101 | 0.365 | 0.324 | 0.188 | 0.353 | -0.044 | 0.282 |
| -0.023 | 0.007 | -0.108 | -0.013 | -0.111 | -0.062 | 0.016 | -0.133 | 0.035 |
| 0.265 | 0.162 | 0.228 | 0.123 | 0.061 | 0.271 | 0.166 | -0.037 | 0.241 |

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|---|---|---|---|---|---|---|---|---|
| 0.112 | 0.094 | -0.026 | 0.172 | 0.127 | 0.066 | 0.046 | 0.023 | 0.182 |
| 0.149 | 0.162 | 0.350 | 0.008 | -0.057 | 0.120 | 0.172 | 0.132 | -0.041 |
| -0.019 | 0.015 | 0.153 | 0.298 | 0.380 | 0.187 | 0.164 | -0.126 | 0.287 |
| 0.132 | 0.077 | -0.044 | 0.365 | 0.220 | 0.083 | 0.518 | 0.030 | 0.178 |
| 0.286 | 0.296 | 0.095 | 0.128 | 0.020 | 0.391 | 0.017 | 0.021 | 0.056 |
| -0.107 | 0.114 | -0.058 | 0.086 | 0.273 | -0.040 | 0.033 | 0.004 | 0.392 |
| 0.315 | 0.386 | 0.232 | 0.223 | 0.243 | 0.429 | 0.158 | 0.144 | 0.157 |
| 0.027 | 0.156 | 0.039 | 0.482 | 0.297 | 0.001 | 0.261 | -0.082 | 0.451 |
| 0.266 | 0.151 | 0.057 | 0.099 | 0.266 | 0.120 | 0.137 | 0.003 | 0.031 |
| 0.322 | 0.348 | 0.264 | 0.082 | -0.038 | 0.050 | 0.051 | 0.096 | -0.005 |
| 0.104 | 0.161 | 0.041 | 0.476 | 0.363 | 0.224 | 0.380 | 0.053 | 0.431 |
| 0.276 | 0.299 | 0.187 | 0.066 | 0.035 | 0.127 | 0.040 | -0.021 | 0.249 |
| 0.104 | 0.266 | 0.027 | 0.306 | 0.314 | 0.073 | 0.151 | -0.137 | 0.321 |
| -0.146 | -0.059 | -0.296 | -0.018 | -0.088 | -0.026 | -0.153 | -0.140 | 0.177 |
| 0.076 | 0.307 | 0.006 | 0.565 | 0.274 | 0.004 | 0.306 | 0.072 | 0.407 |
| -0.081 | -0.091 | 0.037 | 0.292 | 0.009 | -0.100 | 0.175 | -0.012 | 0.072 |
| 0.362 | 0.351 | 0.380 | -0.031 | -0.076 | 0.087 | -0.069 | 0.134 | -0.077 |

| Q46 | Q47 | Q48 | Q49 | Q50 | Q51 | Q52 | Q53 | Q54 |
|---|---|---|---|---|---|---|---|---|
| 0.252 | 0.378 | 0.247 | 0.259 | 0.041 | 0.068 | 0.135 | 0.282 | 0.057 |
| 0.013 | 0.308 | 0.092 | 0.154 | -0.076 | -0.070 | 0.145 | 0.038 | 0.141 |
| 0.152 | 0.072 | 0.055 | -0.036 | 0.020 | 0.078 | 0.417 | -0.066 | -0.090 |
| 0.304 | 0.132 | 0.130 | 0.113 | 0.122 | 0.011 | 0.019 | 0.310 | 0.144 |
| 0.012 | 0.642 | 0.108 | 0.541 | 0.147 | 0.092 | 0.286 | 0.143 | 0.065 |
| 0.084 | 0.126 | 0.241 | 0.234 | 0.010 | 0.162 | 0.200 | 0.204 | 0.132 |
| -0.152 | 0.483 | 0.076 | 0.206 | -0.092 | 0.023 | 0.342 | 0.028 | -0.078 |
| 0.074 | 0.277 | 0.084 | 0.109 | 0.362 | 0.126 | 0.155 | 0.054 | -0.015 |
| 0.142 | 0.012 | 0.002 | 0.041 | 0.137 | 0.131 | 0.136 | 0.125 | 0.066 |
| -0.055 | 0.073 | 0.076 | -0.049 | -0.045 | 0.029 | 0.181 | -0.088 | -0.055 |
| -0.190 | 0.360 | 0.242 | 0.274 | -0.006 | 0.037 | 0.236 | 0.069 | -0.067 |
| 0.015 | 0.425 | 0.133 | 0.260 | 0.055 | 0.152 | 0.348 | 0.127 | 0.250 |
| 0.261 | 0.355 | 0.277 | 0.361 | 0.082 | 0.283 | 0.228 | 0.276 | 0.190 |
| 0.241 | 0.311 | 0.108 | 0.167 | -0.003 | -0.033 | 0.112 | 0.295 | 0.035 |

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|---|---|---|---|---|---|---|---|---|
| -0.050 | 0.122 | 0.115 | 0.144 | -0.058 | 0.107 | 0.124 | 0.079 | 0.046 |
| 0.206 | 0.162 | 0.493 | 0.084 | 0.030 | 0.094 | 0.153 | 0.101 | 0.136 |
| -0.279 | 0.100 | 0.016 | 0.122 | -0.110 | -0.203 | -0.086 | -0.026 | 0.000 |
| 0.261 | 0.134 | 0.114 | 0.205 | 0.120 | 0.200 | 0.278 | 0.287 | 0.106 |
| 0.399 | 0.040 | 0.155 | 0.066 | 0.131 | 0.259 | 0.181 | 0.211 | 0.176 |
| -0.014 | 0.311 | 0.028 | 0.226 | -0.006 | 0.144 | 0.491 | 0.180 | -0.039 |
| 0.236 | 0.207 | 0.113 | 0.048 | 0.150 | 0.061 | 0.204 | 0.117 | 0.181 |
| 0.176 | 0.247 | 0.152 | 0.079 | 0.056 | 0.123 | 0.260 | 0.222 | 0.065 |
| 0.252 | 0.269 | 0.142 | 0.230 | 0.091 | 0.168 | 0.286 | -0.060 | -0.006 |
| 0.252 | -0.090 | 0.126 | -0.172 | 0.124 | 0.168 | 0.041 | 0.032 | 0.126 |
| 0.267 | 0.035 | 0.053 | -0.081 | -0.003 | 0.214 | 0.422 | 0.124 | 0.059 |
| 0.361 | 0.038 | 0.240 | 0.223 | 0.064 | 0.184 | 0.275 | 0.265 | 0.097 |
| 0.254 | 0.386 | 0.223 | 0.144 | -0.035 | 0.245 | 0.349 | 0.242 | 0.082 |
| 0.106 | 0.322 | 0.319 | 0.240 | 0.224 | 0.263 | 0.316 | 0.037 | 0.017 |
| 0.044 | 0.348 | 0.118 | 0.145 | -0.054 | -0.031 | 0.269 | 0.036 | 0.211 |
| 0.310 | 0.114 | 0.095 | 0.143 | 0.251 | 0.339 | 0.257 | 0.174 | 0.217 |
| 0.132 | 0.106 | -0.032 | 0.181 | 0.119 | 0.130 | 0.259 | 0.040 | -0.015 |
| 0.017 | 0.192 | 0.008 | 0.405 | 0.125 | 0.097 | 0.112 | 0.167 | 0.033 |
| -0.015 | 0.531 | 0.291 | 0.353 | 0.003 | -0.083 | 0.275 | 0.122 | 0.033 |
| -0.156 | 0.098 | -0.077 | -0.055 | -0.051 | -0.073 | 0.095 | 0.152 | -0.031 |
| 0.163 | 0.363 | 0.074 | 0.336 | 0.034 | 0.192 | 0.139 | 0.200 | 0.066 |
| 0.238 | 0.211 | 0.263 | 0.096 | 0.250 | 0.157 | 0.248 | 0.122 | 0.242 |
| -0.221 | 0.353 | -0.030 | 0.389 | -0.125 | -0.020 | 0.322 | 0.118 | -0.131 |
| -0.067 | 0.460 | 0.216 | 0.235 | -0.057 | -0.088 | 0.335 | 0.021 | -0.153 |
| -0.071 | 0.382 | 0.014 | 0.117 | 0.076 | -0.125 | 0.189 | -0.021 | 0.114 |
| 0.387 | 0.289 | 0.327 | 0.096 | 0.024 | 0.275 | 0.197 | 0.137 | 0.308 |
| 0.358 | 0.195 | 0.269 | 0.138 | 0.096 | 0.361 | 0.163 | 0.173 | 0.310 |
| -0.080 | 0.211 | -0.129 | 0.288 | 0.031 | -0.010 | 0.138 | -0.117 | -0.080 |
| 0.344 | 0.149 | 0.273 | 0.198 | 0.114 | 0.125 | 0.026 | 0.245 | 0.181 |
| 0.068 | 0.407 | 0.226 | 0.372 | -0.155 | -0.144 | 0.031 | 0.009 | -0.107 |
| 0.473 | 0.058 | 0.311 | -0.009 | 0.140 | 0.272 | 0.113 | 0.125 | 0.084 |
| 1.000 | -0.007 | 0.260 | -0.099 | 0.077 | 0.247 | 0.018 | 0.261 | 0.321 |
| -0.007 | 1.000 | 0.098 | 0.375 | 0.050 | -0.141 | 0.178 | 0.020 | -0.034 |
| 0.260 | 0.098 | 1.000 | 0.109 | -0.004 | 0.106 | 0.030 | 0.292 | 0.233 |
| -0.099 | 0.375 | 0.109 | 1.000 | 0.118 | 0.067 | 0.130 | 0.129 | 0.058 |
| 0.077 | 0.050 | -0.004 | 0.118 | 1.000 | 0.154 | -0.043 | 0.045 | 0.186 |
| 0.247 | -0.141 | 0.106 | 0.067 | 0.154 | 1.000 | 0.151 | 0.122 | 0.155 |
| 0.018 | 0.178 | 0.030 | 0.130 | -0.043 | 0.151 | 1.000 | -0.078 | -0.111 |
| 0.261 | 0.020 | 0.292 | 0.129 | 0.045 | 0.122 | -0.078 | 1.000 | 0.346 |
| 0.321 | -0.034 | 0.233 | 0.058 | 0.186 | 0.155 | -0.111 | 0.346 | 1.000 |
| 0.257 | 0.265 | 0.180 | 0.070 | 0.170 | 0.317 | 0.131 | 0.229 | 0.165 |
| -0.110 | 0.018 | -0.172 | 0.042 | -0.150 | -0.378 | -0.015 | -0.147 | -0.220 |
| 0.344 | 0.149 | 0.075 | 0.210 | -0.042 | 0.257 | 0.226 | 0.271 | 0.117 |
| 0.085 | -0.145 | 0.066 | -0.029 | 0.196 | 0.200 | -0.019 | 0.155 | 0.241 |
| 0.161 | 0.333 | -0.026 | 0.192 | 0.253 | -0.095 | 0.108 | 0.176 | 0.096 |

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|---|---|---|---|---|---|---|---|---|
| 0.272 | 0.013 | 0.093 | 0.202 | 0.047 | 0.189 | 0.163 | 0.085 | 0.185 |
| -0.122 | 0.211 | -0.078 | 0.069 | 0.071 | -0.033 | 0.076 | 0.117 | -0.132 |
| 0.333 | 0.131 | 0.149 | 0.015 | 0.143 | 0.340 | -0.034 | 0.224 | 0.241 |
| 0.443 | 0.158 | 0.198 | 0.071 | 0.007 | 0.116 | 0.183 | 0.377 | 0.247 |
| -0.012 | 0.257 | -0.021 | 0.136 | 0.025 | 0.025 | 0.251 | -0.009 | 0.101 |
| 0.338 | -0.121 | 0.223 | -0.017 | 0.185 | 0.387 | 0.260 | 0.167 | 0.127 |
| 0.036 | 0.355 | 0.167 | 0.151 | 0.031 | 0.139 | 0.103 | 0.096 | 0.041 |
| 0.418 | 0.187 | 0.101 | 0.095 | 0.211 | 0.418 | 0.272 | 0.068 | 0.068 |
| 0.106 | 0.214 | 0.142 | 0.056 | 0.220 | 0.160 | 0.325 | 0.088 | 0.154 |
| -0.178 | 0.435 | -0.104 | 0.097 | -0.289 | -0.135 | 0.293 | -0.140 | -0.378 |
| 0.403 | 0.242 | 0.366 | 0.254 | 0.135 | 0.352 | 0.310 | 0.165 | 0.357 |
| 0.075 | 0.111 | 0.094 | -0.110 | 0.017 | 0.005 | 0.266 | -0.035 | 0.138 |
| 0.147 | 0.036 | 0.242 | 0.029 | 0.404 | 0.342 | 0.180 | 0.013 | 0.183 |
| 0.133 | -0.168 | 0.015 | -0.054 | 0.228 | 0.174 | -0.094 | 0.009 | 0.031 |
| 0.280 | 0.371 | 0.374 | 0.244 | 0.099 | 0.353 | 0.222 | 0.147 | 0.120 |
| 0.238 | -0.102 | 0.066 | 0.072 | 0.152 | 0.323 | 0.128 | 0.024 | 0.101 |
| -0.196 | 0.425 | -0.050 | 0.201 | -0.132 | -0.282 | 0.239 | 0.194 | -0.142 |

| Q55 | Q56 | Q57 | Q58 | Q59 | Q60 | Q61 | Q62 | Q63 |
|---|---|---|---|---|---|---|---|---|
| 0.220 | 0.064 | 0.353 | -0.085 | 0.178 | 0.107 | 0.288 | 0.192 | 0.328 |
| 0.063 | 0.135 | 0.073 | -0.074 | 0.176 | 0.038 | 0.321 | 0.163 | 0.038 |
| 0.174 | -0.119 | 0.223 | 0.001 | 0.164 | 0.126 | 0.118 | 0.173 | -0.097 |
| 0.132 | 0.003 | 0.380 | 0.014 | 0.100 | 0.067 | 0.096 | 0.244 | 0.485 |
| 0.313 | -0.034 | 0.198 | -0.005 | 0.451 | 0.165 | 0.271 | 0.141 | 0.184 |
| 0.196 | -0.181 | 0.274 | -0.046 | 0.142 | 0.071 | 0.101 | 0.285 | 0.083 |
| 0.246 | 0.092 | 0.077 | -0.039 | 0.143 | 0.026 | 0.385 | 0.074 | 0.096 |
| 0.212 | -0.015 | 0.111 | 0.026 | 0.189 | 0.004 | 0.202 | 0.159 | 0.078 |
| -0.063 | 0.126 | -0.033 | 0.145 | -0.042 | 0.091 | 0.203 | -0.024 | 0.133 |
| 0.018 | 0.109 | -0.058 | 0.189 | 0.046 | 0.041 | -0.087 | -0.111 | -0.094 |
| 0.226 | 0.147 | 0.013 | 0.019 | 0.317 | -0.098 | 0.201 | 0.055 | -0.011 |
| 0.265 | -0.029 | 0.168 | 0.090 | 0.174 | 0.098 | 0.085 | 0.207 | 0.060 |
| 0.450 | -0.186 | 0.351 | 0.051 | 0.373 | 0.260 | 0.165 | 0.310 | 0.288 |
| 0.176 | 0.066 | 0.254 | -0.155 | 0.128 | 0.064 | 0.463 | 0.148 | 0.271 |

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|---|---|---|---|---|---|---|---|---|
| 0.048 | 0.071 | 0.041 | 0.004 | 0.197 | 0.138 | 0.275 | 0.164 | 0.041 |
| 0.207 | -0.004 | 0.181 | -0.080 | 0.104 | 0.221 | 0.134 | 0.078 | 0.055 |
| -0.149 | 0.153 | -0.188 | -0.125 | -0.019 | -0.088 | 0.203 | -0.128 | -0.250 |
| 0.306 | -0.133 | 0.334 | -0.020 | 0.175 | 0.167 | 0.209 | 0.268 | 0.236 |
| 0.144 | -0.168 | 0.256 | 0.078 | 0.102 | 0.131 | 0.021 | 0.300 | 0.354 |
| 0.234 | -0.057 | 0.226 | -0.025 | 0.248 | 0.003 | 0.026 | 0.136 | 0.127 |
| 0.257 | -0.119 | 0.262 | -0.067 | 0.273 | 0.247 | 0.045 | 0.200 | 0.137 |
| 0.261 | 0.000 | 0.202 | 0.158 | 0.223 | 0.277 | 0.212 | 0.261 | 0.312 |
| 0.378 | -0.226 | 0.279 | -0.066 | 0.312 | 0.175 | 0.165 | 0.275 | 0.027 |
| 0.175 | -0.051 | 0.179 | 0.047 | -0.100 | 0.223 | -0.053 | 0.071 | -0.004 |
| 0.280 | -0.292 | 0.184 | 0.110 | 0.167 | 0.060 | 0.019 | 0.106 | 0.273 |
| 0.253 | -0.036 | 0.357 | -0.030 | 0.197 | 0.344 | 0.165 | 0.221 | 0.305 |
| 0.513 | -0.149 | 0.315 | 0.020 | 0.242 | 0.261 | 0.071 | 0.282 | 0.300 |
| 0.403 | 0.019 | 0.215 | -0.030 | 0.141 | 0.255 | 0.152 | 0.161 | 0.061 |
| 0.182 | 0.072 | 0.186 | -0.024 | 0.321 | 0.206 | 0.255 | 0.114 | 0.171 |
| 0.414 | -0.290 | 0.383 | 0.047 | 0.173 | 0.259 | 0.039 | 0.104 | 0.216 |
| 0.011 | -0.050 | 0.057 | -0.084 | 0.036 | -0.025 | 0.227 | 0.049 | 0.084 |
| 0.203 | -0.052 | -0.002 | 0.120 | 0.185 | 0.034 | 0.152 | 0.099 | 0.054 |
| 0.283 | 0.124 | 0.116 | -0.010 | 0.322 | 0.146 | 0.149 | 0.099 | 0.223 |
| 0.040 | 0.213 | -0.083 | -0.084 | 0.092 | 0.080 | 0.396 | -0.007 | 0.013 |
| 0.418 | -0.117 | 0.365 | -0.002 | 0.397 | 0.220 | 0.209 | 0.420 | 0.175 |
| 0.236 | -0.061 | 0.299 | 0.130 | 0.278 | 0.061 | 0.087 | 0.093 | 0.358 |
| 0.215 | 0.015 | 0.093 | -0.023 | 0.265 | 0.112 | 0.149 | -0.019 | 0.132 |
| 0.274 | 0.156 | 0.093 | 0.007 | 0.162 | 0.094 | 0.162 | 0.015 | 0.077 |
| 0.057 | 0.193 | 0.101 | -0.108 | 0.228 | -0.026 | 0.350 | 0.153 | -0.044 |
| 0.310 | -0.139 | 0.365 | -0.013 | 0.123 | 0.172 | 0.008 | 0.298 | 0.365 |
| 0.169 | -0.195 | 0.324 | -0.111 | 0.061 | 0.127 | -0.057 | 0.380 | 0.220 |
| 0.056 | -0.132 | 0.188 | -0.062 | 0.271 | 0.066 | 0.120 | 0.187 | 0.083 |
| 0.219 | -0.050 | 0.353 | 0.016 | 0.166 | 0.046 | 0.172 | 0.164 | 0.518 |
| 0.003 | 0.231 | -0.044 | -0.133 | -0.037 | 0.023 | 0.132 | -0.126 | 0.030 |
| 0.219 | -0.217 | 0.282 | 0.035 | 0.241 | 0.182 | -0.041 | 0.287 | 0.178 |
| 0.257 | -0.110 | 0.344 | 0.085 | 0.161 | 0.272 | -0.122 | 0.333 | 0.443 |
| 0.265 | 0.018 | 0.149 | -0.145 | 0.333 | 0.013 | 0.211 | 0.131 | 0.158 |
| 0.180 | -0.172 | 0.075 | 0.066 | -0.026 | 0.093 | -0.078 | 0.149 | 0.198 |
| 0.070 | 0.042 | 0.210 | -0.029 | 0.192 | 0.202 | 0.069 | 0.015 | 0.071 |
| 0.170 | -0.150 | -0.042 | 0.196 | 0.253 | 0.047 | 0.071 | 0.143 | 0.007 |
| 0.317 | -0.378 | 0.257 | 0.200 | -0.095 | 0.189 | -0.033 | 0.340 | 0.116 |
| 0.131 | -0.015 | 0.226 | -0.019 | 0.108 | 0.163 | 0.076 | -0.034 | 0.183 |
| 0.229 | -0.147 | 0.271 | 0.155 | 0.176 | 0.085 | 0.117 | 0.224 | 0.377 |
| 0.165 | -0.220 | 0.117 | 0.241 | 0.096 | 0.185 | -0.132 | 0.241 | 0.247 |
| 1.000 | -0.267 | 0.404 | 0.092 | 0.225 | 0.367 | 0.124 | 0.306 | 0.174 |
| -0.267 | 1.000 | -0.148 | -0.074 | -0.022 | 0.088 | 0.078 | -0.201 | -0.069 |
| 0.404 | -0.148 | 1.000 | -0.162 | 0.109 | 0.365 | 0.029 | 0.312 | 0.292 |
| 0.092 | -0.074 | -0.162 | 1.000 | 0.053 | -0.033 | -0.071 | 0.033 | 0.118 |
| 0.225 | -0.022 | 0.109 | 0.053 | 1.000 | 0.067 | 0.327 | 0.309 | 0.174 |

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|---|---|---|---|---|---|---|---|---|
| 0.367 | 0.088 | 0.365 | -0.033 | 0.067 | 1.000 | 0.038 | 0.076 | 0.164 |
| 0.124 | 0.078 | 0.029 | -0.071 | 0.327 | 0.038 | 1.000 | 0.156 | -0.010 |
| 0.306 | -0.201 | 0.312 | 0.033 | 0.309 | 0.076 | 0.156 | 1.000 | 0.181 |
| 0.174 | -0.069 | 0.292 | 0.118 | 0.174 | 0.164 | -0.010 | 0.181 | 1.000 |
| 0.321 | -0.044 | 0.095 | -0.027 | 0.335 | 0.124 | 0.048 | 0.156 | 0.170 |
| 0.189 | -0.171 | 0.131 | 0.078 | -0.074 | 0.146 | -0.061 | 0.230 | 0.235 |
| 0.429 | -0.192 | 0.302 | -0.094 | 0.342 | 0.187 | 0.215 | 0.263 | 0.039 |
| 0.386 | -0.119 | 0.211 | 0.200 | 0.352 | 0.183 | 0.188 | 0.386 | 0.273 |
| 0.123 | -0.093 | 0.062 | 0.180 | 0.162 | -0.015 | -0.073 | 0.203 | 0.274 |
| 0.094 | 0.173 | 0.143 | -0.297 | 0.061 | 0.078 | 0.279 | 0.003 | 0.021 |
| 0.256 | -0.266 | 0.439 | 0.003 | 0.231 | 0.200 | 0.005 | 0.279 | 0.399 |
| 0.189 | -0.097 | 0.123 | 0.044 | 0.210 | 0.050 | -0.031 | 0.032 | 0.040 |
| 0.170 | -0.225 | 0.052 | 0.163 | 0.186 | 0.054 | 0.014 | 0.204 | 0.006 |
| 0.092 | -0.183 | 0.174 | 0.106 | -0.114 | 0.196 | -0.200 | -0.010 | 0.049 |
| 0.357 | -0.152 | 0.364 | 0.087 | 0.199 | 0.164 | 0.019 | 0.305 | 0.303 |
| 0.119 | -0.077 | 0.111 | 0.180 | 0.041 | 0.144 | 0.069 | 0.176 | -0.011 |
| 0.130 | 0.194 | 0.025 | -0.093 | 0.316 | 0.033 | 0.439 | 0.099 | -0.046 |

| Q64 | Q65 | Q66 | Q67 | Q68 | Q69 | Q70 | Q71 | Q72 |
|---|---|---|---|---|---|---|---|---|
| 0.013 | 0.036 | 0.272 | 0.224 | 0.182 | 0.211 | 0.363 | 0.036 | -0.010 |
| 0.073 | -0.063 | 0.358 | 0.135 | -0.066 | 0.311 | 0.194 | 0.035 | 0.005 |
| 0.033 | 0.161 | 0.205 | 0.260 | 0.083 | 0.032 | 0.122 | 0.199 | 0.123 |
| 0.003 | 0.093 | 0.139 | 0.151 | 0.103 | -0.085 | 0.274 | 0.089 | 0.075 |
| 0.379 | -0.124 | 0.326 | 0.238 | 0.253 | 0.262 | 0.302 | 0.116 | 0.110 |
| 0.072 | 0.113 | 0.335 | 0.114 | 0.158 | 0.231 | 0.329 | 0.145 | 0.201 |
| 0.255 | 0.000 | 0.371 | 0.060 | 0.186 | 0.429 | 0.191 | 0.157 | -0.017 |
| 0.103 | 0.165 | 0.204 | 0.268 | 0.125 | -0.003 | 0.274 | 0.206 | 0.274 |
| -0.131 | 0.049 | -0.117 | 0.141 | -0.007 | -0.019 | 0.074 | 0.051 | 0.035 |
| 0.130 | -0.018 | 0.081 | 0.019 | 0.008 | 0.024 | 0.094 | 0.316 | 0.158 |
| 0.156 | -0.091 | 0.301 | 0.118 | 0.190 | 0.171 | 0.021 | 0.303 | 0.251 |
| 0.260 | 0.080 | 0.311 | 0.168 | 0.322 | 0.237 | 0.259 | 0.031 | 0.120 |
| 0.259 | 0.172 | 0.401 | 0.342 | 0.201 | 0.191 | 0.466 | 0.268 | 0.355 |
| 0.027 | 0.045 | 0.203 | 0.216 | 0.059 | 0.307 | 0.275 | 0.097 | 0.067 |

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|---|---|---|---|---|---|---|---|---|
| 0.363 | 0.039 | 0.388 | 0.181 | 0.048 | 0.194 | 0.171 | 0.238 | 0.194 |
| 0.134 | 0.255 | 0.309 | 0.182 | -0.006 | 0.088 | 0.394 | 0.166 | 0.180 |
| -0.064 | -0.279 | 0.033 | -0.169 | -0.228 | 0.253 | -0.114 | -0.049 | 0.000 |
| 0.141 | 0.339 | 0.078 | 0.266 | 0.105 | -0.059 | 0.394 | -0.031 | 0.133 |
| 0.097 | 0.308 | 0.133 | 0.206 | 0.202 | -0.088 | 0.413 | 0.043 | 0.164 |
| 0.371 | 0.111 | 0.122 | 0.170 | 0.384 | 0.220 | 0.183 | 0.317 | 0.060 |
| 0.094 | 0.307 | 0.094 | 0.219 | 0.238 | -0.086 | 0.266 | 0.065 | 0.117 |
| 0.148 | 0.152 | 0.370 | 0.227 | 0.217 | 0.119 | 0.241 | 0.355 | 0.108 |
| 0.235 | 0.044 | 0.335 | 0.399 | 0.203 | 0.184 | 0.352 | 0.110 | 0.288 |
| -0.164 | 0.213 | -0.110 | 0.126 | -0.120 | -0.028 | 0.122 | 0.045 | 0.237 |
| 0.253 | 0.356 | 0.150 | 0.292 | 0.368 | 0.025 | 0.294 | 0.130 | 0.233 |
| 0.075 | 0.416 | 0.187 | 0.305 | 0.006 | 0.025 | 0.484 | 0.056 | 0.222 |
| 0.282 | 0.251 | 0.383 | 0.421 | 0.326 | 0.192 | 0.329 | 0.126 | 0.236 |
| 0.213 | 0.232 | 0.238 | 0.371 | 0.248 | 0.089 | 0.333 | 0.084 | 0.322 |
| 0.183 | -0.113 | 0.369 | 0.147 | 0.024 | 0.302 | 0.240 | 0.458 | 0.157 |
| 0.081 | 0.145 | 0.180 | 0.313 | 0.074 | 0.002 | 0.319 | 0.139 | 0.410 |
| 0.030 | 0.201 | 0.112 | 0.122 | 0.021 | 0.093 | 0.333 | 0.057 | 0.137 |
| 0.283 | -0.050 | 0.260 | 0.174 | 0.103 | 0.080 | 0.169 | 0.073 | 0.042 |
| 0.233 | 0.097 | 0.397 | 0.205 | 0.190 | 0.278 | 0.174 | 0.202 | 0.180 |
| 0.095 | -0.073 | 0.179 | 0.094 | -0.123 | 0.295 | -0.055 | 0.053 | 0.024 |
| 0.370 | 0.103 | 0.525 | 0.348 | 0.090 | 0.224 | 0.349 | 0.167 | 0.322 |
| 0.150 | 0.158 | 0.187 | 0.291 | 0.168 | 0.017 | 0.544 | 0.369 | 0.324 |
| 0.286 | -0.107 | 0.315 | 0.027 | 0.266 | 0.322 | 0.104 | 0.276 | 0.104 |
| 0.296 | 0.114 | 0.386 | 0.156 | 0.151 | 0.348 | 0.161 | 0.299 | 0.266 |
| 0.095 | -0.058 | 0.232 | 0.039 | 0.057 | 0.264 | 0.041 | 0.187 | 0.027 |
| 0.128 | 0.086 | 0.223 | 0.482 | 0.099 | 0.082 | 0.476 | 0.066 | 0.306 |
| 0.020 | 0.273 | 0.243 | 0.297 | 0.266 | -0.038 | 0.363 | 0.035 | 0.314 |
| 0.391 | -0.040 | 0.429 | 0.001 | 0.120 | 0.050 | 0.224 | 0.127 | 0.073 |
| 0.017 | 0.033 | 0.158 | 0.261 | 0.137 | 0.051 | 0.380 | 0.040 | 0.151 |
| 0.021 | 0.004 | 0.144 | -0.082 | 0.003 | 0.096 | 0.053 | -0.021 | -0.137 |
| 0.056 | 0.392 | 0.157 | 0.451 | 0.031 | -0.005 | 0.431 | 0.249 | 0.321 |
| -0.012 | 0.338 | 0.036 | 0.418 | 0.106 | -0.178 | 0.403 | 0.075 | 0.147 |
| 0.257 | -0.121 | 0.355 | 0.187 | 0.214 | 0.435 | 0.242 | 0.111 | 0.036 |
| -0.021 | 0.223 | 0.167 | 0.101 | 0.142 | -0.104 | 0.366 | 0.094 | 0.242 |
| 0.136 | -0.017 | 0.151 | 0.095 | 0.056 | 0.097 | 0.254 | -0.110 | 0.029 |
| 0.025 | 0.185 | 0.031 | 0.211 | 0.220 | -0.289 | 0.135 | 0.017 | 0.404 |
| 0.025 | 0.387 | 0.139 | 0.418 | 0.160 | -0.135 | 0.352 | 0.005 | 0.342 |
| 0.251 | 0.260 | 0.103 | 0.272 | 0.325 | 0.293 | 0.310 | 0.266 | 0.180 |
| -0.009 | 0.167 | 0.096 | 0.068 | 0.088 | -0.140 | 0.165 | -0.035 | 0.013 |
| 0.101 | 0.127 | 0.041 | 0.068 | 0.154 | -0.378 | 0.357 | 0.138 | 0.183 |
| 0.321 | 0.189 | 0.429 | 0.386 | 0.123 | 0.094 | 0.256 | 0.189 | 0.170 |
| -0.044 | -0.171 | -0.192 | -0.119 | -0.093 | 0.173 | -0.266 | -0.097 | -0.225 |
| 0.095 | 0.131 | 0.302 | 0.211 | 0.062 | 0.143 | 0.439 | 0.123 | 0.052 |
| -0.027 | 0.078 | -0.094 | 0.200 | 0.180 | -0.297 | 0.003 | 0.044 | 0.163 |
| 0.335 | -0.074 | 0.342 | 0.352 | 0.162 | 0.061 | 0.231 | 0.210 | 0.186 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 0.124 | 0.146 | 0.187 | 0.183 | -0.015 | 0.078 | 0.200 | 0.050 | 0.054 |
| 0.048 | -0.061 | 0.215 | 0.188 | -0.073 | 0.279 | 0.005 | -0.031 | 0.014 |
| 0.156 | 0.230 | 0.263 | 0.386 | 0.203 | 0.003 | 0.279 | 0.032 | 0.204 |
| 0.170 | 0.235 | 0.039 | 0.273 | 0.274 | 0.021 | 0.399 | 0.040 | 0.006 |
| 1.000 | 0.074 | 0.316 | 0.233 | 0.230 | 0.084 | 0.313 | 0.337 | 0.126 |
| 0.074 | 1.000 | 0.095 | 0.374 | 0.264 | -0.009 | 0.344 | -0.041 | 0.275 |
| 0.316 | 0.095 | 1.000 | 0.227 | 0.157 | 0.236 | 0.369 | 0.271 | 0.210 |
| 0.233 | 0.374 | 0.227 | 1.000 | 0.149 | 0.090 | 0.381 | 0.044 | 0.314 |
| 0.230 | 0.264 | 0.157 | 0.149 | 1.000 | -0.028 | 0.243 | 0.121 | 0.206 |
| 0.084 | -0.009 | 0.236 | 0.090 | -0.028 | 1.000 | 0.042 | 0.097 | -0.028 |
| 0.313 | 0.344 | 0.369 | 0.381 | 0.243 | 0.042 | 1.000 | 0.223 | 0.368 |
| 0.337 | -0.041 | 0.271 | 0.044 | 0.121 | 0.097 | 0.223 | 1.000 | 0.300 |
| 0.126 | 0.275 | 0.210 | 0.314 | 0.206 | -0.028 | 0.368 | 0.300 | 1.000 |
| 0.049 | 0.278 | -0.094 | 0.117 | 0.007 | -0.291 | 0.067 | 0.055 | 0.225 |
| 0.183 | 0.234 | 0.251 | 0.420 | 0.172 | 0.106 | 0.542 | 0.023 | 0.348 |
| -0.103 | 0.141 | 0.065 | 0.252 | -0.005 | -0.052 | 0.194 | 0.098 | 0.358 |
| 0.251 | -0.236 | 0.262 | 0.037 | 0.026 | 0.406 | 0.025 | 0.165 | -0.119 |

| Q73 | Q74 | Q75 | Q76 |
|---|---|---|---|
| -0.157 | 0.235 | 0.182 | 0.275 |
| -0.135 | 0.170 | 0.068 | 0.358 |
| 0.106 | 0.160 | 0.057 | 0.077 |
| -0.036 | 0.272 | 0.026 | 0.121 |
| -0.077 | 0.417 | -0.122 | 0.406 |
| -0.137 | 0.323 | 0.245 | 0.225 |
| -0.246 | 0.215 | -0.185 | 0.478 |
| 0.032 | 0.269 | 0.112 | 0.184 |
| -0.088 | 0.140 | 0.308 | 0.053 |
| 0.058 | 0.304 | -0.068 | 0.131 |
| -0.139 | 0.260 | -0.066 | 0.296 |
| -0.154 | 0.317 | -0.067 | 0.202 |
| -0.031 | 0.441 | -0.008 | 0.173 |
| -0.164 | 0.221 | 0.110 | 0.312 |

| | | | |
|---|---|---|---|
| -0.110 | 0.259 | 0.113 | 0.194 |
| -0.003 | 0.260 | 0.085 | 0.119 |
| -0.293 | -0.059 | 0.009 | 0.210 |
| 0.186 | 0.496 | 0.109 | 0.189 |
| 0.225 | 0.309 | 0.424 | -0.079 |
| -0.105 | 0.059 | -0.087 | 0.330 |
| 0.145 | 0.152 | -0.051 | -0.010 |
| -0.091 | 0.194 | 0.064 | 0.226 |
| 0.042 | 0.386 | 0.171 | 0.212 |
| 0.212 | 0.074 | 0.321 | -0.121 |
| 0.032 | 0.113 | -0.103 | -0.065 |
| 0.116 | 0.403 | 0.197 | 0.114 |
| 0.038 | 0.443 | 0.226 | 0.227 |
| 0.168 | 0.548 | 0.108 | 0.146 |
| -0.237 | 0.170 | 0.101 | 0.353 |
| 0.092 | 0.358 | 0.218 | -0.033 |
| 0.035 | 0.155 | 0.189 | 0.138 |
| -0.066 | 0.150 | 0.016 | 0.324 |
| -0.044 | 0.356 | -0.142 | 0.332 |
| -0.163 | -0.007 | 0.021 | 0.351 |
| 0.025 | 0.395 | 0.141 | 0.206 |
| 0.031 | 0.393 | 0.410 | 0.001 |
| -0.146 | 0.076 | -0.081 | 0.362 |
| -0.059 | 0.307 | -0.091 | 0.351 |
| -0.296 | 0.006 | 0.037 | 0.380 |
| -0.018 | 0.565 | 0.292 | -0.031 |
| -0.088 | 0.274 | 0.009 | -0.076 |
| -0.026 | 0.004 | -0.100 | 0.087 |
| -0.153 | 0.306 | 0.175 | -0.069 |
| -0.140 | 0.072 | -0.012 | 0.134 |
| 0.177 | 0.407 | 0.072 | -0.077 |
| 0.133 | 0.280 | 0.238 | -0.196 |
| -0.168 | 0.371 | -0.102 | 0.425 |
| 0.015 | 0.374 | 0.066 | -0.050 |
| -0.054 | 0.244 | 0.072 | 0.201 |
| 0.228 | 0.099 | 0.152 | -0.132 |
| 0.174 | 0.353 | 0.323 | -0.282 |
| -0.094 | 0.222 | 0.128 | 0.239 |
| 0.009 | 0.147 | 0.024 | 0.194 |
| 0.031 | 0.120 | 0.101 | -0.142 |
| 0.092 | 0.357 | 0.119 | 0.130 |
| -0.183 | -0.152 | -0.077 | 0.194 |
| 0.174 | 0.364 | 0.111 | 0.025 |
| 0.106 | 0.087 | 0.180 | -0.093 |
| -0.114 | 0.199 | 0.041 | 0.316 |

| | | | |
|---|---|---|---|
| 0.196 | 0.164 | 0.144 | 0.033 |
| -0.200 | 0.019 | 0.069 | 0.439 |
| -0.010 | 0.305 | 0.176 | 0.099 |
| 0.049 | 0.303 | -0.011 | -0.046 |
| 0.049 | 0.183 | -0.103 | 0.251 |
| 0.278 | 0.234 | 0.141 | -0.236 |
| -0.094 | 0.251 | 0.065 | 0.262 |
| 0.117 | 0.420 | 0.252 | 0.037 |
| 0.007 | 0.172 | -0.005 | 0.026 |
| -0.291 | 0.106 | -0.052 | 0.406 |
| 0.067 | 0.542 | 0.194 | 0.025 |
| 0.055 | 0.023 | 0.098 | 0.165 |
| 0.225 | 0.348 | 0.358 | -0.119 |
| 1.000 | 0.103 | 0.045 | -0.216 |
| 0.103 | 1.000 | 0.182 | 0.166 |
| 0.045 | 0.182 | 1.000 | -0.066 |
| -0.216 | 0.166 | -0.066 | 1.000 |

```
T-TEST GROUPS=SET(1 2)
  /MISSING=ANALYSIS
  /VARIABLES=POST_SA_SUM POST_MA_SUM POST_SH_SUM POST_PSB_SUM POST_SM_SUM
  /CRITERIA=CI(.95).
```

# T-Test

**Notes**

| | | |
|---|---|---|
| Output Created | | 04-AUG-2017 11:04:58 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\PRE_POST_2016 (Fixed).sav |
| | Active Dataset | DataSet1 |
| | Filter | GRADE = 2 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 97 |
| Missing Value Handling | Definition of Missing | User defined missing values are treated as missing. |
| | Cases Used | Statistics for each analysis are based on the cases with no missing or out-of-range data for any variable in the analysis. |
| Syntax | | T-TEST GROUPS=SET(1 2)<br>/MISSING=ANALYSIS<br><br>/VARIABLES=POST_SA_SUM<br>POST_MA_SUM<br>POST_SH_SUM<br>POST_PSB_SUM<br>POST_SM_SUM<br>/CRITERIA=CI(.95). |
| Resources | Processor Time | 00:00:00.00 |
| | Elapsed Time | 00:00:00.02 |

**Group Statistics**

| SET | | N | Mean |
|---|---|---|---|
| POST_SA_SUM | 1 | 32 | 52.8125 |
| | 2 | 59 | 51.7288 |
| POST_MA_SUM | 1 | 32 | 57.3438 |

| | | | |
|---|---|---|---|
| | 2 | 59 | 54.2712 |
| POST_SH_SUM | 1 | 32 | 61.2188 |
| | 2 | 59 | 60.6441 |
| POST_PSB_SUM | 1 | 32 | 58.3125 |
| | 2 | 59 | 54.4407 |
| POST_SM_SUM | 1 | 32 | 57.1875 |
| | 2 | 59 | 54.0678 |

**Indepe**

| | | Levene's Test for Equality of Variances | |
|---|---|---|---|
| | | F | Sig. |
| POST_SA_SUM | Equal variances assumed | 0.008 | 0.930 |
| | Equal variances not assumed | | |
| POST_MA_SUM | Equal variances assumed | 0.154 | 0.696 |
| | Equal variances not assumed | | |
| POST_SH_SUM | Equal variances assumed | 0.016 | 0.899 |
| | Equal variances not assumed | | |
| POST_PSB_SUM | Equal variances assumed | 0.832 | 0.364 |
| | Equal variances not assumed | | |
| POST_SM_SUM | Equal variances assumed | 1.715 | 0.194 |
| | Equal variances not assumed | | |

| Std. Deviation | Std. Error Mean | Effect Size |
|---|---|---|
| 8.02190 | 1.41808 | |
| 7.97805 | 1.03865 | 0.14 |
| 8.43422 | 1.49097 | |

| | | |
|---|---|---|
| 9.19301 | 1.19683 | 0.33 |
| 11.39534 | 2.01443 | |
| 10.91940 | 1.42158 | 0.05 |
| 11.26925 | 1.99214 | |
| 9.78611 | 1.27404 | 0.34 |
| 5.28197 | 0.93373 | |
| 6.94278 | 0.90387 | 0.45 |

**endent Samples Test**

| | | | t-test for Equality of Means | | |
|---|---|---|---|---|---|
| t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidenc Differ Lower |
| 0.618 | 89 | 0.538 | 1.08369 | 1.75488 | -2.40323 |
| 0.617 | 63.426 | 0.540 | 1.08369 | 1.75777 | -2.42848 |
| 1.566 | 89 | 0.121 | 3.07256 | 1.96184 | -0.82558 |
| 1.607 | 68.598 | 0.113 | 3.07256 | 1.91191 | -0.74199 |
| 0.236 | 89 | 0.814 | 0.57468 | 2.43418 | -4.26199 |
| 0.233 | 61.423 | 0.816 | 0.57468 | 2.46553 | -4.35476 |
| 1.708 | 89 | 0.091 | 3.87182 | 2.26720 | -0.63306 |
| 1.637 | 56.493 | 0.107 | 3.87182 | 2.36470 | -0.86433 |
| 2.216 | 89 | 0.029 | 3.11970 | 1.40799 | 0.32205 |
| 2.401 | 79.165 | 0.019 | 3.11970 | 1.29955 | 0.53309 |

e Interval of the
ence

| Upper |
| --- |
| 4.57061 |
| 4.59585 |
| 6.97070 |
| 6.88712 |
| 5.41135 |
| 5.50413 |
| 8.37670 |
| 8.60797 |
| 5.91736 |
| 5.70631 |

```
T-TEST GROUPS=SET(1 2)
  /MISSING=ANALYSIS
  /VARIABLES=POST_SA_SUM POST_MA_SUM POST_SH_SUM POST_PSB_SUM POST_SM_SUM
  /CRITERIA=CI(.95).
```

# T-Test

**Notes**

| | | |
|---|---|---|
| Output Created | | 04-AUG-2017 13:00:07 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\PRE_POST_2017 Gr8.sav |
| | Active Dataset | DataSet1 |
| | Filter | <none> |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 94 |
| Missing Value Handling | Definition of Missing | User defined missing values are treated as missing. |
| | Cases Used | Statistics for each analysis are based on the cases with no missing or out-of-range data for any variable in the analysis. |
| Syntax | | T-TEST GROUPS=SET(1 2)<br>/MISSING=ANALYSIS<br><br>/VARIABLES=POST_SA_SUM POST_MA_SUM POST_SH_SUM POST_PSB_SUM POST_SM_SUM<br>/CRITERIA=CI(.95). |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.03 |

**Group Statistics**

| UNIQ | | N | Mean |
|---|---|---|---|
| POST_SA_SUM | 1.00 | 37 | 53.2703 |
| | 2.00 | 43 | 50.4186 |
| POST_MA_SUM | 1.00 | 37 | 55.8649 |

| | | | |
|---|---|---|---|
| | 2.00 | 43 | 54.6744 |
| POST_SH_SUM | 1.00 | 37 | 64.8649 |
| | 2.00 | 43 | 60.5116 |
| POST_PSB_SUM | 1.00 | 37 | 59.9459 |
| | 2.00 | 43 | 54.8605 |
| POST_SM_SUM | 1.00 | 37 | 54.3514 |
| | 2.00 | 43 | 53.7674 |

**Indepe**

| | | Levene's Test for Equality of Variances | |
|---|---|---|---|
| | | F | Sig. |
| POST_SA_SUM | Equal variances assumed | 0.151 | 0.699 |
| | Equal variances not assumed | | |
| POST_MA_SUM | Equal variances assumed | 0.000 | 0.993 |
| | Equal variances not assumed | | |
| POST_SH_SUM | Equal variances assumed | 1.901 | 0.172 |
| | Equal variances not assumed | | |
| POST_PSB_SUM | Equal variances assumed | 3.143 | 0.080 |
| | Equal variances not assumed | | |
| POST_SM_SUM | Equal variances assumed | 0.499 | 0.482 |
| | Equal variances not assumed | | |

| Std. Deviation | Std. Error Mean | Effect Size |
|---|---|---|
| 8.62377 | 1.41774 | |
| 9.83248 | 1.49944 | 0.29 |
| 9.34571 | 1.53643 | |

| | | |
|---|---|---|
| 8.79589 | 1.34136 | 0.13 |
| 8.41679 | 1.38371 | |
| 11.85904 | 1.80849 | 0.37 |
| 7.45708 | 1.22594 | |
| 10.58431 | 1.61409 | 0.48 |
| 9.16884 | 1.50735 | |
| 7.63088 | 1.16370 | 0.06 |

**endent Samples Test**

| | | | t-test for Equality of Means | | |
|---|---|---|---|---|---|
| t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidenc Differ Lower |
| 1.368 | 78 | 0.175 | 2.85167 | 2.08411 | -1.29748 |
| 1.382 | 77.966 | 0.171 | 2.85167 | 2.06357 | -1.25661 |
| 0.586 | 78 | 0.559 | 1.19045 | 2.03021 | -2.85139 |
| 0.584 | 74.630 | 0.561 | 1.19045 | 2.03957 | -2.87292 |
| 1.864 | 78 | 0.066 | 4.35324 | 2.33492 | -0.29524 |
| 1.912 | 75.415 | 0.060 | 4.35324 | 2.27712 | -0.18261 |
| 2.446 | 78 | 0.017 | 5.08548 | 2.07935 | 0.94580 |
| 2.509 | 75.227 | 0.014 | 5.08548 | 2.02687 | 1.04794 |
| 0.311 | 78 | 0.757 | 0.58391 | 1.87819 | -3.15528 |
| 0.307 | 70.297 | 0.760 | 0.58391 | 1.90428 | -3.21378 |

e Interval of the
ence

| Upper |
| --- |
| 7.00081 |
| 6.95994 |
| 5.23228 |
| 5.25381 |
| 9.00171 |
| 8.88909 |
| 9.22516 |
| 9.12302 |
| 4.32310 |
| 4.38160 |

```
USE ALL.
COMPUTE filter_$=(GRADE = 3).
VARIABLE LABELS filter_$ 'GRADE = 3 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
T-TEST GROUPS=SET(1 2)
  /MISSING=ANALYSIS
  /VARIABLES=POST_SA_SUM POST_MA_SUM POST_SH_SUM POST_PSB_SUM POST_SM_SUM
  /CRITERIA=CI(.95).
```

# T-Test

**Notes**

| | | |
|---|---|---|
| Output Created | | 04-AUG-2017 11:05:55 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\PRE_POST_2016 (Fixed).sav |
| | Active Dataset | DataSet1 |
| | Filter | GRADE = 3 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 98 |
| Missing Value Handling | Definition of Missing | User defined missing values are treated as missing. |
| | Cases Used | Statistics for each analysis are based on the cases with no missing or out-of-range data for any variable in the analysis. |
| Syntax | | T-TEST GROUPS=SET(1 2)<br>/MISSING=ANALYSIS<br><br>/VARIABLES=POST_SA_SUM<br>POST_MA_SUM<br>POST_SH_SUM<br>POST_PSB_SUM<br>POST_SM_SUM<br>/CRITERIA=CI(.95). |
| Resources | Processor Time | 00:00:00.00 |
| | Elapsed Time | 00:00:00.01 |

## Group Statistics

| SET | | N | Mean |
|---|---|---|---|
| POST_SA_SUM | 1 | 27 | 55.7407 |
| | 2 | 66 | 49.7727 |
| POST_MA_SUM | 1 | 27 | 59.4815 |
| | 2 | 66 | 57.3333 |
| POST_SH_SUM | 1 | 27 | 66.7407 |
| | 2 | 66 | 60.0455 |
| POST_PSB_SUM | 1 | 27 | 60.8148 |
| | 2 | 66 | 54.7273 |
| POST_SM_SUM | 1 | 27 | 58.4444 |
| | 2 | 66 | 56.0152 |

## Indepe

| | | Levene's Test for Equality of Variances | |
|---|---|---|---|
| | | F | Sig. |
| POST_SA_SUM | Equal variances assumed | 0.060 | 0.806 |
| | Equal variances not assumed | | |
| POST_MA_SUM | Equal variances assumed | 3.632 | 0.060 |
| | Equal variances not assumed | | |
| POST_SH_SUM | Equal variances assumed | 1.619 | 0.206 |
| | Equal variances not assumed | | |
| POST_PSB_SUM | Equal variances assumed | 0.000 | 0.998 |
| | Equal variances not assumed | | |
| POST_SM_SUM | Equal variances assumed | 1.913 | 0.170 |
| | Equal variances not assumed | | |

| Std. Deviation | Std. Error Mean | Effect Size |
|---|---|---|
| 7.58842 | 1.46039 | |
| 8.44857 | 1.03995 | 0.71 |
| 5.45168 | 1.04918 | |
| 8.40208 | 1.03422 | 0.26 |
| 9.37916 | 1.80502 | |
| 11.46021 | 1.41065 | 0.58 |
| 8.29289 | 1.59597 | |
| 8.82400 | 1.08616 | 0.69 |
| 4.65199 | 0.89528 | |
| 7.02850 | 0.86515 | 0.35 |

**ɛndent Samples Test**

| | | | t-test for Equality of Means | | |
|---|---|---|---|---|---|
| t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidenc Differ Lower |
| 3.181 | 91 | 0.002 | 5.96801 | 1.87602 | 2.24153 |
| 3.329 | 53.547 | 0.002 | 5.96801 | 1.79283 | 2.37291 |
| 1.225 | 91 | 0.224 | 2.14815 | 1.75350 | -1.33497 |
| 1.458 | 73.368 | 0.149 | 2.14815 | 1.47322 | -0.78774 |
| 2.687 | 91 | 0.009 | 6.69529 | 2.49151 | 1.74622 |
| 2.923 | 58.700 | 0.005 | 6.69529 | 2.29086 | 2.11079 |
| 3.072 | 91 | 0.003 | 6.08754 | 1.98192 | 2.15070 |
| 3.153 | 51.263 | 0.003 | 6.08754 | 1.93051 | 2.21237 |
| 1.651 | 91 | 0.102 | 2.42929 | 1.47112 | -0.49290 |
| 1.951 | 72.087 | 0.055 | 2.42929 | 1.24499 | -0.05250 |

| e Interval of the ence | |
|---|---|
| Upper | |
| 9.69449 | |
| 9.56311 | |
| 5.63127 | |
| 5.08403 | |
| 11.64436 | |
| 11.27978 | |
| 10.02438 | |
| 9.96271 | |
| 5.35149 | |
| 4.91108 | |

```
USE ALL.
COMPUTE filter_$=(GRADE = 2).
VARIABLE LABELS filter_$ 'GRADE = 2 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
SPLIT FILE OFF.
T-TEST GROUPS=SET(1 2)
  /MISSING=ANALYSIS
  /VARIABLES=PRE_SA_SUM PRE_MA_SUM PRE_SH_SUM PRE_PSB_SUM PRE_SM_SUM
  /CRITERIA=CI(.95).
```

# T-Test

**Notes**

| | | |
|---|---|---|
| Output Created | | 04-AUG-2017 11:03:47 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\PRE_POST_2016 (Fixed).sav |
| | Active Dataset | DataSet1 |
| | Filter | GRADE = 2 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 97 |
| Missing Value Handling | Definition of Missing | User defined missing values are treated as missing. |
| | Cases Used | Statistics for each analysis are based on the cases with no missing or out-of-range data for any variable in the analysis. |
| Syntax | | T-TEST GROUPS=SET(1 2)<br>/MISSING=ANALYSIS<br>/VARIABLES=PRE_SA_SUM<br>PRE_MA_SUM<br>PRE_SH_SUM<br>PRE_PSB_SUM<br>PRE_SM_SUM<br>/CRITERIA=CI(.95). |
| Resources | Processor Time | 00:00:00.00 |
| | Elapsed Time | 00:00:00.03 |

## Group Statistics

| SET | | N | Mean |
|---|---|---|---|
| PRE_SA_SUM | 1 | 36 | 52.9167 |
| | 2 | 61 | 50.2623 |
| PRE_MA_SUM | 1 | 36 | 54.7222 |
| | 2 | 61 | 51.7869 |
| PRE_SH_SUM | 1 | 36 | 62.6667 |
| | 2 | 61 | 59.3607 |
| PRE_PSB_SUM | 1 | 36 | 54.8889 |
| | 2 | 61 | 53.0492 |
| PRE_SM_SUM | 1 | 36 | 53.9167 |
| | 2 | 61 | 51.2787 |

## Indepe

| | | Levene's Test for Equality of Variances | |
|---|---|---|---|
| | | F | Sig. |
| PRE_SA_SUM | Equal variances assumed | 2.722 | 0.102 |
| | Equal variances not assumed | | |
| PRE_MA_SUM | Equal variances assumed | 0.133 | 0.716 |
| | Equal variances not assumed | | |
| PRE_SH_SUM | Equal variances assumed | 0.396 | 0.531 |
| | Equal variances not assumed | | |
| PRE_PSB_SUM | Equal variances assumed | 0.219 | 0.641 |
| | Equal variances not assumed | | |
| PRE_SM_SUM | Equal variances assumed | 0.218 | 0.641 |
| | Equal variances not assumed | | |

| Std. Deviation | Std. Error Mean | Effect Size |
|---|---|---|
| 9.77570 | 1.62928 | |
| 8.90487 | 1.14015 | 0.27 |
| 9.08566 | 1.51428 | |
| 9.42711 | 1.20702 | 0.31 |
| 11.68149 | 1.94691 | |
| 10.76574 | 1.37841 | 0.28 |
| 10.43833 | 1.73972 | |
| 10.22485 | 1.30916 | 0.18 |
| 6.93387 | 1.15565 | |
| 7.71607 | 0.98794 | 0.34 |

**ɛndent Samples Test**

| | | | t-test for Equality of Means | | |
|---|---|---|---|---|---|
| t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidenc Differ Lower |
| 1.368 | 95 | 0.175 | 2.65437 | 1.94097 | -1.19894 |
| 1.335 | 68.140 | 0.186 | 2.65437 | 1.98859 | -1.31366 |
| 1.501 | 95 | 0.137 | 2.93534 | 1.95516 | -0.94615 |
| 1.516 | 75.763 | 0.134 | 2.93534 | 1.93647 | -0.92168 |
| 1.416 | 95 | 0.160 | 3.30601 | 2.33538 | -1.33031 |
| 1.386 | 68.799 | 0.170 | 3.30601 | 2.38548 | -1.45313 |
| 0.850 | 95 | 0.398 | 1.83971 | 2.16559 | -2.45953 |
| 0.845 | 72.332 | 0.401 | 1.83971 | 2.17727 | -2.50027 |
| 1.688 | 95 | 0.095 | 2.63798 | 1.56313 | -0.46522 |
| 1.735 | 79.944 | 0.087 | 2.63798 | 1.52038 | -0.38770 |

e Interval of the
ence

| Upper |
| --- |
| 6.50768 |
| 6.62240 |
| 6.81682 |
| 6.79235 |
| 7.94233 |
| 8.06515 |
| 6.13895 |
| 6.17969 |
| 5.74118 |
| 5.66366 |

```
T-TEST GROUPS=SET(1 2)
  /MISSING=ANALYSIS
  /VARIABLES=PRE_SA_SUM PRE_MA_SUM PRE_SH_SUM PRE_PSB_SUM PRE_SM_SUM
  /CRITERIA=CI(.95).
```

# T-Test

**Notes**

| | | |
|---|---|---|
| Output Created | | 04-AUG-2017 12:59:21 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\PRE_POST_2017 Gr8.sav |
| | Active Dataset | DataSet1 |
| | Filter | <none> |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 94 |
| Missing Value Handling | Definition of Missing | User defined missing values are treated as missing. |
| | Cases Used | Statistics for each analysis are based on the cases with no missing or out-of-range data for any variable in the analysis. |
| Syntax | | T-TEST GROUPS=SET(1 2)<br>/MISSING=ANALYSIS<br>/VARIABLES=PRE_SA_SUM PRE_MA_SUM PRE_SH_SUM PRE_PSB_SUM PRE_SM_SUM<br>/CRITERIA=CI(.95). |
| Resources | Processor Time | 00:00:00.00 |
| | Elapsed Time | 00:00:00.00 |

**Group Statistics**

| UNIQ | | N | Mean |
|---|---|---|---|
| PRE_SA_SUM | 1.00 | 41 | 56.1707 |
| | 2.00 | 53 | 53.7358 |
| PRE_MA_SUM | 1.00 | 41 | 53.6585 |

| | | | |
|---|---|---|---|
| | 2.00 | 53 | 54.3585 |
| PRE_SH_SUM | 1.00 | 41 | 66.7805 |
| | 2.00 | 53 | 63.0377 |
| PRE_PSB_SUM | 1.00 | 41 | 61.1220 |
| | 2.00 | 53 | 55.9623 |
| PRE_SM_SUM | 1.00 | 41 | 54.4390 |
| | 2.00 | 53 | 53.3962 |

**Indepe**

| | | Levene's Test for Equality of Variances | |
|---|---|---|---|
| | | F | Sig. |
| PRE_SA_SUM | Equal variances assumed | 0.390 | 0.534 |
| | Equal variances not assumed | | |
| PRE_MA_SUM | Equal variances assumed | 0.961 | 0.329 |
| | Equal variances not assumed | | |
| PRE_SH_SUM | Equal variances assumed | 0.045 | 0.833 |
| | Equal variances not assumed | | |
| PRE_PSB_SUM | Equal variances assumed | 0.732 | 0.394 |
| | Equal variances not assumed | | |
| PRE_SM_SUM | Equal variances assumed | 0.450 | 0.504 |
| | Equal variances not assumed | | |

| Std. Deviation | Std. Error Mean | Effect Size |
|---|---|---|
| 9.46019 | 1.47743 | |
| 7.72646 | 1.06131 | 0.26 |
| 10.03147 | 1.56665 | |

| | | |
|---|---|---|
| 8.85154 | 1.21585 | 0.07 |
| 11.13219 | 1.73856 | |
| 9.90525 | 1.36059 | 0.34 |
| 9.03104 | 1.41041 | |
| 9.72499 | 1.33583 | 0.53 |
| 8.09027 | 1.26349 | |
| 6.93192 | 0.95217 | 0.13 |

**endent Samples Test**

| | | | t-test for Equality of Means | | |
|---|---|---|---|---|---|
| t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidenc Differ Lower |
| 1.373 | 92 | 0.173 | 2.43488 | 1.77281 | -1.08607 |
| 1.338 | 76.304 | 0.185 | 2.43488 | 1.81912 | -1.18797 |
| -0.359 | 92 | 0.721 | -0.69995 | 1.95149 | -4.57579 |
| -0.353 | 80.290 | 0.725 | -0.69995 | 1.98310 | -4.64624 |
| 1.721 | 92 | 0.089 | 3.74275 | 2.17479 | -0.57656 |
| 1.695 | 80.712 | 0.094 | 3.74275 | 2.20766 | -0.65005 |
| 2.631 | 92 | 0.010 | 5.15969 | 1.96121 | 1.26455 |
| 2.656 | 88.914 | 0.009 | 5.15969 | 1.94260 | 1.29973 |
| 0.672 | 92 | 0.503 | 1.04280 | 1.55109 | -2.03781 |
| 0.659 | 78.788 | 0.512 | 1.04280 | 1.58210 | -2.10642 |

e Interval of the
ence

| Upper |
| --- |
| 5.95583 |
| 6.05774 |
| 3.17588 |
| 3.24633 |
| 8.06206 |
| 8.13555 |
| 9.05483 |
| 9.01965 |
| 4.12341 |
| 4.19202 |

```
T-TEST GROUPS=SET(1 2)
  /MISSING=ANALYSIS
  /VARIABLES=PRE_SA_SUM PRE_MA_SUM PRE_SH_SUM PRE_PSB_SUM PRE_SM_SUM
  /CRITERIA=CI(.95).
```

# T-Test

**Notes**

| | | |
|---|---|---|
| Output Created | | 04-AUG-2017 11:06:27 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\PRE_POST_2016 (Fixed).sav |
| | Active Dataset | DataSet1 |
| | Filter | GRADE = 3 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 98 |
| Missing Value Handling | Definition of Missing | User defined missing values are treated as missing. |
| | Cases Used | Statistics for each analysis are based on the cases with no missing or out-of-range data for any variable in the analysis. |
| Syntax | | T-TEST GROUPS=SET(1 2)<br>/MISSING=ANALYSIS<br>/VARIABLES=PRE_SA_SUM<br>PRE_MA_SUM<br>PRE_SH_SUM<br>PRE_PSB_SUM<br>PRE_SM_SUM<br>/CRITERIA=CI(.95). |
| Resources | Processor Time | 00:00:00.00 |
| | Elapsed Time | 00:00:00.02 |

**Group Statistics**

| SET | | N | Mean |
|---|---|---|---|
| PRE_SA_SUM | 1 | 27 | 54.7778 |
| | 2 | 71 | 50.1690 |
| PRE_MA_SUM | 1 | 27 | 55.6667 |

| | | | |
|---|---|---|---|
| | 2 | 71 | 53.9577 |
| PRE_SH_SUM | 1 | 27 | 65.8889 |
| | 2 | 71 | 58.0423 |
| PRE_PSB_SUM | 1 | 27 | 58.8148 |
| | 2 | 71 | 53.3099 |
| PRE_SM_SUM | 1 | 27 | 56.3704 |
| | 2 | 71 | 54.3099 |

**Indepe**

| | | Levene's Test for Equality of Variances | |
|---|---|---|---|
| | | F | Sig. |
| PRE_SA_SUM | Equal variances assumed | 0.845 | 0.360 |
| | Equal variances not assumed | | |
| PRE_MA_SUM | Equal variances assumed | 1.240 | 0.268 |
| | Equal variances not assumed | | |
| PRE_SH_SUM | Equal variances assumed | 0.481 | 0.490 |
| | Equal variances not assumed | | |
| PRE_PSB_SUM | Equal variances assumed | 0.766 | 0.384 |
| | Equal variances not assumed | | |
| PRE_SM_SUM | Equal variances assumed | 1.169 | 0.282 |
| | Equal variances not assumed | | |

| Std. Deviation | Std. Error Mean | Effect Size |
|---|---|---|
| 6.72157 | 1.29357 | |
| 8.11170 | 0.96268 | 0.57 |
| 7.33799 | 1.41220 | |

| | | |
|---|---|---|
| 8.70047 | 1.03256 | 0.20 |
| 8.88098 | 1.70915 | |
| 10.14247 | 1.20369 | 0.77 |
| 9.11481 | 1.75415 | |
| 8.43732 | 1.00133 | 0.60 |
| 4.90799 | 0.94454 | |
| 6.79410 | 0.80631 | 0.30 |

**endent Samples Test**

| | | | t-test for Equality of Means | | |
|---|---|---|---|---|---|
| t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidenc Differ Lower |
| 2.627 | 96 | 0.010 | 4.60876 | 1.75450 | 1.12610 |
| 2.858 | 56.355 | 0.006 | 4.60876 | 1.61247 | 1.37904 |
| 0.905 | 96 | 0.368 | 1.70892 | 1.88872 | -2.04016 |
| 0.977 | 55.354 | 0.333 | 1.70892 | 1.74942 | -1.79649 |
| 3.535 | 96 | 0.001 | 7.84664 | 2.21959 | 3.44078 |
| 3.754 | 53.316 | 0.000 | 7.84664 | 2.09047 | 3.65427 |
| 2.823 | 96 | 0.006 | 5.50496 | 1.95036 | 1.63352 |
| 2.725 | 43.971 | 0.009 | 5.50496 | 2.01982 | 1.43420 |
| 1.438 | 96 | 0.154 | 2.06051 | 1.43324 | -0.78444 |
| 1.659 | 64.900 | 0.102 | 2.06051 | 1.24189 | -0.41979 |

e Interval of the
ence

| Upper |
|---|
| 8.09143 |
| 7.83849 |
| 5.45800 |
| 5.21433 |
| 12.25249 |
| 12.03900 |
| 9.37639 |
| 9.57572 |
| 4.90547 |
| 4.54081 |

```
GET
  FILE='C:\Users\20396236\Desktop\Jordaan_T\DATA USE\PRE_POST_2016 (Fix
DATASET NAME DataSet1 WINDOW=FRONT.
SORT CASES  BY SET.
SPLIT FILE LAYERED BY SET.
USE ALL.
COMPUTE filter_$=(GRADE = 2).
VARIABLE LABELS filter_$ 'GRADE = 2 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
T-TEST PAIRS=PRE_SA_SUM PRE_MA_SUM PRE_SH_SUM PRE_PSB_SUM PRE_SM_SUM WI
    POST_SH_SUM POST_PSB_SUM POST_SM_SUM (PAIRED)
  /CRITERIA=CI(.9500)
  /MISSING=ANALYSIS.
```

# T-Test

**Notes**

| | | |
|---|---|---|
| Output Created | | 04-AUG-2017 13:02:24 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\PRE_POST_2016 (Fixed).sav |
| | Active Dataset | DataSet1 |
| | Filter | GRADE = 2 (FILTER) |
| | Weight | <none> |
| | Split File | SET |
| | N of Rows in Working Data File | 97 |
| Missing Value Handling | Definition of Missing | User defined missing values are treated as missing. |
| | Cases Used | Statistics for each analysis are based on the cases with no missing or out-of-range data for any variable in the analysis. |

| | | |
|---|---|---|
| Syntax | | T-TEST<br>PAIRS=PRE_SA_SUM<br>PRE_MA_SUM<br>PRE_SH_SUM<br>PRE_PSB_SUM<br>PRE_SM_SUM WITH<br>POST_SA_SUM<br>POST_MA_SUM<br>POST_SH_SUM<br>POST_PSB_SUM<br>POST_SM_SUM (PAIRED)<br>/CRITERIA=CI(.9500)<br>/MISSING=ANALYSIS. |
| Resources | Processor Time | 00:00:00.00 |
| | Elapsed Time | 00:00:00.00 |

[DataSet1] C:\Users\20396236\Desktop\Jordaan_T\DATA USE\PRE_POST_

**Paired Samples Statistics**

| SET | | | Mean |
|---|---|---|---|
| 1 | Pair 1 | PRE_SA_SUM | 52.3438 |
| | | POST_SA_SUM | 52.8125 |
| | Pair 2 | PRE_MA_SUM | 54.4375 |
| | | POST_MA_SUM | 57.3438 |
| | Pair 3 | PRE_SH_SUM | 61.9375 |
| | | POST_SH_SUM | 61.2188 |
| | Pair 4 | PRE_PSB_SUM | 54.7500 |
| | | POST_PSB_SUM | 58.3125 |
| | Pair 5 | PRE_SM_SUM | 53.9688 |
| | | POST_SM_SUM | 57.1875 |
| 2 | Pair 1 | PRE_SA_SUM | 50.0508 |
| | | POST_SA_SUM | 51.7288 |
| | Pair 2 | PRE_MA_SUM | 51.5424 |
| | | POST_MA_SUM | 54.2712 |
| | Pair 3 | PRE_SH_SUM | 59.1864 |
| | | POST_SH_SUM | 60.6441 |
| | Pair 4 | PRE_PSB_SUM | 52.7627 |
| | | POST_PSB_SUM | 54.4407 |
| | Pair 5 | PRE_SM_SUM | 51.1695 |
| | | POST_SM_SUM | 54.0678 |

**Paired Samples Correlations**

| SET | | | N |
|---|---|---|---|
| 1 | Pair 1 | PRE_SA_SUM & POST_SA_SUM | 32 |

| | | | |
|---|---|---|---|
| | Pair 2 | PRE_MA_SUM & POST_MA_SUM | 32 |
| | Pair 3 | PRE_SH_SUM & POST_SH_SUM | 32 |
| | Pair 4 | PRE_PSB_SUM & POST_PSB_SUM | 32 |
| | Pair 5 | PRE_SM_SUM & POST_SM_SUM | 32 |
| 2 | Pair 1 | PRE_SA_SUM & POST_SA_SUM | 59 |
| | Pair 2 | PRE_MA_SUM & POST_MA_SUM | 59 |
| | Pair 3 | PRE_SH_SUM & POST_SH_SUM | 59 |
| | Pair 4 | PRE_PSB_SUM & POST_PSB_SUM | 59 |
| | Pair 5 | PRE_SM_SUM & POST_SM_SUM | 59 |

**Paire**

| SET | | | Mean |
|---|---|---|---|
| 1 | Pair 1 | PRE_SA_SUM - POST_SA_SUM | -0.46875 |
| | Pair 2 | PRE_MA_SUM - POST_MA_SUM | -2.90625 |
| | Pair 3 | PRE_SH_SUM - POST_SH_SUM | 0.71875 |
| | Pair 4 | PRE_PSB_SUM - POST_PSB_SUM | -3.56250 |
| | Pair 5 | PRE_SM_SUM - POST_SM_SUM | -3.21875 |
| 2 | Pair 1 | PRE_SA_SUM - POST_SA_SUM | -1.67797 |
| | Pair 2 | PRE_MA_SUM - POST_MA_SUM | -2.72881 |
| | Pair 3 | PRE_SH_SUM - POST_SH_SUM | -1.45763 |
| | Pair 4 | PRE_PSB_SUM - POST_PSB_SUM | -1.67797 |
| | Pair 5 | PRE_SM_SUM - POST_SM_SUM | -2.89831 |

ed).sav'.

TH POST_SA_SUM POST_MA_SUM

_2016 (Fixed).sav

| N | Std. Deviation | Std. Error Mean | Effect Size |
|---|---|---|---|
| 32 | 9.72728 | 1.71956 | |
| 32 | 8.02190 | 1.41808 | 0.05 |
| 32 | 9.05516 | 1.60074 | |
| 32 | 8.43422 | 1.49097 | 0.32 |
| 32 | 11.86194 | 2.09691 | |
| 32 | 11.39534 | 2.01443 | 0.06 |
| 32 | 10.19804 | 1.80278 | |
| 32 | 11.26925 | 1.99214 | 0.32 |
| 32 | 6.60637 | 1.16785 | |
| 32 | 5.28197 | 0.93373 | 0.49 |
| 59 | 8.97588 | 1.16856 | |
| 59 | 7.97805 | 1.03865 | 0.19 |
| 59 | 9.48924 | 1.23539 | |
| 59 | 9.19301 | 1.19683 | 0.29 |
| 59 | 10.90630 | 1.41988 | |
| 59 | 10.91940 | 1.42158 | 0.13 |
| 59 | 10.12395 | 1.31803 | |
| 59 | 9.78611 | 1.27404 | 0.17 |
| 59 | 7.81059 | 1.01685 | |
| 59 | 6.94278 | 0.90387 | 0.37 |

| Correlation | Sig. |
|---|---|
| 0.744 | 0.000 |

| | |
|---|---|
| 0.732 | 0.000 |
| 0.719 | 0.000 |
| 0.804 | 0.000 |
| 0.535 | 0.002 |
| 0.579 | 0.000 |
| 0.671 | 0.000 |
| 0.595 | 0.000 |
| 0.598 | 0.000 |
| 0.680 | 0.000 |

**d Samples Test**

| Paired Differences | | | | | | |
|---|---|---|---|---|---|---|
| | | 95% Confidence Interval of the Difference | | | | |
| Std. Deviation | Std. Error Mean | Lower | Upper | t | df | Sig. (2-tailed) |
| 6.54998 | 1.15788 | -2.83027 | 1.89277 | -0.405 | 31 | 0.688 |
| 6.43258 | 1.13713 | -5.22544 | -0.58706 | -2.556 | 31 | 0.016 |
| 8.73345 | 1.54387 | -2.43000 | 3.86750 | 0.466 | 31 | 0.645 |
| 6.79629 | 1.20143 | -6.01282 | -1.11218 | -2.965 | 31 | 0.006 |
| 5.85157 | 1.03442 | -5.32847 | -1.10903 | -3.112 | 31 | 0.004 |
| 7.82666 | 1.01894 | -3.71760 | 0.36167 | -1.647 | 58 | 0.105 |
| 7.58135 | 0.98701 | -4.70452 | -0.75310 | -2.765 | 58 | 0.008 |
| 9.82664 | 1.27932 | -4.01846 | 1.10321 | -1.139 | 58 | 0.259 |
| 8.93355 | 1.16305 | -4.00606 | 0.65013 | -1.443 | 58 | 0.154 |
| 5.95296 | 0.77501 | -4.44966 | -1.34695 | -3.740 | 58 | 0.000 |

```
DATASET ACTIVATE DataSet1.

SAVE OUTFILE='C:\Users\20396236\Desktop\Jordaan_T\DATA USE\PRE_POST_201
  /COMPRESSED.
T-TEST PAIRS=PRE_SA_SUM PRE_MA_SUM PRE_SH_SUM PRE_PSB_SUM PRE_SM_SUM WI
    POST_SH_SUM POST_PSB_SUM POST_SM_SUM (PAIRED)
  /CRITERIA=CI(.9500)
  /MISSING=ANALYSIS.
```

# T-Test

**Notes**

| | | |
|---|---|---|
| Output Created | | 04-AUG-2017 12:53:44 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\PRE_POST_2017 Gr8.sav |
| | Active Dataset | DataSet1 |
| | Filter | <none> |
| | Weight | <none> |
| | Split File | UNIQ |
| | N of Rows in Working Data File | 94 |
| Missing Value Handling | Definition of Missing | User defined missing values are treated as missing. |
| | Cases Used | Statistics for each analysis are based on the cases with no missing or out-of-range data for any variable in the analysis. |
| Syntax | | T-TEST PAIRS=PRE_SA_SUM PRE_MA_SUM PRE_SH_SUM PRE_PSB_SUM PRE_SM_SUM WITH POST_SA_SUM POST_MA_SUM POST_SH_SUM POST_PSB_SUM POST_SM_SUM (PAIRED) /CRITERIA=CI(.9500) /MISSING=ANALYSIS. |
| Resources | Processor Time | 00:00:00.00 |
| | Elapsed Time | 00:00:00.02 |

## Paired Samples Statistics

| UNIQ | | | Mean |
|---|---|---|---|
| 1.00 | Pair 1 | PRE_SA_SUM | 56.8108 |
| | | POST_SA_SUM | 53.2703 |
| | Pair 2 | PRE_MA_SUM | 54.4595 |
| | | POST_MA_SUM | 55.8649 |
| | Pair 3 | PRE_SH_SUM | 67.9730 |
| | | POST_SH_SUM | 64.8649 |
| | Pair 4 | PRE_PSB_SUM | 61.6216 |
| | | POST_PSB_SUM | 59.9459 |
| | Pair 5 | PRE_SM_SUM | 55.4054 |
| | | POST_SM_SUM | 54.3514 |
| 2.00 | Pair 1 | PRE_SA_SUM | 53.6977 |
| | | POST_SA_SUM | 50.4186 |
| | Pair 2 | PRE_MA_SUM | 53.9767 |
| | | POST_MA_SUM | 54.6744 |
| | Pair 3 | PRE_SH_SUM | 62.9302 |
| | | POST_SH_SUM | 60.5116 |
| | Pair 4 | PRE_PSB_SUM | 55.5814 |
| | | POST_PSB_SUM | 54.8605 |
| | Pair 5 | PRE_SM_SUM | 52.7907 |
| | | POST_SM_SUM | 53.7674 |

## Paired Samples Correlations

| UNIQ | | | N |
|---|---|---|---|
| 1.00 | Pair 1 | PRE_SA_SUM & POST_SA_SUM | 37 |
| | Pair 2 | PRE_MA_SUM & POST_MA_SUM | 37 |
| | Pair 3 | PRE_SH_SUM & POST_SH_SUM | 37 |
| | Pair 4 | PRE_PSB_SUM & POST_PSB_SUM | 37 |
| | Pair 5 | PRE_SM_SUM & POST_SM_SUM | 37 |
| 2.00 | Pair 1 | PRE_SA_SUM & POST_SA_SUM | 43 |
| | Pair 2 | PRE_MA_SUM & POST_MA_SUM | 43 |
| | Pair 3 | PRE_SH_SUM & POST_SH_SUM | 43 |
| | Pair 4 | PRE_PSB_SUM & POST_PSB_SUM | 43 |
| | Pair 5 | PRE_SM_SUM & POST_SM_SUM | 43 |

**Paire**

| UNIQ | | | Mean |
|---|---|---|---|
| 1.00 | Pair 1 | PRE_SA_SUM - POST_SA_SUM | 3.54054 |
| | Pair 2 | PRE_MA_SUM - POST_MA_SUM | -1.40541 |
| | Pair 3 | PRE_SH_SUM - POST_SH_SUM | 3.10811 |
| | Pair 4 | PRE_PSB_SUM - POST_PSB_SUM | 1.67568 |
| | Pair 5 | PRE_SM_SUM - POST_SM_SUM | 1.05405 |
| 2.00 | Pair 1 | PRE_SA_SUM - POST_SA_SUM | 3.27907 |
| | Pair 2 | PRE_MA_SUM - POST_MA_SUM | -0.69767 |
| | Pair 3 | PRE_SH_SUM - POST_SH_SUM | 2.41860 |
| | Pair 4 | PRE_PSB_SUM - POST_PSB_SUM | 0.72093 |
| | Pair 5 | PRE_SM_SUM - POST_SM_SUM | -0.97674 |

.7 Gr8.sav'

TH POST_SA_SUM POST_MA_SUM

| N | Std. Deviation | Std. Error Mean | Effect Size |
|---|---|---|---|
| 37 | 7.83808 | 1.28857 | |
| 37 | 8.62377 | 1.41774 | 0.41 |
| 37 | 9.33510 | 1.53468 | |
| 37 | 9.34571 | 1.53643 | 0.15 |
| 37 | 7.94595 | 1.30631 | |
| 37 | 8.41679 | 1.38371 | 0.37 |
| 37 | 8.07380 | 1.32732 | |
| 37 | 7.45708 | 1.22594 | 0.21 |
| 37 | 6.48699 | 1.06646 | |
| 37 | 9.16884 | 1.50735 | 0.11 |
| 43 | 7.50725 | 1.14484 | |
| 43 | 9.83248 | 1.49944 | 0.33 |
| 43 | 9.03298 | 1.37752 | |
| 43 | 8.79589 | 1.34136 | 0.08 |
| 43 | 10.40466 | 1.58670 | |
| 43 | 11.85904 | 1.80849 | 0.20 |
| 43 | 9.57236 | 1.45977 | |
| 43 | 10.58431 | 1.61409 | 0.07 |
| 43 | 7.31456 | 1.11546 | |
| 43 | 7.63088 | 1.16370 | 0.13 |

| Correlation | Sig. |
|---|---|
| 0.627 | 0.000 |
| 0.688 | 0.000 |
| 0.655 | 0.000 |
| 0.698 | 0.000 |
| 0.744 | 0.000 |
| 0.452 | 0.002 |
| 0.732 | 0.000 |
| 0.650 | 0.000 |
| 0.641 | 0.000 |
| 0.762 | 0.000 |

**d Samples Test**

| Paired Differences | | | | | | |
|---|---|---|---|---|---|---|
| | | 95% Confidence Interval of the Difference | | | | |
| Std. Deviation | Std. Error Mean | Lower | Upper | t | df | Sig. (2-tailed) |
| 7.14374 | 1.17442 | 1.15870 | 5.92238 | 3.015 | 36 | 0.005 |
| 7.37661 | 1.21271 | -3.86489 | 1.05408 | -1.159 | 36 | 0.254 |
| 6.80598 | 1.11890 | 0.83888 | 5.37733 | 2.778 | 36 | 0.009 |
| 6.06013 | 0.99628 | -0.34487 | 3.69622 | 1.682 | 36 | 0.101 |
| 6.13707 | 1.00893 | -0.99215 | 3.10026 | 1.045 | 36 | 0.303 |
| 9.28984 | 1.41669 | 0.42008 | 6.13806 | 2.315 | 42 | 0.026 |
| 6.53028 | 0.99586 | -2.70740 | 1.31205 | -0.701 | 42 | 0.487 |
| 9.40930 | 1.43490 | -0.47715 | 5.31436 | 1.686 | 42 | 0.099 |
| 8.58661 | 1.30945 | -1.92164 | 3.36350 | 0.551 | 42 | 0.585 |
| 5.16623 | 0.78784 | -2.56667 | 0.61319 | -1.240 | 42 | 0.222 |

```
USE ALL.
COMPUTE filter_$=(GRADE = 3).
VARIABLE LABELS filter_$ 'GRADE = 3 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
T-TEST PAIRS=PRE_SA_SUM PRE_MA_SUM PRE_SH_SUM PRE_PSB_SUM PRE_SM_SUM WI
    POST_SH_SUM POST_PSB_SUM POST_SM_SUM (PAIRED)
  /CRITERIA=CI(.9500)
  /MISSING=ANALYSIS.
```

# T-Test

**Notes**

| | | |
|---|---|---|
| Output Created | | 04-AUG-2017 11:00:37 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\PRE_POST_2016 (Fixed).sav |
| | Active Dataset | DataSet1 |
| | Filter | GRADE = 3 (FILTER) |
| | Weight | <none> |
| | Split File | SET |
| | N of Rows in Working Data File | 98 |
| Missing Value Handling | Definition of Missing | User defined missing values are treated as missing. |
| | Cases Used | Statistics for each analysis are based on the cases with no missing or out-of-range data for any variable in the analysis. |
| Syntax | | T-TEST PAIRS=PRE_SA_SUM PRE_MA_SUM PRE_SH_SUM PRE_PSB_SUM PRE_SM_SUM WITH POST_SA_SUM POST_MA_SUM POST_SH_SUM POST_PSB_SUM POST_SM_SUM (PAIRED) /CRITERIA=CI(.9500) /MISSING=ANALYSIS. |

| | | |
|---|---|---|
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.02 |

## Paired Samples Statistics

| SET | | | Mean |
|---|---|---|---|
| 1 | Pair 1 | PRE_SA_SUM | 54.7778 |
| | | POST_SA_SUM | 55.7407 |
| | Pair 2 | PRE_MA_SUM | 55.6667 |
| | | POST_MA_SUM | 59.4815 |
| | Pair 3 | PRE_SH_SUM | 65.8889 |
| | | POST_SH_SUM | 66.7407 |
| | Pair 4 | PRE_PSB_SUM | 58.8148 |
| | | POST_PSB_SUM | 60.8148 |
| | Pair 5 | PRE_SM_SUM | 56.3704 |
| | | POST_SM_SUM | 58.4444 |
| 2 | Pair 1 | PRE_SA_SUM | 50.1818 |
| | | POST_SA_SUM | 49.7727 |
| | Pair 2 | PRE_MA_SUM | 53.9394 |
| | | POST_MA_SUM | 57.3333 |
| | Pair 3 | PRE_SH_SUM | 58.3333 |
| | | POST_SH_SUM | 60.0455 |
| | Pair 4 | PRE_PSB_SUM | 53.3030 |
| | | POST_PSB_SUM | 54.7273 |
| | Pair 5 | PRE_SM_SUM | 54.3030 |
| | | POST_SM_SUM | 56.0152 |

## Paired Samples Correlations

| SET | | | N |
|---|---|---|---|
| 1 | Pair 1 | PRE_SA_SUM & POST_SA_SUM | 27 |
| | Pair 2 | PRE_MA_SUM & POST_MA_SUM | 27 |
| | Pair 3 | PRE_SH_SUM & POST_SH_SUM | 27 |
| | Pair 4 | PRE_PSB_SUM & POST_PSB_SUM | 27 |
| | Pair 5 | PRE_SM_SUM & POST_SM_SUM | 27 |
| 2 | Pair 1 | PRE_SA_SUM & POST_SA_SUM | 66 |
| | Pair 2 | PRE_MA_SUM & POST_MA_SUM | 66 |
| | Pair 3 | PRE_SH_SUM & POST_SH_SUM | 66 |
| | Pair 4 | PRE_PSB_SUM & POST_PSB_SUM | 66 |

| | | | |
|---|---|---|---|
| | Pair 5 | PRE_SM_SUM & POST_SM_SUM | 66 |

**Paire**

| SET | | | Mean |
|---|---|---|---|
| 1 | Pair 1 | PRE_SA_SUM - POST_SA_SUM | -0.96296 |
| | Pair 2 | PRE_MA_SUM - POST_MA_SUM | -3.81481 |
| | Pair 3 | PRE_SH_SUM - POST_SH_SUM | -0.85185 |
| | Pair 4 | PRE_PSB_SUM - POST_PSB_SUM | -2.00000 |
| | Pair 5 | PRE_SM_SUM - POST_SM_SUM | -2.07407 |
| 2 | Pair 1 | PRE_SA_SUM - POST_SA_SUM | 0.40909 |
| | Pair 2 | PRE_MA_SUM - POST_MA_SUM | -3.39394 |
| | Pair 3 | PRE_SH_SUM - POST_SH_SUM | -1.71212 |
| | Pair 4 | PRE_PSB_SUM - POST_PSB_SUM | -1.42424 |
| | Pair 5 | PRE_SM_SUM - POST_SM_SUM | -1.71212 |

TH POST_SA_SUM POST_MA_SUM

| N | Std. Deviation | Std. Error Mean | Effect Size |
|---|---|---|---|
| 27 | 6.72157 | 1.29357 | |
| 27 | 7.58842 | 1.46039 | 0.13 |
| 27 | 7.33799 | 1.41220 | |
| 27 | 5.45168 | 1.04918 | 0.52 |
| 27 | 8.88098 | 1.70915 | |
| 27 | 9.37916 | 1.80502 | 0.09 |
| 27 | 9.11481 | 1.75415 | |
| 27 | 8.29289 | 1.59597 | 0.22 |
| 27 | 4.90799 | 0.94454 | |
| 27 | 4.65199 | 0.89528 | 0.42 |
| 66 | 7.93805 | 0.97711 | |
| 66 | 8.44857 | 1.03995 | 0.05 |
| 66 | 8.76159 | 1.07848 | |
| 66 | 8.40208 | 1.03422 | 0.39 |
| 66 | 9.54396 | 1.17478 | |
| 66 | 11.46021 | 1.41065 | 0.15 |
| 66 | 8.00955 | 0.98591 | |
| 66 | 8.82400 | 1.08616 | 0.16 |
| 66 | 6.87687 | 0.84648 | |
| 66 | 7.02850 | 0.86515 | 0.24 |

| Correlation | Sig. |
|---|---|
| 0.573 | 0.002 |
| 0.685 | 0.000 |
| 0.508 | 0.007 |
| 0.312 | 0.113 |
| 0.508 | 0.007 |
| 0.712 | 0.000 |
| 0.623 | 0.000 |
| 0.765 | 0.000 |
| 0.736 | 0.000 |

| | |
|---|---|
| 0.667 | 0.000 |

**d Samples Test**

| Paired Differences | | | | | | |
|---|---|---|---|---|---|---|
| | | 95% Confidence Interval of the Difference | | | | |
| Std. Deviation | Std. Error Mean | Lower | Upper | t | df | Sig. (2-tailed) |
| 6.65918 | 1.28156 | -3.59725 | 1.67132 | -0.751 | 26 | 0.459 |
| 5.36396 | 1.03229 | -5.93673 | -1.69290 | -3.695 | 26 | 0.001 |
| 9.07110 | 1.74573 | -4.44026 | 2.73656 | -0.488 | 26 | 0.630 |
| 10.23193 | 1.96914 | -6.04762 | 2.04762 | -1.016 | 26 | 0.319 |
| 4.74687 | 0.91354 | -3.95187 | -0.19628 | -2.270 | 26 | 0.032 |
| 6.23385 | 0.76733 | -1.12338 | 1.94156 | 0.533 | 65 | 0.596 |
| 7.46248 | 0.91857 | -5.22845 | -1.55943 | -3.695 | 65 | 0.000 |
| 7.42297 | 0.91370 | -3.53691 | 0.11267 | -1.874 | 65 | 0.065 |
| 6.16457 | 0.75881 | -2.93968 | 0.09120 | -1.877 | 65 | 0.065 |
| 5.67251 | 0.69824 | -3.10660 | -0.31764 | -2.452 | 65 | 0.017 |

```
GET
  FILE='C:\Users\20396236\Desktop\Spreadsheet6.sav'.

Warning # 5281.  Command name: GET FILE
SPSS Statistics is running in Unicode encoding mode.  This file is encoded
a locale-specific (code page) encoding.  The defined width of any string
variables are automatically tripled in order to avoid possible data loss.
can use ALTER TYPE to set the width of string variables to the width of th
longest observed value for each string variable.
DATASET NAME DataSet1 WINDOW=FRONT.
T-TEST PAIRS=PRE_SA_SUM PRE_MA_SUM PRE_SH_SUM PRE_PSB_SUM PRE_SM_SUM WITH
    PSB_SUM SM_SUM (PAIRED)
  /CRITERIA=CI(.9500)
  /MISSING=ANALYSIS.
```

# T-Test

**Notes**

| | | |
|---|---|---|
| Output Created | | 15-AUG-2017 09:42:40 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Spreadsheet6.sav |
| | Active Dataset | DataSet1 |
| | Filter | <none> |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 109 |
| Missing Value Handling | Definition of Missing | User defined missing values are treated as missing. |
| | Cases Used | Statistics for each analysis are based on the cases with no missing or out-of-range data for any variable in the analysis. |
| Syntax | | T-TEST PAIRS=PRE_SA_SUM PRE_MA_SUM PRE_SH_SUM PRE_PSB_SUM PRE_SM_SUM WITH SA_SUM MA_SUM SH_SUM PSB_SUM SM_SUM (PAIRED) /CRITERIA=CI(.9500) /MISSING=ANALYSIS. |

| | | |
|---|---|---|
| Resources | Processor Time | 00:00:00.00 |
| | Elapsed Time | 00:00:00.01 |

[DataSet1] C:\Users\20396236\Desktop\Spreadsheet6.sav

**Paired Samples Statistics**

| | | Mean | N |
|---|---|---|---|
| Pair 1 | PRE_SA_SUM | 51.1125 | 80 |
| | SA_SUM | 53.0500 | 80 |
| Pair 2 | PRE_MA_SUM | 52.7000 | 80 |
| | MA_SUM | 56.0875 | 80 |
| Pair 3 | PRE_SH_SUM | 60.1000 | 80 |
| | SH_SUM | 62.0125 | 80 |
| Pair 4 | PRE_PSB_SUM | 53.7125 | 80 |
| | PSB_SUM | 57.6250 | 80 |
| Pair 5 | PRE_SM_SUM | 52.3375 | 80 |
| | SM_SUM | 56.5250 | 80 |

**Paired Samples Correlations**

| | | N | Correlation |
|---|---|---|---|
| Pair 1 | PRE_SA_SUM & SA_SUM | 80 | 0.580 |
| Pair 2 | PRE_MA_SUM & MA_SUM | 80 | 0.597 |
| Pair 3 | PRE_SH_SUM & SH_SUM | 80 | 0.679 |
| Pair 4 | PRE_PSB_SUM & PSB_SUM | 80 | 0.615 |
| Pair 5 | PRE_SM_SUM & SM_SUM | 80 | 0.574 |

**Paired Sample**

| | | Paired | |
|---|---|---|---|
| | | Mean | Std. Deviation |
| Pair 1 | PRE_SA_SUM - SA_SUM | -1.93750 | 7.92104 |
| Pair 2 | PRE_MA_SUM - MA_SUM | -3.38750 | 7.84420 |
| Pair 3 | PRE_SH_SUM - SH_SUM | -1.91250 | 8.91336 |
| Pair 4 | PRE_PSB_SUM - PSB_SUM | -3.91250 | 9.03186 |
| Pair 5 | PRE_SM_SUM - SM_SUM | -4.18750 | 6.43781 |

in

You
e

SA_SUM MA_SUM SH_SUM

| Std. Deviation | Std. Error Mean |
|---|---|
| 9.19685 | 1.02824 |
| 7.91873 | 0.88534 |
| 9.36246 | 1.04676 |
| 7.83887 | 0.87641 |
| 11.00127 | 1.22998 |
| 11.22666 | 1.25518 |
| 10.35227 | 1.15742 |
| 10.23567 | 1.14438 |
| 7.49167 | 0.83759 |
| 6.26013 | 0.69990 |

| Sig. |
|---|
| 0.000 |
| 0.000 |
| 0.000 |
| 0.000 |
| 0.000 |

**s Test**

| Differences | | | | | |
|---|---|---|---|---|---|
| | 95% Confidence Interval of the Difference | | | | |
| Std. Error Mean | Lower | Upper | t | df | Sig. (2-tailed) |
| 0.88560 | -3.70024 | -0.17476 | -2.188 | 79 | 0.032 |
| 0.87701 | -5.13314 | -1.64186 | -3.863 | 79 | 0.000 |
| 0.99654 | -3.89607 | 0.07107 | -1.919 | 79 | 0.059 |
| 1.00979 | -5.92244 | -1.90256 | -3.875 | 79 | 0.000 |
| 0.71977 | -5.62016 | -2.75484 | -5.818 | 79 | 0.000 |

```
T-TEST PAIRS=PRE_SA_SUM PRE_MA_SUM PRE_SH_SUM PRE_PSB_SUM PRE_SM_SUM WI
    PSB_SUM SM_SUM (PAIRED)
  /CRITERIA=CI(.9500)
  /MISSING=ANALYSIS.
```

# T-Test

**Notes**

| | | |
|---|---|---|
| Output Created | | 11-AUG-2017 09:42:29 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Gr9_2016 Gr10_2017 (Merged).sav |
| | Active Dataset | DataSet1 |
| | Filter | <none> |
| | Weight | <none> |
| | Split File | SET |
| | N of Rows in Working Data File | 98 |
| Missing Value Handling | Definition of Missing | User defined missing values are treated as missing. |
| | Cases Used | Statistics for each analysis are based on the cases with no missing or out-of-range data for any variable in the analysis. |
| Syntax | | T-TEST PAIRS=PRE_SA_SUM PRE_MA_SUM PRE_SH_SUM PRE_PSB_SUM PRE_SM_SUM WITH SA_SUM MA_SUM SH_SUM PSB_SUM SM_SUM (PAIRED) /CRITERIA=CI(.9500) /MISSING=ANALYSIS. |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.53 |

**Paired Samples Statistics**

| SET | | | Mean |
|---|---|---|---|
| 1.00 | Pair 1 | PRE_SA_SUM | 54.7778 |
| | | SA_SUM | 54.6667 |

| | | | |
|---|---|---|---|
| | Pair 2 | PRE_MA_SUM | 55.6667 |
| | | MA_SUM | 60.1852 |
| | Pair 3 | PRE_SH_SUM | 65.8889 |
| | | SH_SUM | 65.7407 |
| | Pair 4 | PRE_PSB_SUM | 58.8148 |
| | | PSB_SUM | 59.9630 |
| | Pair 5 | PRE_SM_SUM | 56.3704 |
| | | SM_SUM | 56.4444 |
| 2.00 | Pair 1 | PRE_SA_SUM | 50.4310 |
| | | SA_SUM | 49.0172 |
| | Pair 2 | PRE_MA_SUM | 54.4655 |
| | | MA_SUM | 56.6552 |
| | Pair 3 | PRE_SH_SUM | 58.0172 |
| | | SH_SUM | 59.3621 |
| | Pair 4 | PRE_PSB_SUM | 53.0690 |
| | | PSB_SUM | 51.8621 |
| | Pair 5 | PRE_SM_SUM | 54.3276 |
| | | SM_SUM | 53.6552 |

**Paired Samples Correlations**

| SET | | | N |
|---|---|---|---|
| 1.00 | Pair 1 | PRE_SA_SUM & SA_SUM | 27 |
| | Pair 2 | PRE_MA_SUM & MA_SUM | 27 |
| | Pair 3 | PRE_SH_SUM & SH_SUM | 27 |
| | Pair 4 | PRE_PSB_SUM & PSB_SUM | 27 |
| | Pair 5 | PRE_SM_SUM & SM_SUM | 27 |
| 2.00 | Pair 1 | PRE_SA_SUM & SA_SUM | 58 |
| | Pair 2 | PRE_MA_SUM & MA_SUM | 58 |
| | Pair 3 | PRE_SH_SUM & SH_SUM | 58 |
| | Pair 4 | PRE_PSB_SUM & PSB_SUM | 58 |
| | Pair 5 | PRE_SM_SUM & SM_SUM | 58 |

**Paire**

| SET | Mean |
|---|---|

| | | | |
|---|---|---|---|
| 1.00 | Pair 1 | PRE_SA_SUM - SA_SUM | 0.11111 |
| | Pair 2 | PRE_MA_SUM - MA_SUM | -4.51852 |
| | Pair 3 | PRE_SH_SUM - SH_SUM | 0.14815 |
| | Pair 4 | PRE_PSB_SUM - PSB_SUM | -1.14815 |
| | Pair 5 | PRE_SM_SUM - SM_SUM | -0.07407 |
| 2.00 | Pair 1 | PRE_SA_SUM - SA_SUM | 1.41379 |
| | Pair 2 | PRE_MA_SUM - MA_SUM | -2.18966 |
| | Pair 3 | PRE_SH_SUM - SH_SUM | -1.34483 |
| | Pair 4 | PRE_PSB_SUM - PSB_SUM | 1.20690 |
| | Pair 5 | PRE_SM_SUM - SM_SUM | 0.67241 |

TH SA_SUM MA_SUM SH_SUM

| N | Std. Deviation | Std. Error Mean |
|---|---|---|
| 27 | 6.72157 | 1.29357 |
| 27 | 7.89839 | 1.52005 |

| | | |
|---|---|---|
| 27 | 7.33799 | 1.41220 |
| 27 | 6.11453 | 1.17674 |
| 27 | 8.88098 | 1.70915 |
| 27 | 10.40929 | 2.00327 |
| 27 | 9.11481 | 1.75415 |
| 27 | 9.33761 | 1.79702 |
| 27 | 4.90799 | 0.94454 |
| 27 | 5.89872 | 1.13521 |
| 58 | 7.14784 | 0.93856 |
| 58 | 7.62381 | 1.00106 |
| 58 | 8.18260 | 1.07443 |
| 58 | 8.40332 | 1.10341 |
| 58 | 9.32548 | 1.22450 |
| 58 | 11.30393 | 1.48428 |
| 58 | 7.88483 | 1.03533 |
| 58 | 8.78485 | 1.15351 |
| 58 | 6.97964 | 0.91647 |
| 58 | 7.48226 | 0.98247 |

| Correlation | Sig. |
|---|---|
| 0.555 | 0.003 |
| 0.613 | 0.001 |
| 0.408 | 0.035 |
| 0.251 | 0.206 |
| 0.037 | 0.856 |
| 0.440 | 0.001 |
| 0.658 | 0.000 |
| 0.643 | 0.000 |
| 0.522 | 0.000 |
| 0.669 | 0.000 |

**d Samples Test**

| Paired Differences | | | | | | |
|---|---|---|---|---|---|---|
| | | 95% Confidence Interval of the Difference | | | | |
| Std. Deviation | Std. Error Mean | Lower | Upper | t | df | Sig. (2-tailed) |

| | | | | | | |
|---|---|---|---|---|---|---|
| 6.97431 | 1.34221 | -2.64783 | 2.87006 | 0.083 | 26 | 0.935 |
| 6.02157 | 1.15885 | -6.90057 | -2.13647 | -3.899 | 26 | 0.001 |
| 10.57466 | 2.03509 | -4.03505 | 4.33134 | 0.073 | 26 | 0.943 |
| 11.29228 | 2.17320 | -5.61523 | 3.31893 | -0.528 | 26 | 0.602 |
| 7.53416 | 1.44995 | -3.05449 | 2.90634 | -0.051 | 26 | 0.960 |
| 7.82940 | 1.02805 | -0.64484 | 3.47243 | 1.375 | 57 | 0.174 |
| 6.86577 | 0.90152 | -3.99492 | -0.38439 | -2.429 | 57 | 0.018 |
| 8.89816 | 1.16839 | -3.68448 | 0.99482 | -1.151 | 57 | 0.255 |
| 8.18376 | 1.07458 | -0.94491 | 3.35871 | 1.123 | 57 | 0.266 |
| 5.89793 | 0.77444 | -0.87837 | 2.22319 | 0.868 | 57 | 0.389 |

```
RELIABILITY
  /VARIABLES=Q1 Q6 Q11 Q16 Q21 Q28 Q33 Q38 Q43 Q48 Q55 Q60 Q65 Q70
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

# Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 04-AUG-2017 13:09:25 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\Jordaan_T Gr9 2017.sav |
| | Active Dataset | DataSet1 |
| | Filter | <none> |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 92 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |
| Syntax | | RELIABILITY /VARIABLES=Q1 Q6 Q11 Q16 Q21 Q28 Q33 Q38 Q43 Q48 Q55 Q60 Q65 Q70 /SCALE('ALL VARIABLES') ALL /MODEL=ALPHA<br><br>/STATISTICS=DESCRIPTIVE SCALE CORR /SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.02 |

# Scale: ALL VARIABLES

## Case Processing Summary

| | | N | % |
|---|---|---|---|
| Cases | Valid | 87 | 94.6 |
| | Excluded[a] | 5 | 5.4 |
| | Total | 92 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

## Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.767 | 0.775 | 14 |

## Item Statistics

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q1 | 3.26 | 1.224 | 87 |
| Q6 | 4.36 | 1.000 | 87 |
| Q11 | 4.29 | 0.999 | 87 |
| Q16 | 3.84 | 1.160 | 87 |
| Q21 | 4.17 | 0.991 | 87 |
| Q28 | 4.45 | 0.728 | 87 |
| Q33 | 4.22 | 0.882 | 87 |
| Q38 | 3.92 | 1.213 | 87 |
| Q43 | 2.52 | 1.328 | 87 |
| Q48 | 3.34 | 1.405 | 87 |
| Q55 | 3.75 | 1.193 | 87 |
| Q60 | 3.69 | 1.260 | 87 |
| Q65 | 3.72 | 1.168 | 87 |
| Q70 | 3.90 | 1.057 | 87 |

| | Q1 | Q6 | Q11 |
|---|---|---|---|
| Q1 | 1.000 | 0.378 | 0.080 |
| Q6 | 0.378 | 1.000 | 0.083 |
| Q11 | 0.080 | 0.083 | 1.000 |
| Q16 | 0.440 | 0.321 | 0.201 |
| Q21 | -0.038 | 0.078 | 0.008 |
| Q28 | 0.166 | 0.209 | 0.301 |
| Q33 | 0.280 | 0.227 | 0.258 |
| Q38 | 0.343 | 0.216 | 0.490 |
| Q43 | 0.408 | 0.201 | 0.053 |

| | | | |
|---|---|---|---|
| Q48 | 0.379 | 0.259 | 0.144 |
| Q55 | 0.062 | 0.106 | 0.286 |
| Q60 | 0.076 | 0.080 | 0.025 |
| Q65 | 0.222 | 0.085 | 0.228 |
| Q70 | 0.084 | 0.211 | 0.117 |

**Summary Item Statistics**

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 3.816 | 2.517 | 4.448 |
| Inter-Item Correlations | 0.198 | -0.111 | 0.490 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q1 | 50.16 | 52.462 | 0.457 |
| Q6 | 49.07 | 55.484 | 0.375 |
| Q11 | 49.14 | 56.074 | 0.334 |
| Q16 | 49.59 | 52.617 | 0.481 |
| Q21 | 49.25 | 56.959 | 0.276 |
| Q28 | 48.98 | 56.604 | 0.450 |
| Q33 | 49.21 | 54.864 | 0.492 |
| Q38 | 49.51 | 51.695 | 0.510 |
| Q43 | 50.91 | 53.573 | 0.346 |
| Q48 | 50.08 | 51.214 | 0.441 |
| Q55 | 49.68 | 53.523 | 0.408 |
| Q60 | 49.74 | 57.290 | 0.167 |
| Q65 | 49.70 | 54.677 | 0.348 |
| Q70 | 49.53 | 55.531 | 0.344 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 53.43 | 62.061 | 7.878 | 14 |

```
RELIABILITY
  /VARIABLES=Q2 Q7 Q12 Q17 Q22 Q29 Q34 Q39 Q44 Q49 Q56 Q61 Q66 Q71
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

## Reliability

### Notes

| | | |
|---|---|---|
| Output Created | | 04-AUG-2017 13:09:25 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\Jordaan_T Gr9 2017.sav |
| | Active Dataset | DataSet1 |
| | Filter | <none> |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 92 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |
| Syntax | | RELIABILITY /VARIABLES=Q2 Q7 Q12 Q17 Q22 Q29 Q34 Q39 Q44 Q49 Q56 Q61 Q66 Q71 /SCALE('ALL VARIABLES') ALL /MODEL=ALPHA<br><br>/STATISTICS=DESCRIPTIVE SCALE CORR /SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.00 |
| | Elapsed Time | 00:00:00.00 |

## Scale: ALL VARIABLES

### Case Processing Summary

| | | N | % |
|---|---|---|---|
| Cases | Valid | 87 | 94.6 |
| | Excluded[a] | 5 | 5.4 |
| | Total | 92 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

## Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.778 | 0.759 | 14 |

## Item Statistics

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q2 | 3.46 | 1.354 | 87 |
| Q7 | 4.51 | 0.776 | 87 |
| Q12 | 3.76 | 1.285 | 87 |
| Q17 | 3.77 | 1.008 | 87 |
| Q22 | 4.32 | 1.073 | 87 |
| Q29 | 3.54 | 1.379 | 87 |
| Q34 | 3.47 | 1.170 | 87 |
| Q39 | 3.64 | 1.397 | 87 |
| Q44 | 4.75 | 0.575 | 87 |
| Q49 | 4.70 | 0.684 | 87 |
| Q56 | 4.70 | 0.684 | 87 |
| Q61 | 3.34 | 1.199 | 87 |
| Q66 | 4.31 | 1.164 | 87 |
| Q71 | 4.05 | 1.470 | 87 |

| | Q2 | Q7 | Q12 |
|---|---|---|---|
| Q2 | 1.000 | 0.440 | 0.332 |
| Q7 | 0.440 | 1.000 | 0.264 |
| Q12 | 0.332 | 0.264 | 1.000 |
| Q17 | 0.164 | 0.344 | 0.055 |
| Q22 | 0.321 | 0.417 | 0.200 |
| Q29 | 0.326 | 0.307 | 0.271 |
| Q34 | 0.493 | 0.452 | 0.193 |
| Q39 | 0.708 | 0.415 | 0.211 |
| Q44 | -0.043 | 0.003 | 0.121 |
| Q49 | 0.225 | 0.201 | 0.314 |
| Q56 | 0.012 | 0.047 | -0.215 |
| Q61 | 0.309 | 0.373 | 0.160 |
| Q66 | 0.277 | 0.313 | 0.284 |
| Q71 | 0.258 | -0.051 | 0.191 |

## Summary Item Statistics

| | Mean | Minimum | Maximum |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Item Means | 4.023 | 3.345 | 4.747 |
| Inter-Item Correlations | 0.183 | -0.215 | 0.708 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q2 | 52.86 | 49.632 | 0.639 |
| Q7 | 51.82 | 56.594 | 0.554 |
| Q12 | 52.56 | 54.923 | 0.372 |
| Q17 | 52.55 | 58.157 | 0.292 |
| Q22 | 52.00 | 54.186 | 0.527 |
| Q29 | 52.78 | 51.359 | 0.526 |
| Q34 | 52.85 | 54.408 | 0.457 |
| Q39 | 52.68 | 49.105 | 0.644 |
| Q44 | 51.57 | 63.247 | 0.009 |
| Q49 | 51.62 | 59.982 | 0.303 |
| Q56 | 51.62 | 63.424 | -0.021 |
| Q61 | 52.98 | 54.976 | 0.408 |
| Q66 | 52.01 | 55.291 | 0.405 |
| Q71 | 52.28 | 56.365 | 0.233 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 56.32 | 63.663 | 7.979 | 14 |

```
RELIABILITY
  /VARIABLES=Q3 Q8 Q13 Q18 Q23 Q27 Q30 Q35 Q40 Q45 Q50 Q54 Q57 Q62 Q67 Q72
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

# Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 04-AUG-2017 13:09:25 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\Jordaan_T Gr9 2017.sav |
| | Active Dataset | DataSet1 |
| | Filter | <none> |

| | | |
|---|---|---|
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 92 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |
| Syntax | | RELIABILITY /VARIABLES=Q3 Q8 Q13 Q18 Q23 Q27 Q30 Q35 Q40 Q45 Q50 Q54 Q57 Q62 Q67 Q72 Q74 /SCALE('ALL VARIABLES') ALL /MODEL=ALPHA /STATISTICS=DESCRIPTIVE SCALE CORR /SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.00 |
| | Elapsed Time | 00:00:00.00 |

## Scale: ALL VARIABLES

### Case Processing Summary

| | | N | % |
|---|---|---|---|
| Cases | Valid | 85 | 92.4 |
| | Excluded[a] | 7 | 7.6 |
| | Total | 92 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.859 | 0.860 | 17 |

### Item Statistics

| | Mean | Std. Deviation | N |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Q3 | 4.09 | 1.306 | 85 |
| Q8 | 3.01 | 1.323 | 85 |
| Q13 | 4.40 | 0.805 | 85 |
| Q18 | 3.88 | 1.106 | 85 |
| Q23 | 4.31 | 0.859 | 85 |
| Q27 | 3.93 | 1.173 | 85 |
| Q30 | 3.68 | 1.177 | 85 |
| Q35 | 4.24 | 0.996 | 85 |
| Q40 | 3.75 | 1.057 | 85 |
| Q45 | 3.42 | 1.209 | 85 |
| Q50 | 2.61 | 1.346 | 85 |
| Q54 | 3.74 | 1.082 | 85 |
| Q57 | 3.92 | 1.177 | 85 |
| Q62 | 3.46 | 1.314 | 85 |
| Q67 | 2.84 | 1.317 | 85 |
| Q72 | 3.21 | 1.254 | 85 |
| Q74 | 3.95 | 0.999 | 85 |

| | Q3 | Q8 | Q13 |
|---|---|---|---|
| Q3 | 1.000 | 0.420 | 0.383 |
| Q8 | 0.420 | 1.000 | 0.253 |
| Q13 | 0.383 | 0.253 | 1.000 |
| Q18 | 0.354 | 0.391 | 0.267 |
| Q23 | 0.483 | 0.300 | 0.355 |
| Q27 | 0.307 | 0.353 | 0.282 |
| Q30 | 0.345 | 0.408 | 0.211 |
| Q35 | 0.376 | 0.332 | 0.624 |
| Q40 | 0.276 | 0.334 | 0.202 |
| Q45 | 0.291 | 0.287 | 0.130 |
| Q50 | 0.312 | 0.337 | 0.101 |
| Q54 | 0.119 | 0.210 | 0.148 |
| Q57 | 0.392 | 0.291 | 0.136 |
| Q62 | 0.169 | 0.298 | 0.050 |
| Q67 | 0.258 | 0.377 | 0.063 |
| Q72 | 0.198 | 0.436 | 0.233 |
| Q74 | 0.286 | 0.226 | 0.009 |

**Summary Item Statistics**

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 3.673 | 2.612 | 4.400 |
| Inter-Item Correlations | 0.266 | -0.013 | 0.624 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q3 | 58.35 | 102.683 | 0.549 |
| Q8 | 59.44 | 101.154 | 0.602 |
| Q13 | 58.05 | 111.974 | 0.370 |
| Q18 | 58.56 | 108.225 | 0.411 |
| Q23 | 58.14 | 108.789 | 0.524 |
| Q27 | 58.52 | 103.896 | 0.571 |
| Q30 | 58.76 | 103.230 | 0.598 |
| Q35 | 58.21 | 111.669 | 0.297 |
| Q40 | 58.69 | 106.762 | 0.505 |
| Q45 | 59.02 | 105.023 | 0.502 |
| Q50 | 59.84 | 105.663 | 0.413 |
| Q54 | 58.71 | 108.829 | 0.395 |
| Q57 | 58.53 | 105.919 | 0.479 |
| Q62 | 58.99 | 106.297 | 0.402 |
| Q67 | 59.61 | 106.883 | 0.378 |
| Q72 | 59.24 | 102.515 | 0.584 |
| Q74 | 58.49 | 107.039 | 0.526 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 62.45 | 118.917 | 10.905 | 17 |

```
RELIABILITY
  /VARIABLES=Q4 Q9 Q14 Q19 Q24 Q26 Q31 Q36 Q41 Q46 Q51 Q53 Q58 Q63 Q68 Q73
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

# Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 04-AUG-2017 13:09:25 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\Jordaan_T Gr9 2017.sav |
| | Active Dataset | DataSet1 |
| | Filter | <none> |
| | Weight | <none> |

| | | |
|---|---|---|
| | Split File | <none> |
| | N of Rows in Working Data File | 92 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |
| Syntax | | RELIABILITY<br>/VARIABLES=Q4 Q9 Q14 Q19 Q24 Q26 Q31 Q36 Q41 Q46 Q51 Q53 Q58 Q63 Q68 Q73 Q75 Q76<br>/SCALE('ALL VARIABLES') ALL<br>/MODEL=ALPHA<br><br>/STATISTICS=DESCRIPTIVE SCALE CORR<br>/SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.02 |

## Scale: ALL VARIABLES

### Case Processing Summary

| | | N | % |
|---|---|---|---|
| Cases | Valid | 86 | 93.5 |
| | Excluded[a] | 6 | 6.5 |
| | Total | 92 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.788 | 0.789 | 18 |

### Item Statistics

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q4 | 2.53 | 1.299 | 86 |

| | | | |
|---|---|---|---|
| Q9 | 2.86 | 1.356 | 86 |
| Q14 | 3.65 | 0.891 | 86 |
| Q19 | 3.23 | 1.234 | 86 |
| Q24 | 3.42 | 1.142 | 86 |
| Q26 | 3.53 | 1.185 | 86 |
| Q31 | 3.62 | 1.285 | 86 |
| Q36 | 2.38 | 1.129 | 86 |
| Q41 | 3.27 | 1.350 | 86 |
| Q46 | 3.57 | 1.143 | 86 |
| Q51 | 3.20 | 1.225 | 86 |
| Q53 | 3.71 | 1.207 | 86 |
| Q58 | 1.77 | 1.124 | 86 |
| Q63 | 2.09 | 1.134 | 86 |
| Q68 | 3.43 | 1.435 | 86 |
| Q73 | 4.01 | 1.035 | 86 |
| Q75 | 3.35 | 1.166 | 86 |
| Q76 | 3.63 | 1.247 | 86 |

| | Q4 | Q9 | Q14 |
|---|---|---|---|
| Q4 | 1.000 | 0.564 | 0.295 |
| Q9 | 0.564 | 1.000 | 0.543 |
| Q14 | 0.295 | 0.543 | 1.000 |
| Q19 | 0.267 | 0.406 | 0.289 |
| Q24 | 0.323 | 0.289 | 0.191 |
| Q26 | 0.232 | 0.318 | 0.279 |
| Q31 | 0.294 | 0.252 | 0.303 |
| Q36 | 0.500 | 0.558 | 0.392 |
| Q41 | 0.179 | 0.066 | 0.039 |
| Q46 | 0.307 | 0.257 | 0.197 |
| Q51 | 0.177 | 0.102 | 0.042 |
| Q53 | -0.087 | 0.112 | 0.036 |
| Q58 | 0.054 | 0.056 | 0.129 |
| Q63 | 0.541 | 0.307 | 0.289 |
| Q68 | 0.393 | 0.297 | 0.321 |
| Q73 | 0.197 | -0.024 | -0.047 |
| Q75 | 0.303 | 0.359 | 0.243 |
| Q76 | 0.226 | 0.268 | 0.284 |

**Summary Item Statistics**

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 3.181 | 1.767 | 4.012 |
| Inter-Item Correlations | 0.172 | -0.203 | 0.564 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q4 | 54.72 | 85.545 | 0.619 |
| Q9 | 54.40 | 85.112 | 0.605 |
| Q14 | 53.60 | 92.830 | 0.493 |
| Q19 | 54.02 | 89.505 | 0.474 |
| Q24 | 53.84 | 90.797 | 0.459 |
| Q26 | 53.72 | 89.686 | 0.490 |
| Q31 | 53.64 | 92.210 | 0.334 |
| Q36 | 54.87 | 89.383 | 0.536 |
| Q41 | 53.99 | 95.329 | 0.188 |
| Q46 | 53.69 | 88.947 | 0.549 |
| Q51 | 54.06 | 92.879 | 0.327 |
| Q53 | 53.55 | 103.686 | -0.124 |
| Q58 | 55.49 | 98.276 | 0.115 |
| Q63 | 55.16 | 91.526 | 0.428 |
| Q68 | 53.83 | 89.722 | 0.379 |
| Q73 | 53.24 | 97.975 | 0.149 |
| Q75 | 53.91 | 91.568 | 0.411 |
| Q76 | 53.63 | 94.754 | 0.239 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 57.26 | 102.098 | 10.104 | 18 |

```
RELIABILITY
  /VARIABLES=Q5 Q10 Q15 Q20 Q25 Q32 Q37 Q42 Q47 Q52 Q59 Q64 Q69
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

# Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 04-AUG-2017 13:09:25 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\Jordaan_T Gr9 2017.sav |

| | | |
|---|---|---|
| | Active Dataset | DataSet1 |
| | Filter | <none> |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 92 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |
| Syntax | | RELIABILITY<br>/VARIABLES=Q5 Q10 Q15 Q20 Q25 Q32 Q37 Q42 Q47 Q52 Q59 Q64 Q69<br>/SCALE('ALL VARIABLES') ALL<br>/MODEL=ALPHA<br><br>/STATISTICS=DESCRIPTIVE SCALE CORR<br>/SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.00 |
| | Elapsed Time | 00:00:00.00 |

## Scale: ALL VARIABLES

### Case Processing Summary

| | | N | % |
|---|---|---|---|
| Cases | Valid | 88 | 95.7 |
| | Excluded[a] | 4 | 4.3 |
| | Total | 92 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.796 | 0.819 | 13 |

## Item Statistics

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q5 | 4.48 | 0.959 | 88 |
| Q10 | 3.94 | 1.118 | 88 |
| Q15 | 3.86 | 1.315 | 88 |
| Q20 | 4.59 | 0.990 | 88 |
| Q25 | 3.36 | 1.408 | 88 |
| Q32 | 4.89 | 0.440 | 88 |
| Q37 | 4.75 | 0.592 | 88 |
| Q42 | 4.84 | 0.452 | 88 |
| Q47 | 4.28 | 0.896 | 88 |
| Q52 | 4.19 | 1.143 | 88 |
| Q59 | 4.22 | 1.098 | 88 |
| Q64 | 4.50 | 0.959 | 88 |
| Q69 | 4.32 | 1.130 | 88 |

## Ir

| | Q5 | Q10 | Q15 |
|---|---|---|---|
| Q5 | 1.000 | 0.004 | 0.444 |
| Q10 | 0.004 | 1.000 | 0.081 |
| Q15 | 0.444 | 0.081 | 1.000 |
| Q20 | 0.293 | 0.031 | 0.142 |
| Q25 | 0.142 | 0.225 | 0.145 |
| Q32 | 0.321 | -0.037 | 0.172 |
| Q37 | 0.375 | -0.109 | 0.177 |
| Q42 | 0.443 | 0.027 | 0.369 |
| Q47 | 0.576 | 0.062 | 0.384 |
| Q52 | 0.135 | 0.126 | 0.232 |
| Q59 | 0.316 | 0.001 | 0.331 |
| Q64 | 0.425 | 0.005 | 0.638 |
| Q69 | 0.272 | 0.178 | 0.300 |

## Summary Item Statistics

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 4.325 | 3.364 | 4.886 |
| Inter-Item Correlations | 0.258 | -0.109 | 0.638 |

## Item-Total Statistics

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q5 | 51.75 | 42.121 | 0.520 |
| Q10 | 52.28 | 46.482 | 0.117 |
| Q15 | 52.36 | 39.544 | 0.498 |

| | | | |
|---|---|---|---|
| Q20 | 51.64 | 42.579 | 0.461 |
| Q25 | 52.86 | 40.027 | 0.421 |
| Q32 | 51.34 | 47.285 | 0.336 |
| Q37 | 51.48 | 45.724 | 0.429 |
| Q42 | 51.39 | 45.642 | 0.600 |
| Q47 | 51.94 | 43.089 | 0.477 |
| Q52 | 52.03 | 40.999 | 0.492 |
| Q59 | 52.01 | 40.793 | 0.536 |
| Q64 | 51.73 | 42.476 | 0.489 |
| Q69 | 51.91 | 40.980 | 0.501 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 56.23 | 49.511 | 7.036 | 13 |

**Inter-Item Correlation Matrix**

| Q16 | Q21 | Q28 | Q33 | Q38 | Q43 | Q48 | Q55 |
|---|---|---|---|---|---|---|---|
| 0.440 | -0.038 | 0.166 | 0.280 | 0.343 | 0.408 | 0.379 | 0.062 |
| 0.321 | 0.078 | 0.209 | 0.227 | 0.216 | 0.201 | 0.259 | 0.106 |
| 0.201 | 0.008 | 0.301 | 0.258 | 0.490 | 0.053 | 0.144 | 0.286 |
| 1.000 | 0.105 | 0.362 | 0.308 | 0.131 | 0.394 | 0.406 | 0.172 |
| 0.105 | 1.000 | 0.166 | 0.116 | 0.176 | 0.011 | 0.291 | 0.342 |
| 0.362 | 0.166 | 1.000 | 0.226 | 0.200 | 0.251 | 0.166 | 0.333 |
| 0.308 | 0.116 | 0.226 | 1.000 | 0.397 | 0.300 | 0.192 | 0.186 |
| 0.131 | 0.176 | 0.200 | 0.397 | 1.000 | 0.272 | 0.283 | 0.227 |
| 0.394 | 0.011 | 0.251 | 0.300 | 0.272 | 1.000 | 0.327 | 0.032 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.406 | 0.291 | 0.166 | 0.192 | 0.283 | 0.327 | 1.000 | 0.219 |
| 0.172 | 0.342 | 0.333 | 0.186 | 0.227 | 0.032 | 0.219 | 1.000 |
| -0.050 | 0.109 | 0.166 | 0.271 | 0.037 | -0.111 | 0.002 | 0.349 |
| 0.250 | 0.102 | 0.134 | 0.217 | 0.296 | 0.086 | 0.122 | 0.258 |
| 0.100 | 0.373 | 0.303 | 0.199 | 0.284 | 0.072 | 0.056 | 0.191 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 1.931 | 1.767 | 0.266 | 14 |
| 0.601 | -4.397 | 0.015 | 14 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.425 | 0.746 |
| 0.222 | 0.755 |
| 0.381 | 0.758 |
| 0.453 | 0.744 |
| 0.326 | 0.763 |
| 0.315 | 0.752 |
| 0.329 | 0.747 |
| 0.491 | 0.740 |
| 0.335 | 0.758 |
| 0.345 | 0.748 |
| 0.349 | 0.751 |
| 0.282 | 0.776 |
| 0.198 | 0.757 |
| 0.297 | 0.757 |

**Inter-Item Correlation Matrix**

| Q17 | Q22 | Q29 | Q34 | Q39 | Q44 | Q49 | Q56 |
|---|---|---|---|---|---|---|---|
| 0.164 | 0.321 | 0.326 | 0.493 | 0.708 | -0.043 | 0.225 | 0.012 |
| 0.344 | 0.417 | 0.307 | 0.452 | 0.415 | 0.003 | 0.201 | 0.047 |
| 0.055 | 0.200 | 0.271 | 0.193 | 0.211 | 0.121 | 0.314 | -0.215 |
| 1.000 | 0.252 | 0.207 | 0.211 | 0.164 | -0.021 | 0.118 | 0.118 |
| 0.252 | 1.000 | 0.565 | 0.230 | 0.395 | -0.017 | 0.085 | 0.148 |
| 0.207 | 0.565 | 1.000 | 0.179 | 0.421 | -0.060 | 0.210 | -0.024 |
| 0.211 | 0.230 | 0.179 | 1.000 | 0.460 | 0.145 | 0.018 | -0.011 |
| 0.164 | 0.395 | 0.421 | 0.460 | 1.000 | 0.017 | 0.252 | -0.003 |
| -0.021 | -0.017 | -0.060 | 0.145 | 0.017 | 1.000 | 0.013 | -0.135 |
| 0.118 | 0.085 | 0.210 | 0.018 | 0.252 | 0.013 | 1.000 | -0.119 |
| 0.118 | 0.148 | -0.024 | -0.011 | -0.003 | -0.135 | -0.119 | 1.000 |
| 0.201 | 0.365 | 0.308 | 0.248 | 0.303 | -0.024 | -0.015 | 0.155 |
| 0.131 | 0.180 | 0.474 | 0.173 | 0.255 | 0.032 | 0.235 | -0.101 |
| 0.062 | 0.145 | 0.079 | 0.116 | 0.280 | -0.014 | 0.291 | -0.056 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|

| | | | |
|---|---|---|---|
| 1.402 | 1.419 | 0.265 | 14 |
| 0.924 | -3.289 | 0.029 | 14 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.590 | 0.737 |
| 0.483 | 0.756 |
| 0.283 | 0.767 |
| 0.164 | 0.773 |
| 0.468 | 0.753 |
| 0.520 | 0.750 |
| 0.380 | 0.758 |
| 0.593 | 0.736 |
| 0.085 | 0.786 |
| 0.259 | 0.772 |
| 0.137 | 0.789 |
| 0.251 | 0.763 |
| 0.317 | 0.763 |
| 0.236 | 0.785 |

Q74

**Inter-Item Correlation Matrix**

| Q18 | Q23 | Q27 | Q30 | Q35 | Q40 | Q45 | Q50 |
|---|---|---|---|---|---|---|---|
| 0.354 | 0.483 | 0.307 | 0.345 | 0.376 | 0.276 | 0.291 | 0.312 |
| 0.391 | 0.300 | 0.353 | 0.408 | 0.332 | 0.334 | 0.287 | 0.337 |
| 0.267 | 0.355 | 0.282 | 0.211 | 0.624 | 0.202 | 0.130 | 0.101 |
| 1.000 | 0.214 | 0.250 | 0.327 | 0.242 | 0.148 | 0.225 | 0.185 |
| 0.214 | 1.000 | 0.293 | 0.368 | 0.360 | 0.307 | 0.309 | 0.289 |
| 0.250 | 0.293 | 1.000 | 0.501 | 0.198 | 0.322 | 0.357 | 0.246 |
| 0.327 | 0.368 | 0.501 | 1.000 | 0.065 | 0.309 | 0.414 | 0.259 |
| 0.242 | 0.360 | 0.198 | 0.065 | 1.000 | -0.001 | 0.124 | 0.078 |
| 0.148 | 0.307 | 0.322 | 0.309 | -0.001 | 1.000 | 0.400 | 0.241 |
| 0.225 | 0.309 | 0.357 | 0.414 | 0.124 | 0.400 | 1.000 | 0.271 |
| 0.185 | 0.289 | 0.246 | 0.259 | 0.078 | 0.241 | 0.271 | 1.000 |
| 0.213 | 0.291 | 0.295 | 0.206 | 0.090 | 0.318 | 0.203 | 0.192 |
| 0.358 | 0.331 | 0.349 | 0.316 | 0.067 | 0.357 | 0.267 | 0.385 |
| 0.136 | 0.233 | 0.276 | 0.295 | 0.080 | 0.237 | 0.191 | 0.203 |
| 0.011 | 0.108 | 0.100 | 0.181 | 0.075 | 0.338 | 0.269 | 0.219 |
| 0.224 | 0.215 | 0.480 | 0.546 | 0.160 | 0.255 | 0.364 | 0.240 |
| 0.178 | 0.267 | 0.475 | 0.503 | -0.013 | 0.440 | 0.352 | 0.093 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 1.788 | 1.685 | 0.267 | 17 |
| 0.637 | -49.236 | 0.014 | 17 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.458 | 0.848 |
| 0.477 | 0.845 |
| 0.519 | 0.856 |
| 0.326 | 0.854 |
| 0.418 | 0.850 |
| 0.456 | 0.847 |
| 0.533 | 0.845 |
| 0.525 | 0.858 |
| 0.420 | 0.850 |
| 0.326 | 0.850 |
| 0.295 | 0.855 |
| 0.255 | 0.855 |
| 0.415 | 0.851 |
| 0.367 | 0.855 |
| 0.359 | 0.856 |
| 0.545 | 0.846 |
| 0.535 | 0.849 |

Q75 Q76

**Inter-Item Correlation Matrix**

| Q19 | Q24 | Q26 | Q31 | Q36 | Q41 | Q46 | Q51 |
|---|---|---|---|---|---|---|---|
| 0.267 | 0.323 | 0.232 | 0.294 | 0.500 | 0.179 | 0.307 | 0.177 |
| 0.406 | 0.289 | 0.318 | 0.252 | 0.558 | 0.066 | 0.257 | 0.102 |
| 0.289 | 0.191 | 0.279 | 0.303 | 0.392 | 0.039 | 0.197 | 0.042 |
| 1.000 | 0.439 | 0.260 | 0.146 | 0.374 | 0.224 | 0.339 | 0.234 |
| 0.439 | 1.000 | 0.250 | 0.015 | 0.102 | 0.194 | 0.473 | 0.512 |
| 0.260 | 0.250 | 1.000 | 0.360 | 0.372 | 0.035 | 0.458 | 0.202 |
| 0.146 | 0.015 | 0.360 | 1.000 | 0.273 | -0.191 | 0.167 | -0.063 |
| 0.374 | 0.102 | 0.372 | 0.273 | 1.000 | 0.032 | 0.257 | 0.132 |
| 0.224 | 0.194 | 0.035 | -0.191 | 0.032 | 1.000 | 0.297 | 0.345 |
| 0.339 | 0.473 | 0.458 | 0.167 | 0.257 | 0.297 | 1.000 | 0.549 |
| 0.234 | 0.512 | 0.202 | -0.063 | 0.132 | 0.345 | 0.549 | 1.000 |
| -0.065 | 0.030 | -0.046 | -0.103 | -0.150 | -0.118 | -0.083 | -0.160 |
| 0.039 | 0.214 | 0.050 | 0.125 | 0.127 | 0.096 | 0.077 | 0.059 |
| 0.203 | 0.188 | 0.208 | 0.259 | 0.156 | 0.091 | 0.195 | 0.105 |
| 0.229 | 0.104 | 0.244 | 0.282 | 0.376 | 0.122 | 0.093 | 0.018 |
| -0.030 | 0.105 | 0.158 | 0.163 | 0.057 | 0.099 | 0.183 | 0.091 |
| 0.409 | 0.304 | 0.289 | 0.232 | 0.299 | 0.045 | 0.405 | 0.272 |
| -0.027 | -0.088 | 0.216 | 0.218 | 0.287 | -0.010 | 0.142 | 0.033 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 2.244 | 2.270 | 0.374 | 18 |
| 0.767 | -2.777 | 0.029 | 18 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.621 | 0.759 |
| 0.609 | 0.759 |
| 0.399 | 0.772 |
| 0.445 | 0.770 |
| 0.537 | 0.772 |
| 0.374 | 0.769 |
| 0.367 | 0.780 |
| 0.571 | 0.767 |
| 0.319 | 0.791 |
| 0.527 | 0.766 |
| 0.463 | 0.780 |
| 0.254 | 0.809 |
| 0.192 | 0.793 |
| 0.418 | 0.774 |
| 0.351 | 0.777 |
| 0.209 | 0.790 |
| 0.369 | 0.775 |
| 0.310 | 0.787 |

**ıter-Item Correlation Matrix**

| Q20 | Q25 | Q32 | Q37 | Q42 | Q47 | Q52 | Q59 |
|---|---|---|---|---|---|---|---|
| 0.293 | 0.142 | 0.321 | 0.375 | 0.443 | 0.576 | 0.135 | 0.316 |
| 0.031 | 0.225 | -0.037 | -0.109 | 0.027 | 0.062 | 0.126 | 0.001 |
| 0.142 | 0.145 | 0.172 | 0.177 | 0.369 | 0.384 | 0.232 | 0.331 |
| 1.000 | 0.372 | 0.182 | 0.255 | 0.341 | 0.145 | 0.487 | 0.368 |
| 0.372 | 1.000 | -0.025 | 0.207 | 0.399 | 0.218 | 0.406 | 0.343 |
| 0.182 | -0.025 | 1.000 | 0.331 | 0.139 | 0.141 | 0.455 | 0.194 |
| 0.255 | 0.207 | 0.331 | 1.000 | 0.451 | 0.330 | 0.225 | 0.225 |
| 0.341 | 0.399 | 0.139 | 0.451 | 1.000 | 0.425 | 0.171 | 0.441 |
| 0.145 | 0.218 | 0.141 | 0.330 | 0.425 | 1.000 | 0.114 | 0.322 |
| 0.487 | 0.406 | 0.455 | 0.225 | 0.171 | 0.114 | 1.000 | 0.488 |
| 0.368 | 0.343 | 0.194 | 0.225 | 0.441 | 0.322 | 0.488 | 1.000 |
| 0.073 | 0.111 | 0.272 | 0.324 | 0.557 | 0.314 | 0.100 | 0.355 |
| 0.385 | 0.252 | 0.258 | 0.378 | 0.258 | 0.284 | 0.334 | 0.203 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 1.523 | 1.453 | 0.183 | 13 |
| 0.747 | -5.880 | 0.023 | 13 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.508 | 0.775 |
| 0.134 | 0.812 |
| 0.512 | 0.777 |

| | |
|---|---|
| 0.432 | 0.780 |
| 0.387 | 0.787 |
| 0.420 | 0.793 |
| 0.375 | 0.786 |
| 0.563 | 0.782 |
| 0.432 | 0.779 |
| 0.591 | 0.777 |
| 0.434 | 0.772 |
| 0.614 | 0.778 |
| 0.360 | 0.776 |

| Q60 | Q65 | Q70 |
|---|---|---|
| 0.076 | 0.222 | 0.084 |
| 0.080 | 0.085 | 0.211 |
| 0.025 | 0.228 | 0.117 |
| -0.050 | 0.250 | 0.100 |
| 0.109 | 0.102 | 0.373 |
| 0.166 | 0.134 | 0.303 |
| 0.271 | 0.217 | 0.199 |
| 0.037 | 0.296 | 0.284 |
| -0.111 | 0.086 | 0.072 |

| | | |
|---|---|---|
| 0.002 | 0.122 | 0.056 |
| 0.349 | 0.258 | 0.191 |
| 1.000 | 0.107 | 0.203 |
| 0.107 | 1.000 | 0.212 |
| 0.203 | 0.212 | 1.000 |

| Q61 | Q66 | Q71 |
|---|---|---|
| 0.309 | 0.277 | 0.258 |
| 0.373 | 0.313 | -0.051 |
| 0.160 | 0.284 | 0.191 |
| 0.201 | 0.131 | 0.062 |
| 0.365 | 0.180 | 0.145 |
| 0.308 | 0.474 | 0.079 |
| 0.248 | 0.173 | 0.116 |
| 0.303 | 0.255 | 0.280 |
| -0.024 | 0.032 | -0.014 |
| -0.015 | 0.235 | 0.291 |
| 0.155 | -0.101 | -0.056 |
| 1.000 | 0.189 | 0.050 |
| 0.189 | 1.000 | 0.107 |
| 0.050 | 0.107 | 1.000 |

| Q54 | Q57 | Q62 | Q67 | Q72 | Q74 |
|---|---|---|---|---|---|
| 0.119 | 0.392 | 0.169 | 0.258 | 0.198 | 0.286 |
| 0.210 | 0.291 | 0.298 | 0.377 | 0.436 | 0.226 |
| 0.148 | 0.136 | 0.050 | 0.063 | 0.233 | 0.009 |
| 0.213 | 0.358 | 0.136 | 0.011 | 0.224 | 0.178 |
| 0.291 | 0.331 | 0.233 | 0.108 | 0.215 | 0.267 |
| 0.295 | 0.349 | 0.276 | 0.100 | 0.480 | 0.475 |
| 0.206 | 0.316 | 0.295 | 0.181 | 0.546 | 0.503 |
| 0.090 | 0.067 | 0.080 | 0.075 | 0.160 | -0.013 |
| 0.318 | 0.357 | 0.237 | 0.338 | 0.255 | 0.440 |
| 0.203 | 0.267 | 0.191 | 0.269 | 0.364 | 0.352 |
| 0.192 | 0.385 | 0.203 | 0.219 | 0.240 | 0.093 |
| 1.000 | 0.301 | 0.218 | 0.170 | 0.304 | 0.319 |
| 0.301 | 1.000 | 0.025 | 0.206 | 0.173 | 0.331 |
| 0.218 | 0.025 | 1.000 | 0.264 | 0.496 | 0.397 |
| 0.170 | 0.206 | 0.264 | 1.000 | 0.353 | 0.320 |
| 0.304 | 0.173 | 0.496 | 0.353 | 1.000 | 0.407 |
| 0.319 | 0.331 | 0.397 | 0.320 | 0.407 | 1.000 |

| Q53 | Q58 | Q63 | Q68 | Q73 | Q75 | Q76 |
|---|---|---|---|---|---|---|
| -0.087 | 0.054 | 0.541 | 0.393 | 0.197 | 0.303 | 0.226 |
| 0.112 | 0.056 | 0.307 | 0.297 | -0.024 | 0.359 | 0.268 |
| 0.036 | 0.129 | 0.289 | 0.321 | -0.047 | 0.243 | 0.284 |
| -0.065 | 0.039 | 0.203 | 0.229 | -0.030 | 0.409 | -0.027 |
| 0.030 | 0.214 | 0.188 | 0.104 | 0.105 | 0.304 | -0.088 |
| -0.046 | 0.050 | 0.208 | 0.244 | 0.158 | 0.289 | 0.216 |
| -0.103 | 0.125 | 0.259 | 0.282 | 0.163 | 0.232 | 0.218 |
| -0.150 | 0.127 | 0.156 | 0.376 | 0.057 | 0.299 | 0.287 |
| -0.118 | 0.096 | 0.091 | 0.122 | 0.099 | 0.045 | -0.010 |
| -0.083 | 0.077 | 0.195 | 0.093 | 0.183 | 0.405 | 0.142 |
| -0.160 | 0.059 | 0.105 | 0.018 | 0.091 | 0.272 | 0.033 |
| 1.000 | 0.036 | -0.083 | -0.076 | 0.144 | -0.203 | -0.182 |
| 0.036 | 1.000 | -0.029 | -0.120 | 0.063 | 0.099 | -0.071 |
| -0.083 | -0.029 | 1.000 | 0.315 | 0.150 | 0.144 | 0.308 |
| -0.076 | -0.120 | 0.315 | 1.000 | -0.003 | 0.106 | 0.301 |
| 0.144 | 0.063 | 0.150 | -0.003 | 1.000 | -0.072 | -0.024 |
| -0.203 | 0.099 | 0.144 | 0.106 | -0.072 | 1.000 | 0.034 |
| -0.182 | -0.071 | 0.308 | 0.301 | -0.024 | 0.034 | 1.000 |

| Q64 | Q69 |
|---|---|
| 0.425 | 0.272 |
| 0.005 | 0.178 |
| 0.638 | 0.300 |
| 0.073 | 0.385 |
| 0.111 | 0.252 |
| 0.272 | 0.258 |
| 0.324 | 0.378 |
| 0.557 | 0.258 |
| 0.314 | 0.284 |
| 0.100 | 0.334 |
| 0.355 | 0.203 |
| 1.000 | 0.318 |
| 0.318 | 1.000 |

```
RECODE Q2 Q5 Q7 Q11 Q12 Q13 Q15 Q17 Q20 Q22 Q29 Q32 Q33 Q34 Q35 Q37 Q38 Q3
    Q59 Q61 Q64 Q66 Q69 Q71 Q76 Q77 Q78 Q80 Q81 Q82 Q84 Q86 Q87 Q88 Q89 Q9
    (5=1).
EXECUTE.
RELIABILITY
  /VARIABLES=Q1 Q6 Q11 Q16 Q21 Q28 Q33 Q38 Q43 Q48 Q55 Q60 Q65 Q70
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

## Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 04-AUG-2017 10:20:52 |
| Comments | | |
| Input | Active Dataset | DataSet1 |
| | Filter | <none> |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 100 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |
| Syntax | | RELIABILITY /VARIABLES=Q1 Q6 Q11 Q16 Q21 Q28 Q33 Q38 Q43 Q48 Q55 Q60 Q65 Q70 /SCALE('ALL VARIABLES') ALL /MODEL=ALPHA /STATISTICS=DESCRIPTIVE SCALE CORR /SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.00 |
| | Elapsed Time | 00:00:00.01 |

## Scale: ALL VARIABLES

## Case Processing Summary

| | | N | % |
|---|---|---|---|
| Cases | Valid | 98 | 98.0 |
| | Excluded[a] | 2 | 2.0 |
| | Total | 100 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

## Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.822 | 0.830 | 14 |

## Item Statistics

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q1 | 3.22 | 1.108 | 98 |
| Q6 | 4.16 | 0.821 | 98 |
| Q11 | 4.16 | 1.091 | 98 |
| Q16 | 3.22 | 1.162 | 98 |
| Q21 | 4.40 | 0.729 | 98 |
| Q28 | 4.22 | 0.780 | 98 |
| Q33 | 4.02 | 1.103 | 98 |
| Q38 | 3.88 | 1.028 | 98 |
| Q43 | 2.36 | 1.229 | 98 |
| Q48 | 2.73 | 1.344 | 98 |
| Q55 | 3.68 | 1.136 | 98 |
| Q60 | 3.57 | 1.035 | 98 |
| Q65 | 3.74 | 1.263 | 98 |
| Q70 | 3.74 | 1.048 | 98 |

| | Q1 | Q6 | Q11 |
|---|---|---|---|
| Q1 | 1.000 | 0.390 | 0.038 |
| Q6 | 0.390 | 1.000 | 0.120 |
| Q11 | 0.038 | 0.120 | 1.000 |
| Q16 | 0.465 | 0.382 | 0.255 |
| Q21 | 0.195 | 0.218 | 0.203 |
| Q28 | 0.168 | 0.280 | 0.380 |
| Q33 | 0.427 | 0.349 | 0.263 |
| Q38 | 0.242 | 0.317 | 0.340 |
| Q43 | 0.380 | 0.361 | 0.148 |
| Q48 | 0.186 | 0.245 | 0.241 |

| | | | |
|---|---|---|---|
| Q55 | 0.335 | 0.133 | 0.192 |
| Q60 | 0.246 | 0.229 | 0.145 |
| Q65 | 0.041 | 0.309 | 0.150 |
| Q70 | 0.405 | 0.384 | 0.091 |

**Summary Item Statistics**

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 3.652 | 2.357 | 4.398 |
| Inter-Item Correlations | 0.259 | -0.052 | 0.567 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q1 | 47.91 | 59.074 | 0.484 |
| Q6 | 46.97 | 61.226 | 0.518 |
| Q11 | 46.97 | 61.515 | 0.342 |
| Q16 | 47.91 | 58.022 | 0.518 |
| Q21 | 46.73 | 63.537 | 0.386 |
| Q28 | 46.91 | 62.043 | 0.480 |
| Q33 | 47.11 | 58.657 | 0.514 |
| Q38 | 47.26 | 59.058 | 0.534 |
| Q43 | 48.78 | 59.145 | 0.418 |
| Q48 | 48.40 | 58.984 | 0.376 |
| Q55 | 47.45 | 58.209 | 0.522 |
| Q60 | 47.56 | 59.630 | 0.491 |
| Q65 | 47.39 | 61.333 | 0.284 |
| Q70 | 47.39 | 58.384 | 0.566 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 51.13 | 68.549 | 8.279 | 14 |

```
RELIABILITY
  /VARIABLES=Q2 Q7 Q12 Q17 Q22 Q29 Q34 Q39 Q44 Q49 Q56 Q61 Q66 Q71
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

# Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 04-AUG-2017 10:20:52 |
| Comments | | |
| Input | Active Dataset | DataSet1 |
| | Filter | <none> |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 100 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |
| Syntax | | RELIABILITY /VARIABLES=Q2 Q7 Q12 Q17 Q22 Q29 Q34 Q39 Q44 Q49 Q56 Q61 Q66 Q71 /SCALE('ALL VARIABLES') ALL /MODEL=ALPHA /STATISTICS=DESCRIPTIVE SCALE CORR /SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.02 |

## Scale: ALL VARIABLES

### Case Processing Summary

| | | N | % |
|---|---|---|---|
| Cases | Valid | 93 | 93.0 |
| | Excluded[a] | 7 | 7.0 |
| | Total | 100 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|

| | | |
|---|---|---|
| 0.859 | 0.863 | 14 |

**Item Statistics**

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q2 | 3.73 | 1.208 | 93 |
| Q7 | 4.58 | 0.851 | 93 |
| Q12 | 3.85 | 1.251 | 93 |
| Q17 | 3.74 | 1.072 | 93 |
| Q22 | 4.65 | 0.803 | 93 |
| Q29 | 4.16 | 0.992 | 93 |
| Q34 | 3.28 | 1.228 | 93 |
| Q39 | 4.08 | 1.013 | 93 |
| Q44 | 4.75 | 0.583 | 93 |
| Q49 | 4.71 | 0.788 | 93 |
| Q56 | 4.45 | 0.950 | 93 |
| Q61 | 3.65 | 1.039 | 93 |
| Q66 | 4.24 | 1.155 | 93 |
| Q71 | 3.53 | 1.717 | 93 |

| | Q2 | Q7 | Q12 |
|---|---|---|---|
| Q2 | 1.000 | 0.280 | 0.498 |
| Q7 | 0.280 | 1.000 | 0.491 |
| Q12 | 0.498 | 0.491 | 1.000 |
| Q17 | 0.458 | 0.273 | 0.433 |
| Q22 | 0.270 | 0.480 | 0.314 |
| Q29 | 0.508 | 0.158 | 0.431 |
| Q34 | 0.498 | 0.176 | 0.375 |
| Q39 | 0.523 | 0.314 | 0.446 |
| Q44 | 0.043 | 0.270 | 0.097 |
| Q49 | 0.123 | 0.270 | 0.043 |
| Q56 | 0.154 | 0.465 | 0.158 |
| Q61 | 0.503 | 0.358 | 0.402 |
| Q66 | 0.389 | 0.489 | 0.582 |
| Q71 | 0.200 | 0.287 | 0.265 |

**Summary Item Statistics**

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 4.099 | 3.280 | 4.753 |
| Inter-Item Correlations | 0.311 | -0.024 | 0.582 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q2 | 53.66 | 67.315 | 0.585 |
| Q7 | 52.81 | 71.875 | 0.538 |
| Q12 | 53.54 | 66.643 | 0.596 |
| Q17 | 53.65 | 67.753 | 0.650 |
| Q22 | 52.74 | 73.172 | 0.477 |
| Q29 | 53.23 | 71.046 | 0.499 |
| Q34 | 54.11 | 67.988 | 0.537 |
| Q39 | 53.31 | 69.673 | 0.572 |
| Q44 | 52.63 | 77.278 | 0.268 |
| Q49 | 52.68 | 74.786 | 0.364 |
| Q56 | 52.94 | 72.148 | 0.454 |
| Q61 | 53.74 | 68.433 | 0.632 |
| Q66 | 53.15 | 67.347 | 0.616 |
| Q71 | 53.86 | 65.274 | 0.438 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 57.39 | 80.370 | 8.965 | 14 |

```
RELIABILITY
  /VARIABLES=Q3 Q8 Q13 Q18 Q23 Q27 Q30 Q35 Q40 Q45 Q50 Q54 Q57 Q62 Q67 Q72
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

# Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 04-AUG-2017 10:20:52 |
| Comments | | |
| Input | Active Dataset | DataSet1 |
| | Filter | <none> |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 100 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |

| | | |
|---|---|---|
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |
| Syntax | | RELIABILITY<br>/VARIABLES=Q3 Q8 Q13 Q18 Q23 Q27 Q30 Q35 Q40 Q45 Q50 Q54 Q57 Q62 Q67 Q72 Q74<br>/SCALE('ALL VARIABLES') ALL<br>/MODEL=ALPHA<br><br>/STATISTICS=DESCRIPTIVE SCALE CORR<br>/SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.02 |

## Scale: ALL VARIABLES

### Case Processing Summary

| | | N | % |
|---|---|---|---|
| Cases | Valid | 97 | 97.0 |
| | Excluded[a] | 3 | 3.0 |
| | Total | 100 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.868 | 0.867 | 17 |

### Item Statistics

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q3 | 4.03 | 1.168 | 97 |
| Q8 | 2.76 | 1.273 | 97 |
| Q13 | 4.14 | 1.031 | 97 |
| Q18 | 3.95 | 0.870 | 97 |
| Q23 | 3.88 | 1.063 | 97 |
| Q27 | 4.18 | 0.924 | 97 |
| Q30 | 3.63 | 1.202 | 97 |

| | | | |
|---|---|---|---|
| Q35 | 4.09 | 1.052 | 97 |
| Q40 | 3.58 | 1.189 | 97 |
| Q45 | 3.49 | 1.012 | 97 |
| Q50 | 3.23 | 1.279 | 97 |
| Q54 | 3.30 | 1.218 | 97 |
| Q57 | 3.73 | 1.056 | 97 |
| Q62 | 3.35 | 1.315 | 97 |
| Q67 | 2.81 | 1.253 | 97 |
| Q72 | 3.19 | 1.294 | 97 |
| Q74 | 3.96 | 1.145 | 97 |

| | Q3 | Q8 | Q13 |
|---|---|---|---|
| Q3 | 1.000 | 0.271 | 0.213 |
| Q8 | 0.271 | 1.000 | 0.257 |
| Q13 | 0.213 | 0.257 | 1.000 |
| Q18 | 0.094 | 0.224 | 0.136 |
| Q23 | 0.423 | 0.401 | 0.530 |
| Q27 | 0.275 | 0.071 | 0.006 |
| Q30 | 0.417 | 0.398 | 0.161 |
| Q35 | 0.150 | 0.289 | 0.679 |
| Q40 | 0.287 | 0.319 | 0.322 |
| Q45 | 0.199 | 0.213 | 0.270 |
| Q50 | 0.135 | 0.168 | 0.014 |
| Q54 | 0.103 | 0.234 | -0.002 |
| Q57 | 0.142 | 0.231 | 0.141 |
| Q62 | 0.183 | 0.249 | 0.131 |
| Q67 | 0.260 | 0.344 | 0.271 |
| Q72 | 0.286 | 0.324 | 0.245 |
| Q74 | 0.352 | 0.351 | 0.252 |

**Summary Item Statistics**

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 3.606 | 2.763 | 4.175 |
| Inter-Item Correlations | 0.278 | -0.002 | 0.784 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q3 | 57.27 | 110.427 | 0.413 |
| Q8 | 58.54 | 107.647 | 0.479 |
| Q13 | 57.15 | 112.382 | 0.388 |
| Q18 | 57.35 | 116.543 | 0.246 |

| | | | |
|---|---|---|---|
| Q23 | 57.42 | 107.080 | 0.623 |
| Q27 | 57.12 | 113.589 | 0.379 |
| Q30 | 57.67 | 103.744 | 0.683 |
| Q35 | 57.21 | 109.020 | 0.537 |
| Q40 | 57.72 | 105.078 | 0.633 |
| Q45 | 57.80 | 109.659 | 0.530 |
| Q50 | 58.07 | 113.276 | 0.257 |
| Q54 | 58.00 | 112.688 | 0.300 |
| Q57 | 57.57 | 110.123 | 0.482 |
| Q62 | 57.95 | 105.966 | 0.525 |
| Q67 | 58.48 | 105.523 | 0.576 |
| Q72 | 58.11 | 103.018 | 0.656 |
| Q74 | 57.34 | 105.331 | 0.650 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 61.30 | 121.920 | 11.042 | 17 |

```
RELIABILITY
  /VARIABLES=Q4 Q9 Q14 Q19 Q24 Q26 Q31 Q36 Q41 Q46 Q51 Q53 Q58 Q63 Q68 Q73
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

# Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 04-AUG-2017 10:20:52 |
| Comments | | |
| Input | Active Dataset | DataSet1 |
| | Filter | <none> |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 100 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |

| | | |
|---|---|---|
| Syntax | | RELIABILITY<br>/VARIABLES=Q4 Q9 Q14 Q19 Q24 Q26 Q31 Q36 Q41 Q46 Q51 Q53 Q58 Q63 Q68 Q73 Q75 Q76<br>/SCALE('ALL VARIABLES') ALL<br>/MODEL=ALPHA<br><br>/STATISTICS=DESCRIPTIVE SCALE CORR<br>/SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.01 |

## Scale: ALL VARIABLES

### Case Processing Summary

| | | N | % |
|---|---|---|---|
| Cases | Valid | 98 | 98.0 |
| | Excluded[a] | 2 | 2.0 |
| | Total | 100 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.791 | 0.791 | 18 |

### Item Statistics

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q4 | 2.42 | 1.157 | 98 |
| Q9 | 2.71 | 1.235 | 98 |
| Q14 | 3.48 | 0.888 | 98 |
| Q19 | 2.88 | 1.221 | 98 |
| Q24 | 3.43 | 1.140 | 98 |
| Q26 | 3.33 | 1.119 | 98 |
| Q31 | 3.43 | 1.094 | 98 |
| Q36 | 2.31 | 1.179 | 98 |
| Q41 | 3.19 | 1.329 | 98 |
| Q46 | 3.22 | 1.231 | 98 |
| Q51 | 3.11 | 1.192 | 98 |

| | | | |
|---|---|---|---|
| Q53 | 3.70 | 1.096 | 98 |
| Q58 | 1.69 | 0.989 | 98 |
| Q63 | 2.24 | 1.085 | 98 |
| Q68 | 2.89 | 1.291 | 98 |
| Q73 | 3.80 | 1.157 | 98 |
| Q75 | 3.00 | 1.324 | 98 |
| Q76 | 3.72 | 1.233 | 98 |

| | Q4 | Q9 | Q14 |
|---|---|---|---|
| Q4 | 1.000 | 0.431 | 0.264 |
| Q9 | 0.431 | 1.000 | 0.389 |
| Q14 | 0.264 | 0.389 | 1.000 |
| Q19 | 0.431 | 0.271 | 0.093 |
| Q24 | 0.097 | 0.029 | -0.052 |
| Q26 | 0.077 | 0.135 | 0.162 |
| Q31 | 0.134 | 0.321 | 0.232 |
| Q36 | 0.396 | 0.563 | 0.361 |
| Q41 | 0.148 | -0.092 | 0.069 |
| Q46 | 0.187 | 0.226 | 0.249 |
| Q51 | 0.018 | 0.078 | 0.017 |
| Q53 | 0.131 | 0.066 | 0.126 |
| Q58 | 0.095 | 0.265 | 0.075 |
| Q63 | 0.575 | 0.299 | 0.251 |
| Q68 | 0.087 | 0.018 | 0.128 |
| Q73 | -0.051 | 0.204 | 0.116 |
| Q75 | 0.249 | 0.322 | 0.175 |
| Q76 | 0.183 | 0.029 | 0.282 |

**Summary Item Statistics**

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 3.031 | 1.694 | 3.796 |
| Inter-Item Correlations | 0.174 | -0.214 | 0.575 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q4 | 52.14 | 86.722 | 0.432 |
| Q9 | 51.85 | 85.945 | 0.432 |
| Q14 | 51.08 | 90.385 | 0.367 |
| Q19 | 51.68 | 85.043 | 0.481 |
| Q24 | 51.13 | 91.023 | 0.232 |
| Q26 | 51.23 | 86.924 | 0.440 |

| | | | |
|---|---|---|---|
| Q31 | 51.13 | 87.539 | 0.422 |
| Q36 | 52.26 | 83.924 | 0.558 |
| Q41 | 51.37 | 86.792 | 0.356 |
| Q46 | 51.34 | 82.803 | 0.582 |
| Q51 | 51.45 | 87.260 | 0.390 |
| Q53 | 50.86 | 92.619 | 0.168 |
| Q58 | 52.87 | 92.157 | 0.223 |
| Q63 | 52.32 | 86.033 | 0.505 |
| Q68 | 51.67 | 88.985 | 0.275 |
| Q73 | 50.77 | 90.408 | 0.255 |
| Q75 | 51.56 | 84.888 | 0.440 |
| Q76 | 50.84 | 92.963 | 0.121 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 54.56 | 97.362 | 9.867 | 18 |

```
RELIABILITY
  /VARIABLES=Q5 Q10 Q15 Q20 Q25 Q32 Q37 Q42 Q47 Q52 Q59 Q64 Q69
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

# Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 04-AUG-2017 10:20:52 |
| Comments | | |
| Input | Active Dataset | DataSet1 |
| | Filter | <none> |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 100 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |

| | | |
|---|---|---|
| Syntax | | RELIABILITY<br>/VARIABLES=Q5 Q10 Q15 Q20 Q25 Q32 Q37 Q42 Q47 Q52 Q59 Q64 Q69<br>/SCALE('ALL VARIABLES') ALL<br>/MODEL=ALPHA<br><br>/STATISTICS=DESCRIPTIVE SCALE CORR<br>/SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.01 |

## Scale: ALL VARIABLES

### Case Processing Summary

| | | N | % |
|---|---|---|---|
| Cases | Valid | 97 | 97.0 |
| | Excluded[a] | 3 | 3.0 |
| | Total | 100 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.801 | 0.807 | 13 |

### Item Statistics

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q5 | 4.28 | 0.965 | 97 |
| Q10 | 3.98 | 1.118 | 97 |
| Q15 | 3.88 | 1.192 | 97 |
| Q20 | 4.33 | 1.170 | 97 |
| Q25 | 3.00 | 1.377 | 97 |
| Q32 | 4.27 | 1.104 | 97 |
| Q37 | 4.56 | 0.889 | 97 |
| Q42 | 4.69 | 0.683 | 97 |
| Q47 | 4.22 | 0.915 | 97 |
| Q52 | 4.08 | 1.133 | 97 |
| Q59 | 4.04 | 1.040 | 97 |

| | | | |
|---|---|---|---|
| Q64 | 4.46 | 0.890 | 97 |
| Q69 | 4.18 | 1.031 | 97 |

**Ir**

| | Q5 | Q10 | Q15 |
|---|---|---|---|
| Q5 | 1.000 | 0.208 | 0.166 |
| Q10 | 0.208 | 1.000 | 0.154 |
| Q15 | 0.166 | 0.154 | 1.000 |
| Q20 | 0.416 | 0.165 | 0.291 |
| Q25 | 0.165 | 0.129 | 0.108 |
| Q32 | 0.398 | 0.140 | 0.302 |
| Q37 | 0.400 | 0.169 | 0.174 |
| Q42 | 0.085 | 0.128 | 0.426 |
| Q47 | 0.379 | 0.177 | 0.282 |
| Q52 | 0.207 | 0.100 | 0.277 |
| Q59 | 0.300 | 0.108 | 0.021 |
| Q64 | 0.175 | 0.104 | 0.545 |
| Q69 | 0.045 | 0.283 | 0.187 |

**Summary Item Statistics**

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 4.151 | 3.000 | 4.691 |
| Inter-Item Correlations | 0.243 | -0.011 | 0.667 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q5 | 49.68 | 48.303 | 0.445 |
| Q10 | 49.98 | 49.666 | 0.272 |
| Q15 | 50.08 | 46.931 | 0.419 |
| Q20 | 49.63 | 44.527 | 0.596 |
| Q25 | 50.96 | 46.415 | 0.368 |
| Q32 | 49.69 | 47.403 | 0.433 |
| Q37 | 49.40 | 47.430 | 0.570 |
| Q42 | 49.27 | 51.802 | 0.299 |
| Q47 | 49.74 | 47.818 | 0.517 |
| Q52 | 49.88 | 45.068 | 0.582 |
| Q59 | 49.92 | 47.931 | 0.430 |
| Q64 | 49.49 | 47.857 | 0.532 |
| Q69 | 49.78 | 50.526 | 0.247 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|

| | | | |
|---|---|---|---|
| 53.96 | 55.207 | 7.430 | 13 |

9 Q42 Q44 Q47 Q49 Q52 Q56
1 Q92 (1=5) (2=4) (3=3) (4=2)

**Inter-Item Correlation Matrix**

| Q16 | Q21 | Q28 | Q33 | Q38 | Q43 | Q48 | Q55 |
|---|---|---|---|---|---|---|---|
| 0.465 | 0.195 | 0.168 | 0.427 | 0.242 | 0.380 | 0.186 | 0.335 |
| 0.382 | 0.218 | 0.280 | 0.349 | 0.317 | 0.361 | 0.245 | 0.133 |
| 0.255 | 0.203 | 0.380 | 0.263 | 0.340 | 0.148 | 0.241 | 0.192 |
| 1.000 | 0.234 | 0.308 | 0.350 | 0.334 | 0.254 | 0.421 | 0.156 |
| 0.234 | 1.000 | 0.313 | 0.298 | 0.162 | 0.058 | 0.088 | 0.266 |
| 0.308 | 0.313 | 1.000 | 0.354 | 0.330 | 0.184 | 0.205 | 0.244 |
| 0.350 | 0.298 | 0.354 | 1.000 | 0.466 | 0.314 | 0.192 | 0.137 |
| 0.334 | 0.162 | 0.330 | 0.466 | 1.000 | 0.190 | 0.327 | 0.390 |
| 0.254 | 0.058 | 0.184 | 0.314 | 0.190 | 1.000 | 0.264 | 0.296 |
| 0.421 | 0.088 | 0.205 | 0.192 | 0.327 | 0.264 | 1.000 | 0.248 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.156 | 0.266 | 0.244 | 0.137 | 0.390 | 0.296 | 0.248 | 1.000 |
| 0.184 | 0.379 | 0.273 | 0.252 | 0.289 | 0.292 | 0.147 | 0.567 |
| 0.138 | 0.201 | 0.184 | 0.115 | 0.174 | 0.066 | -0.052 | 0.274 |
| 0.267 | 0.296 | 0.323 | 0.290 | 0.277 | 0.223 | 0.252 | 0.520 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 2.041 | 1.866 | 0.346 | 14 |
| 0.620 | -10.810 | 0.012 | 14 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.480 | 0.808 |
| 0.402 | 0.808 |
| 0.265 | 0.819 |
| 0.423 | 0.806 |
| 0.269 | 0.816 |
| 0.310 | 0.811 |
| 0.443 | 0.806 |
| 0.424 | 0.805 |
| 0.306 | 0.814 |
| 0.324 | 0.818 |
| 0.575 | 0.805 |
| 0.416 | 0.808 |
| 0.311 | 0.825 |
| 0.483 | 0.803 |

**Inter-Item Correlation Matrix**

| Q17 | Q22 | Q29 | Q34 | Q39 | Q44 | Q49 | Q56 |
|---|---|---|---|---|---|---|---|
| 0.458 | 0.270 | 0.508 | 0.498 | 0.523 | 0.043 | 0.123 | 0.154 |
| 0.273 | 0.480 | 0.158 | 0.176 | 0.314 | 0.270 | 0.270 | 0.465 |
| 0.433 | 0.314 | 0.431 | 0.375 | 0.446 | 0.097 | 0.043 | 0.158 |
| 1.000 | 0.347 | 0.356 | 0.526 | 0.318 | 0.227 | 0.399 | 0.457 |
| 0.347 | 1.000 | 0.386 | 0.157 | 0.207 | 0.228 | 0.419 | 0.241 |
| 0.356 | 0.386 | 1.000 | 0.364 | 0.420 | -0.024 | 0.186 | 0.049 |
| 0.526 | 0.157 | 0.364 | 1.000 | 0.446 | 0.082 | 0.152 | 0.198 |
| 0.318 | 0.207 | 0.420 | 0.446 | 1.000 | 0.197 | 0.177 | 0.235 |
| 0.227 | 0.228 | -0.024 | 0.082 | 0.197 | 1.000 | 0.173 | 0.321 |
| 0.399 | 0.419 | 0.186 | 0.152 | 0.177 | 0.173 | 1.000 | 0.395 |
| 0.457 | 0.241 | 0.049 | 0.198 | 0.235 | 0.321 | 0.395 | 1.000 |
| 0.473 | 0.264 | 0.320 | 0.445 | 0.480 | 0.374 | 0.271 | 0.351 |
| 0.401 | 0.396 | 0.440 | 0.305 | 0.412 | 0.120 | 0.243 | 0.308 |
| 0.340 | 0.216 | 0.192 | 0.311 | 0.227 | 0.164 | 0.211 | 0.372 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 1.473 | 1.449 | 0.231 | 14 |
| 0.606 | -24.005 | 0.017 | 14 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.514 | 0.845 |
| 0.535 | 0.849 |
| 0.562 | 0.844 |
| 0.558 | 0.841 |
| 0.432 | 0.852 |
| 0.446 | 0.850 |
| 0.430 | 0.848 |
| 0.438 | 0.846 |
| 0.260 | 0.860 |
| 0.354 | 0.856 |
| 0.462 | 0.852 |
| 0.492 | 0.843 |
| 0.488 | 0.843 |
| 0.256 | 0.862 |

Q74

**Inter-Item Correlation Matrix**

| Q18 | Q23 | Q27 | Q30 | Q35 | Q40 | Q45 | Q50 |
|---|---|---|---|---|---|---|---|
| 0.094 | 0.423 | 0.275 | 0.417 | 0.150 | 0.287 | 0.199 | 0.135 |
| 0.224 | 0.401 | 0.071 | 0.398 | 0.289 | 0.319 | 0.213 | 0.168 |
| 0.136 | 0.530 | 0.006 | 0.161 | 0.679 | 0.322 | 0.270 | 0.014 |
| 1.000 | 0.117 | 0.024 | 0.191 | 0.210 | 0.230 | 0.219 | 0.057 |
| 0.117 | 1.000 | 0.202 | 0.339 | 0.532 | 0.461 | 0.406 | 0.105 |
| 0.024 | 0.202 | 1.000 | 0.434 | 0.101 | 0.362 | 0.151 | 0.081 |
| 0.191 | 0.339 | 0.434 | 1.000 | 0.324 | 0.494 | 0.281 | 0.116 |
| 0.210 | 0.532 | 0.101 | 0.324 | 1.000 | 0.340 | 0.309 | 0.077 |
| 0.230 | 0.461 | 0.362 | 0.494 | 0.340 | 1.000 | 0.401 | 0.228 |
| 0.219 | 0.406 | 0.151 | 0.281 | 0.309 | 0.401 | 1.000 | 0.251 |
| 0.057 | 0.105 | 0.081 | 0.116 | 0.077 | 0.228 | 0.251 | 1.000 |
| 0.221 | 0.182 | 0.064 | 0.304 | 0.125 | 0.247 | 0.234 | 0.130 |
| 0.143 | 0.313 | 0.337 | 0.446 | 0.285 | 0.432 | 0.379 | 0.169 |
| 0.007 | 0.404 | 0.326 | 0.393 | 0.315 | 0.309 | 0.354 | 0.243 |
| 0.106 | 0.381 | 0.298 | 0.445 | 0.369 | 0.345 | 0.418 | 0.215 |
| 0.157 | 0.441 | 0.330 | 0.541 | 0.431 | 0.485 | 0.367 | 0.283 |
| 0.165 | 0.364 | 0.361 | 0.784 | 0.375 | 0.454 | 0.351 | 0.070 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 1.412 | 1.511 | 0.200 | 17 |
| 0.785 | -508.821 | 0.020 | 17 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.328 | 0.865 |
| 0.312 | 0.862 |
| 0.574 | 0.865 |
| 0.156 | 0.870 |

| | |
|---|---|
| 0.562 | 0.856 |
| 0.326 | 0.865 |
| 0.728 | 0.852 |
| 0.595 | 0.859 |
| 0.459 | 0.855 |
| 0.397 | 0.860 |
| 0.192 | 0.872 |
| 0.202 | 0.870 |
| 0.411 | 0.862 |
| 0.443 | 0.860 |
| 0.525 | 0.857 |
| 0.513 | 0.853 |
| 0.683 | 0.854 |

Q75 Q76

**Inter-Item Correlation Matrix**

| Q19 | Q24 | Q26 | Q31 | Q36 | Q41 | Q46 | Q51 |
|---|---|---|---|---|---|---|---|
| 0.431 | 0.097 | 0.077 | 0.134 | 0.396 | 0.148 | 0.187 | 0.018 |
| 0.271 | 0.029 | 0.135 | 0.321 | 0.563 | -0.092 | 0.226 | 0.078 |
| 0.093 | -0.052 | 0.162 | 0.232 | 0.361 | 0.069 | 0.249 | 0.017 |
| 1.000 | 0.171 | 0.173 | 0.186 | 0.334 | 0.256 | 0.327 | 0.123 |
| 0.171 | 1.000 | 0.253 | 0.083 | 0.124 | 0.183 | 0.239 | 0.139 |
| 0.173 | 0.253 | 1.000 | 0.263 | 0.291 | 0.310 | 0.388 | 0.266 |
| 0.186 | 0.083 | 0.263 | 1.000 | 0.153 | 0.112 | 0.410 | 0.200 |
| 0.334 | 0.124 | 0.291 | 0.153 | 1.000 | 0.166 | 0.329 | 0.151 |
| 0.256 | 0.183 | 0.310 | 0.112 | 0.166 | 1.000 | 0.414 | 0.390 |
| 0.327 | 0.239 | 0.388 | 0.410 | 0.329 | 0.414 | 1.000 | 0.348 |
| 0.123 | 0.139 | 0.266 | 0.200 | 0.151 | 0.390 | 0.348 | 1.000 |
| 0.188 | 0.127 | 0.138 | 0.073 | -0.073 | 0.174 | 0.119 | 0.152 |
| 0.114 | -0.001 | 0.073 | 0.199 | 0.382 | 0.006 | 0.193 | 0.213 |
| 0.327 | 0.214 | 0.231 | 0.137 | 0.368 | 0.138 | 0.205 | 0.202 |
| 0.161 | -0.100 | 0.168 | 0.312 | 0.192 | 0.283 | 0.301 | 0.236 |
| 0.128 | 0.215 | 0.203 | 0.265 | 0.122 | 0.113 | 0.228 | 0.211 |
| 0.364 | 0.089 | 0.369 | 0.178 | 0.489 | 0.094 | 0.304 | 0.314 |
| 0.107 | 0.056 | -0.039 | 0.104 | 0.044 | 0.052 | 0.062 | 0.000 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 2.102 | 2.241 | 0.332 | 18 |
| 0.788 | -2.691 | 0.019 | 18 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.511 | 0.777 |
| 0.532 | 0.777 |
| 0.344 | 0.782 |
| 0.367 | 0.774 |
| 0.233 | 0.790 |
| 0.351 | 0.777 |

| | |
|---|---|
| 0.363 | 0.778 |
| 0.602 | 0.768 |
| 0.400 | 0.783 |
| 0.431 | 0.766 |
| 0.367 | 0.780 |
| 0.255 | 0.794 |
| 0.353 | 0.790 |
| 0.471 | 0.773 |
| 0.328 | 0.788 |
| 0.329 | 0.789 |
| 0.466 | 0.776 |
| 0.277 | 0.799 |

**ıter-Item Correlation Matrix**

| Q20 | Q25 | Q32 | Q37 | Q42 | Q47 | Q52 | Q59 |
|---|---|---|---|---|---|---|---|
| 0.416 | 0.165 | 0.398 | 0.400 | 0.085 | 0.379 | 0.207 | 0.300 |
| 0.165 | 0.129 | 0.140 | 0.169 | 0.128 | 0.177 | 0.100 | 0.108 |
| 0.291 | 0.108 | 0.302 | 0.174 | 0.426 | 0.282 | 0.277 | 0.021 |
| 1.000 | 0.478 | 0.294 | 0.432 | 0.181 | 0.370 | 0.474 | 0.340 |
| 0.478 | 1.000 | 0.130 | 0.442 | -0.011 | 0.107 | 0.394 | 0.262 |
| 0.294 | 0.130 | 1.000 | 0.366 | 0.194 | 0.323 | 0.224 | 0.144 |
| 0.432 | 0.442 | 0.366 | 1.000 | 0.201 | 0.234 | 0.491 | 0.392 |
| 0.181 | -0.011 | 0.194 | 0.201 | 1.000 | 0.108 | 0.128 | 0.003 |
| 0.370 | 0.107 | 0.323 | 0.234 | 0.108 | 1.000 | 0.495 | 0.242 |
| 0.474 | 0.394 | 0.224 | 0.491 | 0.128 | 0.495 | 1.000 | 0.404 |
| 0.340 | 0.262 | 0.144 | 0.392 | 0.003 | 0.242 | 0.404 | 1.000 |
| 0.271 | 0.119 | 0.328 | 0.341 | 0.667 | 0.425 | 0.364 | 0.260 |
| 0.081 | 0.059 | 0.105 | 0.006 | -0.011 | 0.257 | 0.193 | 0.353 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 1.691 | 1.564 | 0.172 | 13 |
| 0.678 | -60.176 | 0.021 | 13 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.392 | 0.787 |
| 0.157 | 0.802 |
| 0.417 | 0.789 |
| 0.466 | 0.772 |
| 0.358 | 0.797 |
| 0.288 | 0.787 |
| 0.485 | 0.778 |
| 0.538 | 0.797 |
| 0.492 | 0.781 |
| 0.501 | 0.773 |
| 0.438 | 0.788 |
| 0.683 | 0.781 |
| 0.318 | 0.803 |

| Q60 | Q65 | Q70 |
|---|---|---|
| 0.246 | 0.041 | 0.405 |
| 0.229 | 0.309 | 0.384 |
| 0.145 | 0.150 | 0.091 |
| 0.184 | 0.138 | 0.267 |
| 0.379 | 0.201 | 0.296 |
| 0.273 | 0.184 | 0.323 |
| 0.252 | 0.115 | 0.290 |
| 0.289 | 0.174 | 0.277 |
| 0.292 | 0.066 | 0.223 |
| 0.147 | -0.052 | 0.252 |

| | | |
|---|---|---|
| 0.567 | 0.274 | 0.520 |
| 1.000 | 0.255 | 0.354 |
| 0.255 | 1.000 | 0.402 |
| 0.354 | 0.402 | 1.000 |

| Q61 | Q66 | Q71 |
|---|---|---|
| 0.503 | 0.389 | 0.200 |
| 0.358 | 0.489 | 0.287 |
| 0.402 | 0.582 | 0.265 |
| 0.473 | 0.401 | 0.340 |
| 0.264 | 0.396 | 0.216 |
| 0.320 | 0.440 | 0.192 |
| 0.445 | 0.305 | 0.311 |
| 0.480 | 0.412 | 0.227 |
| 0.374 | 0.120 | 0.164 |
| 0.271 | 0.243 | 0.211 |
| 0.351 | 0.308 | 0.372 |
| 1.000 | 0.315 | 0.356 |
| 0.315 | 1.000 | 0.342 |
| 0.356 | 0.342 | 1.000 |

| Q54 | Q57 | Q62 | Q67 | Q72 | Q74 |
|---|---|---|---|---|---|
| 0.103 | 0.142 | 0.183 | 0.260 | 0.286 | 0.352 |
| 0.234 | 0.231 | 0.249 | 0.344 | 0.324 | 0.351 |
| -0.002 | 0.141 | 0.131 | 0.271 | 0.245 | 0.252 |
| 0.221 | 0.143 | 0.007 | 0.106 | 0.157 | 0.165 |
| 0.182 | 0.313 | 0.404 | 0.381 | 0.441 | 0.364 |
| 0.064 | 0.337 | 0.326 | 0.298 | 0.330 | 0.361 |
| 0.304 | 0.446 | 0.393 | 0.445 | 0.541 | 0.784 |
| 0.125 | 0.285 | 0.315 | 0.369 | 0.431 | 0.375 |
| 0.247 | 0.432 | 0.309 | 0.345 | 0.485 | 0.454 |
| 0.234 | 0.379 | 0.354 | 0.418 | 0.367 | 0.351 |
| 0.130 | 0.169 | 0.243 | 0.215 | 0.283 | 0.070 |
| 1.000 | 0.087 | 0.207 | 0.180 | 0.216 | 0.226 |
| 0.087 | 1.000 | 0.338 | 0.151 | 0.349 | 0.473 |
| 0.207 | 0.338 | 1.000 | 0.514 | 0.353 | 0.397 |
| 0.180 | 0.151 | 0.514 | 1.000 | 0.516 | 0.321 |
| 0.216 | 0.349 | 0.353 | 0.516 | 1.000 | 0.519 |
| 0.226 | 0.473 | 0.397 | 0.321 | 0.519 | 1.000 |

| Q53 | Q58 | Q63 | Q68 | Q73 | Q75 | Q76 |
|---|---|---|---|---|---|---|
| 0.131 | 0.095 | 0.575 | 0.087 | -0.051 | 0.249 | 0.183 |
| 0.066 | 0.265 | 0.299 | 0.018 | 0.204 | 0.322 | 0.029 |
| 0.126 | 0.075 | 0.251 | 0.128 | 0.116 | 0.175 | 0.282 |
| 0.188 | 0.114 | 0.327 | 0.161 | 0.128 | 0.364 | 0.107 |
| 0.127 | -0.001 | 0.214 | -0.100 | 0.215 | 0.089 | 0.056 |
| 0.138 | 0.073 | 0.231 | 0.168 | 0.203 | 0.369 | -0.039 |
| 0.073 | 0.199 | 0.137 | 0.312 | 0.265 | 0.178 | 0.104 |
| -0.073 | 0.382 | 0.368 | 0.192 | 0.122 | 0.489 | 0.044 |
| 0.174 | 0.006 | 0.138 | 0.283 | 0.113 | 0.094 | 0.052 |
| 0.119 | 0.193 | 0.205 | 0.301 | 0.228 | 0.304 | 0.062 |
| 0.152 | 0.213 | 0.202 | 0.236 | 0.211 | 0.314 | 0.000 |
| 1.000 | 0.077 | 0.157 | -0.104 | 0.188 | 0.014 | -0.130 |
| 0.077 | 1.000 | 0.196 | -0.076 | -0.064 | 0.291 | -0.214 |
| 0.157 | 0.196 | 1.000 | 0.138 | 0.024 | 0.280 | 0.259 |
| -0.104 | -0.076 | 0.138 | 1.000 | 0.171 | 0.115 | 0.149 |
| 0.188 | -0.064 | 0.024 | 0.171 | 1.000 | -0.101 | 0.105 |
| 0.014 | 0.291 | 0.280 | 0.115 | -0.101 | 1.000 | -0.025 |
| -0.130 | -0.214 | 0.259 | 0.149 | 0.105 | -0.025 | 1.000 |

| Q64 | Q69 |
|---|---|
| 0.175 | 0.045 |
| 0.104 | 0.283 |
| 0.545 | 0.187 |
| 0.271 | 0.081 |
| 0.119 | 0.059 |
| 0.328 | 0.105 |
| 0.341 | 0.006 |
| 0.667 | -0.011 |
| 0.425 | 0.257 |
| 0.364 | 0.193 |
| 0.260 | 0.353 |
| 1.000 | 0.069 |
| 0.069 | 1.000 |

```
USE ALL.
COMPUTE filter_$=(GRADE = 2).
VARIABLE LABELS filter_$ 'GRADE = 2 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
RELIABILITY
  /VARIABLES=Q1_2 Q6_2 Q11_2 Q16_2 Q21_2 Q28_2 Q33_2 Q38_2 Q43_2 Q48_2 Q55_
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

## Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 15-AUG-2017 09:51:34 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\PRE_POST_2016 (Fixed).sav |
| | Active Dataset | DataSet1 |
| | Filter | GRADE = 2 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 97 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |

| | | |
|---|---|---|
| Syntax | | RELIABILITY<br>/VARIABLES=Q1_2 Q6_2 Q11_2 Q16_2 Q21_2 Q28_2 Q33_2 Q38_2 Q43_2 Q48_2 Q55_2 Q60_2 Q65_2 Q70_2<br>/SCALE('ALL VARIABLES') ALL<br>/MODEL=ALPHA<br><br>/STATISTICS=DESCRIPTIVE SCALE CORR<br>/SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.02 |

## Scale: ALL VARIABLES

### Case Processing Summary

| | | N | % |
|---|---|---|---|
| Cases | Valid | 88 | 90.7 |
| | Excluded[a] | 9 | 9.3 |
| | Total | 97 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.796 | 0.810 | 14 |

### Item Statistics

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q1_2 | 3.22 | 1.044 | 88 |
| Q6_2 | 4.32 | 0.810 | 88 |
| Q11_2 | 4.23 | 1.122 | 88 |
| Q16_2 | 3.80 | 1.084 | 88 |
| Q21_2 | 4.17 | 0.913 | 88 |
| Q28_2 | 4.32 | 0.720 | 88 |
| Q33_2 | 3.98 | 1.114 | 88 |
| Q38_2 | 3.82 | 1.067 | 88 |
| Q43_2 | 2.49 | 1.241 | 88 |
| Q48_2 | 3.44 | 1.249 | 88 |

| | | | |
|---|---|---|---|
| Q55_2 | 3.72 | 1.061 | 88 |
| Q60_2 | 3.38 | 1.289 | 88 |
| Q65_2 | 3.80 | 1.095 | 88 |
| Q70_2 | 3.74 | 1.109 | 88 |

| | Q1_2 | Q6_2 | Q11_2 |
|---|---|---|---|
| Q1_2 | 1.000 | 0.298 | 0.183 |
| Q6_2 | 0.298 | 1.000 | 0.147 |
| Q11_2 | 0.183 | 0.147 | 1.000 |
| Q16_2 | 0.344 | 0.284 | 0.341 |
| Q21_2 | 0.190 | 0.159 | 0.377 |
| Q28_2 | 0.351 | 0.159 | 0.536 |
| Q33_2 | 0.251 | 0.186 | 0.308 |
| Q38_2 | 0.345 | 0.187 | 0.256 |
| Q43_2 | 0.503 | 0.141 | 0.134 |
| Q48_2 | 0.217 | 0.120 | 0.206 |
| Q55_2 | 0.232 | 0.040 | 0.383 |
| Q60_2 | -0.052 | 0.050 | 0.068 |
| Q65_2 | 0.250 | 0.152 | 0.048 |
| Q70_2 | 0.347 | 0.426 | 0.141 |

**Summary Item Statistics**

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 3.743 | 2.489 | 4.318 |
| Inter-Item Correlations | 0.234 | -0.052 | 0.541 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q1_2 | 49.18 | 53.599 | 0.495 |
| Q6_2 | 48.08 | 57.522 | 0.333 |
| Q11_2 | 48.17 | 53.936 | 0.429 |
| Q16_2 | 48.60 | 53.231 | 0.497 |
| Q21_2 | 48.23 | 54.522 | 0.513 |
| Q28_2 | 48.08 | 54.833 | 0.649 |
| Q33_2 | 48.42 | 54.706 | 0.383 |
| Q38_2 | 48.58 | 53.120 | 0.515 |
| Q43_2 | 49.91 | 53.256 | 0.412 |
| Q48_2 | 48.95 | 54.320 | 0.347 |
| Q55_2 | 48.68 | 53.829 | 0.470 |
| Q60_2 | 49.02 | 58.873 | 0.087 |
| Q65_2 | 48.60 | 54.909 | 0.379 |

| | | | |
|---|---|---|---|
| Q70_2 | 48.66 | 52.756 | 0.514 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 52.40 | 62.265 | 7.891 | 14 |

```
RELIABILITY
  /VARIABLES=Q2_2 Q7_2 Q12_2 Q17_2 Q22_2 Q29_2 Q34_2 Q39_2 Q44_2 Q49_2 Q56_
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORRS
  /SUMMARY=TOTAL MEANS CORR.
```

# Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 15-AUG-2017 09:51:35 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\PRE_POST_2016 (Fixed).sav |
| | Active Dataset | DataSet1 |
| | Filter | GRADE = 2 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 97 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |

| | | |
|---|---|---|
| Syntax | | RELIABILITY<br>/VARIABLES=Q2_2 Q7_2 Q12_2 Q17_2 Q22_2 Q29_2 Q34_2 Q39_2 Q44_2 Q49_2 Q56_2 Q61_2 Q66_2 Q71_2<br>/SCALE('ALL VARIABLES') ALL<br>/MODEL=ALPHA<br><br>/STATISTICS=DESCRIPTIVE SCALE CORRS<br>/SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.02 |

## Scale: ALL VARIABLES

### Case Processing Summary

| | | N | % |
|---|---|---|---|
| Cases | Valid | 89 | 91.8 |
| | Excluded[a] | 8 | 8.2 |
| | Total | 97 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.847 | 0.838 | 14 |

### Item Statistics

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q2_2 | 3.58 | 1.185 | 89 |
| Q7_2 | 4.26 | 1.072 | 89 |
| Q12_2 | 3.75 | 1.299 | 89 |
| Q17_2 | 3.65 | 0.955 | 89 |
| Q22_2 | 4.35 | 1.139 | 89 |
| Q29_2 | 3.37 | 1.377 | 89 |
| Q34_2 | 3.55 | 1.306 | 89 |
| Q39_2 | 3.66 | 1.381 | 89 |
| Q44_2 | 4.60 | 0.719 | 89 |
| Q49_2 | 4.75 | 0.679 | 89 |

| | | | |
|---|---|---|---|
| Q56_2 | 4.62 | 0.805 | 89 |
| Q61_2 | 3.26 | 1.017 | 89 |
| Q66_2 | 4.33 | 0.951 | 89 |
| Q71_2 | 3.79 | 1.394 | 89 |

| | Q2_2 | Q7_2 | Q12_2 |
|---|---|---|---|
| Q2_2 | 1.000 | 0.542 | 0.515 |
| Q7_2 | 0.542 | 1.000 | 0.503 |
| Q12_2 | 0.515 | 0.503 | 1.000 |
| Q17_2 | 0.282 | 0.267 | 0.241 |
| Q22_2 | 0.420 | 0.540 | 0.550 |
| Q29_2 | 0.346 | 0.389 | 0.497 |
| Q34_2 | 0.407 | 0.279 | 0.403 |
| Q39_2 | 0.587 | 0.482 | 0.346 |
| Q44_2 | -0.093 | 0.108 | 0.123 |
| Q49_2 | 0.224 | 0.354 | 0.059 |
| Q56_2 | 0.165 | 0.366 | 0.159 |
| Q61_2 | 0.307 | 0.240 | 0.290 |
| Q66_2 | 0.343 | 0.485 | 0.397 |
| Q71_2 | 0.331 | 0.334 | 0.410 |

**Summary Item Statistics**

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 3.965 | 3.258 | 4.753 |
| Inter-Item Correlations | 0.269 | -0.093 | 0.587 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q2_2 | 51.93 | 68.154 | 0.622 |
| Q7_2 | 51.26 | 68.762 | 0.665 |
| Q12_2 | 51.76 | 66.546 | 0.637 |
| Q17_2 | 51.87 | 74.436 | 0.387 |
| Q22_2 | 51.17 | 68.437 | 0.636 |
| Q29_2 | 52.15 | 65.717 | 0.633 |
| Q34_2 | 51.97 | 68.306 | 0.543 |
| Q39_2 | 51.85 | 66.535 | 0.590 |
| Q44_2 | 50.92 | 80.551 | 0.051 |
| Q49_2 | 50.76 | 77.160 | 0.345 |
| Q56_2 | 50.90 | 76.660 | 0.314 |
| Q61_2 | 52.26 | 74.239 | 0.368 |
| Q66_2 | 51.19 | 72.270 | 0.529 |

| | | | |
|---|---|---|---|
| Q71_2 | 51.73 | 70.449 | 0.399 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 55.52 | 81.730 | 9.040 | 14 |

```
RELIABILITY
  /VARIABLES=Q3_2 Q8_2 Q13_2 Q18_2 Q23_2 Q27_2 Q30_2 Q35_2 Q40_2 Q45_2 Q50_
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

# Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 15-AUG-2017 09:51:35 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\PRE_POST_2016 (Fixed).sav |
| | Active Dataset | DataSet1 |
| | Filter | GRADE = 2 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 97 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |

| | | |
|---|---|---|
| Syntax | | RELIABILITY<br>/VARIABLES=Q3_2 Q8_2 Q13_2 Q18_2 Q23_2 Q27_2 Q30_2 Q35_2 Q40_2 Q45_2 Q50_2 Q54_2 Q57_2 Q62_2 Q67_2 Q72_2 Q74_2<br>/SCALE('ALL VARIABLES') ALL<br>/MODEL=ALPHA<br><br>/STATISTICS=DESCRIPTIVE SCALE CORR<br>/SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.00 |
| | Elapsed Time | 00:00:00.01 |

## Scale: ALL VARIABLES

### Case Processing Summary

| | | N | % |
|---|---|---|---|
| Cases | Valid | 88 | 90.7 |
| | Excluded[a] | 9 | 9.3 |
| | Total | 97 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.873 | 0.875 | 17 |

### Item Statistics

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q3_2 | 3.90 | 1.356 | 88 |
| Q8_2 | 3.34 | 1.212 | 88 |
| Q13_2 | 4.27 | 0.893 | 88 |
| Q18_2 | 4.15 | 0.941 | 88 |
| Q23_2 | 3.89 | 1.139 | 88 |
| Q27_2 | 4.16 | 0.856 | 88 |
| Q30_2 | 3.59 | 1.161 | 88 |
| Q35_2 | 4.05 | 0.970 | 88 |
| Q40_2 | 3.72 | 1.193 | 88 |
| Q45_2 | 3.33 | 1.142 | 88 |

| | | | |
|---|---|---|---|
| Q50_2 | 2.53 | 1.212 | 88 |
| Q54_2 | 3.63 | 1.065 | 88 |
| Q57_2 | 3.88 | 1.143 | 88 |
| Q62_2 | 3.22 | 1.217 | 88 |
| Q67_2 | 2.68 | 1.218 | 88 |
| Q72_2 | 3.09 | 1.210 | 88 |
| Q74_2 | 3.80 | 1.041 | 88 |

| | Q3_2 | Q8_2 | Q13_2 |
|---|---|---|---|
| Q3_2 | 1.000 | 0.406 | 0.516 |
| Q8_2 | 0.406 | 1.000 | 0.380 |
| Q13_2 | 0.516 | 0.380 | 1.000 |
| Q18_2 | 0.120 | 0.187 | 0.375 |
| Q23_2 | 0.535 | 0.228 | 0.460 |
| Q27_2 | 0.252 | 0.180 | 0.303 |
| Q30_2 | 0.323 | 0.182 | 0.231 |
| Q35_2 | 0.432 | 0.368 | 0.582 |
| Q40_2 | 0.450 | 0.314 | 0.418 |
| Q45_2 | 0.259 | 0.383 | 0.159 |
| Q50_2 | 0.166 | 0.172 | 0.097 |
| Q54_2 | 0.100 | 0.216 | 0.072 |
| Q57_2 | 0.281 | 0.239 | 0.326 |
| Q62_2 | 0.215 | 0.448 | 0.157 |
| Q67_2 | 0.231 | 0.510 | 0.250 |
| Q72_2 | 0.258 | 0.394 | 0.243 |
| Q74_2 | 0.229 | 0.293 | 0.234 |

**Summary Item Statistics**

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 3.600 | 2.534 | 4.273 |
| Inter-Item Correlations | 0.291 | 0.059 | 0.582 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q3_2 | 57.31 | 104.077 | 0.514 |
| Q8_2 | 57.86 | 105.292 | 0.538 |
| Q13_2 | 56.93 | 109.673 | 0.517 |
| Q18_2 | 57.06 | 110.928 | 0.420 |
| Q23_2 | 57.32 | 106.610 | 0.520 |
| Q27_2 | 57.05 | 110.090 | 0.519 |
| Q30_2 | 57.61 | 105.688 | 0.549 |

| | | | |
|---|---|---|---|
| Q35_2 | 57.16 | 109.974 | 0.454 |
| Q40_2 | 57.49 | 104.621 | 0.577 |
| Q45_2 | 57.88 | 107.973 | 0.458 |
| Q50_2 | 58.67 | 106.798 | 0.474 |
| Q54_2 | 57.58 | 108.913 | 0.454 |
| Q57_2 | 57.33 | 106.545 | 0.521 |
| Q62_2 | 57.99 | 108.494 | 0.401 |
| Q67_2 | 58.52 | 105.379 | 0.531 |
| Q72_2 | 58.11 | 105.803 | 0.517 |
| Q74_2 | 57.41 | 106.727 | 0.573 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 61.20 | 120.142 | 10.961 | 17 |

```
RELIABILITY
  /VARIABLES=Q4_2 Q9_2 Q14_2 Q19_2 Q24_2 Q26_2 Q31_2 Q36_2 Q41_2 Q46_2 Q51_
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

# Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 15-AUG-2017 09:51:35 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\PRE_POST_2016 (Fixed).sav |
| | Active Dataset | DataSet1 |
| | Filter | GRADE = 2 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 97 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |

| | | |
|---|---|---|
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |
| Syntax | | RELIABILITY<br>/VARIABLES=Q4_2 Q9_2 Q14_2 Q19_2 Q24_2 Q26_2 Q31_2 Q36_2 Q41_2 Q46_2 Q51_2 Q53_2 Q58_2 Q63_2 Q68_2 Q73_2 Q75_2 Q76_2<br>/SCALE('ALL VARIABLES') ALL<br>/MODEL=ALPHA<br><br>/STATISTICS=DESCRIPTIVE SCALE CORR<br>/SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.01 |

## Scale: ALL VARIABLES

### Case Processing Summary

| | | N | % |
|---|---|---|---|
| Cases | Valid | 85 | 87.6 |
| | Excluded[a] | 12 | 12.4 |
| | Total | 97 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.828 | 0.826 | 18 |

### Item Statistics

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q4_2 | 2.72 | 1.211 | 85 |
| Q9_2 | 3.09 | 1.306 | 85 |
| Q14_2 | 3.48 | 1.031 | 85 |
| Q19_2 | 2.98 | 1.112 | 85 |
| Q24_2 | 3.44 | 1.052 | 85 |

| | | | |
|---|---|---|---|
| Q26_2 | 3.47 | 1.211 | 85 |
| Q31_2 | 3.42 | 1.127 | 85 |
| Q36_2 | 2.59 | 1.188 | 85 |
| Q41_2 | 2.79 | 1.245 | 85 |
| Q46_2 | 3.47 | 1.150 | 85 |
| Q51_2 | 3.21 | 1.226 | 85 |
| Q53_2 | 3.60 | 1.217 | 85 |
| Q58_2 | 1.67 | 0.892 | 85 |
| Q63_2 | 2.48 | 1.181 | 85 |
| Q68_2 | 3.24 | 1.368 | 85 |
| Q73_2 | 3.61 | 1.156 | 85 |
| Q75_2 | 3.20 | 1.213 | 85 |
| Q76_2 | 3.82 | 1.071 | 85 |

| | Q4_2 | Q9_2 | Q14_2 |
|---|---|---|---|
| Q4_2 | 1.000 | 0.303 | 0.387 |
| Q9_2 | 0.303 | 1.000 | 0.382 |
| Q14_2 | 0.387 | 0.382 | 1.000 |
| Q19_2 | 0.287 | 0.116 | 0.166 |
| Q24_2 | 0.238 | 0.152 | 0.177 |
| Q26_2 | 0.254 | 0.341 | 0.417 |
| Q31_2 | 0.071 | 0.288 | 0.324 |
| Q36_2 | 0.357 | 0.501 | 0.261 |
| Q41_2 | 0.220 | 0.093 | 0.220 |
| Q46_2 | 0.267 | 0.208 | 0.298 |
| Q51_2 | 0.305 | 0.344 | 0.295 |
| Q53_2 | 0.044 | -0.103 | -0.044 |
| Q58_2 | 0.012 | 0.119 | -0.071 |
| Q63_2 | 0.554 | 0.287 | 0.266 |
| Q68_2 | 0.436 | 0.374 | 0.433 |
| Q73_2 | 0.133 | 0.001 | 0.099 |
| Q75_2 | 0.274 | 0.266 | 0.369 |
| Q76_2 | 0.163 | 0.157 | 0.283 |

**Summary Item Statistics**

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 3.127 | 1.671 | 3.824 |
| Inter-Item Correlations | 0.209 | -0.180 | 0.554 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Q4_2 | 53.56 | 98.773 | 0.514 |
| Q9_2 | 53.19 | 99.202 | 0.450 |
| Q14_2 | 52.80 | 100.924 | 0.513 |
| Q19_2 | 53.31 | 100.667 | 0.480 |
| Q24_2 | 52.85 | 100.822 | 0.506 |
| Q26_2 | 52.81 | 98.583 | 0.522 |
| Q31_2 | 52.86 | 101.599 | 0.429 |
| Q36_2 | 53.69 | 98.191 | 0.552 |
| Q41_2 | 53.49 | 101.539 | 0.379 |
| Q46_2 | 52.81 | 99.726 | 0.503 |
| Q51_2 | 53.07 | 100.424 | 0.435 |
| Q53_2 | 52.68 | 108.648 | 0.098 |
| Q58_2 | 54.61 | 108.383 | 0.185 |
| Q63_2 | 53.80 | 100.662 | 0.445 |
| Q68_2 | 53.05 | 97.998 | 0.470 |
| Q73_2 | 52.67 | 103.700 | 0.322 |
| Q75_2 | 53.08 | 98.172 | 0.539 |
| Q76_2 | 52.46 | 108.346 | 0.140 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 56.28 | 112.610 | 10.612 | 18 |

```
RELIABILITY
  /VARIABLES=Q5_2 Q10_2 Q15_2 Q20_2 Q25_2 Q32_2 Q37_2 Q42_2 Q47_2 Q52_2 Q5
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

# Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 15-AUG-2017 09:51:35 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\PRE_POST_2016 (Fixed).sav |
| | Active Dataset | DataSet1 |
| | Filter | GRADE = 2 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |

| | | |
|---|---|---|
| | N of Rows in Working Data File | 97 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |
| Syntax | | RELIABILITY /VARIABLES=Q5_2 Q10_2 Q15_2 Q20_2 Q25_2 Q32_2 Q37_2 Q42_2 Q47_2 Q52_2 Q59_2 Q64_2 Q69_2 /SCALE('ALL VARIABLES') ALL /MODEL=ALPHA /STATISTICS=DESCRIPTIVE SCALE CORR /SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.01 |

## Scale: ALL VARIABLES

### Case Processing Summary

| | | N | % |
|---|---|---|---|
| Cases | Valid | 88 | 90.7 |
| | Excluded[a] | 9 | 9.3 |
| | Total | 97 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.762 | 0.780 | 13 |

### Item Statistics

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q5_2 | 4.33 | 0.769 | 88 |

| | | | |
|---|---|---|---|
| Q10_2 | 3.82 | 1.273 | 88 |
| Q15_2 | 3.59 | 1.345 | 88 |
| Q20_2 | 4.52 | 0.884 | 88 |
| Q25_2 | 3.32 | 1.318 | 88 |
| Q32_2 | 4.89 | 0.413 | 88 |
| Q37_2 | 4.81 | 0.564 | 88 |
| Q42_2 | 4.84 | 0.452 | 88 |
| Q47_2 | 4.16 | 0.981 | 88 |
| Q52_2 | 4.01 | 1.199 | 88 |
| Q59_2 | 4.19 | 0.981 | 88 |
| Q64_2 | 4.40 | 0.941 | 88 |
| Q69_2 | 4.45 | 0.970 | 88 |

**Ir**

| | Q5_2 | Q10_2 | Q15_2 |
|---|---|---|---|
| Q5_2 | 1.000 | 0.085 | 0.232 |
| Q10_2 | 0.085 | 1.000 | 0.211 |
| Q15_2 | 0.232 | 0.211 | 1.000 |
| Q20_2 | 0.336 | 0.096 | 0.346 |
| Q25_2 | 0.247 | 0.220 | 0.301 |
| Q32_2 | 0.155 | 0.201 | 0.205 |
| Q37_2 | 0.175 | -0.001 | 0.107 |
| Q42_2 | 0.252 | 0.089 | 0.175 |
| Q47_2 | 0.387 | 0.097 | 0.215 |
| Q52_2 | 0.358 | 0.129 | 0.324 |
| Q59_2 | 0.433 | 0.176 | 0.191 |
| Q64_2 | 0.230 | 0.157 | 0.366 |
| Q69_2 | 0.028 | 0.021 | 0.065 |

**Summary Item Statistics**

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 4.256 | 3.318 | 4.886 |
| Inter-Item Correlations | 0.214 | -0.099 | 0.579 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q5_2 | 51.00 | 37.011 | 0.459 |
| Q10_2 | 51.51 | 36.621 | 0.237 |
| Q15_2 | 51.74 | 33.184 | 0.446 |
| Q20_2 | 50.81 | 36.296 | 0.453 |
| Q25_2 | 52.01 | 33.414 | 0.443 |
| Q32_2 | 50.44 | 40.181 | 0.296 |

| | | | |
|---|---|---|---|
| Q37_2 | 50.52 | 38.643 | 0.419 |
| Q42_2 | 50.49 | 39.724 | 0.346 |
| Q47_2 | 51.17 | 36.189 | 0.402 |
| Q52_2 | 51.32 | 31.990 | 0.625 |
| Q59_2 | 51.14 | 34.786 | 0.532 |
| Q64_2 | 50.93 | 36.087 | 0.436 |
| Q69_2 | 50.88 | 39.214 | 0.144 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 55.33 | 41.902 | 6.473 | 13 |

_2 Q60_2 Q65_2 Q70_2

**Inter-Item Correlation Matrix**

| Q16_2 | Q21_2 | Q28_2 | Q33_2 | Q38_2 | Q43_2 | Q48_2 | Q55_2 |
|---|---|---|---|---|---|---|---|
| 0.344 | 0.190 | 0.351 | 0.251 | 0.345 | 0.503 | 0.217 | 0.232 |
| 0.284 | 0.159 | 0.159 | 0.186 | 0.187 | 0.141 | 0.120 | 0.040 |
| 0.341 | 0.377 | 0.536 | 0.308 | 0.256 | 0.134 | 0.206 | 0.383 |
| 1.000 | 0.396 | 0.246 | 0.158 | 0.246 | 0.169 | 0.450 | 0.219 |
| 0.396 | 1.000 | 0.441 | 0.253 | 0.339 | 0.190 | 0.135 | 0.419 |
| 0.246 | 0.441 | 1.000 | 0.367 | 0.480 | 0.313 | 0.161 | 0.541 |
| 0.158 | 0.253 | 0.367 | 1.000 | 0.403 | 0.183 | 0.156 | 0.208 |
| 0.246 | 0.339 | 0.480 | 0.403 | 1.000 | 0.250 | 0.173 | 0.289 |
| 0.169 | 0.190 | 0.313 | 0.183 | 0.250 | 1.000 | 0.378 | 0.194 |
| 0.450 | 0.135 | 0.161 | 0.156 | 0.173 | 0.378 | 1.000 | 0.070 |
| 0.219 | 0.419 | 0.541 | 0.208 | 0.289 | 0.194 | 0.070 | 1.000 |
| 0.072 | 0.131 | 0.080 | -0.018 | 0.017 | -0.044 | 0.038 | 0.188 |
| 0.255 | 0.219 | 0.331 | 0.043 | 0.302 | 0.201 | 0.168 | 0.217 |
| 0.270 | 0.351 | 0.437 | 0.284 | 0.358 | 0.294 | 0.126 | 0.347 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 1.830 | 1.735 | 0.248 | 14 |
| 0.593 | -10.351 | 0.018 | 14 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.407 | 0.777 |
| 0.272 | 0.790 |
| 0.421 | 0.783 |
| 0.430 | 0.777 |
| 0.362 | 0.777 |
| 0.576 | 0.773 |
| 0.261 | 0.787 |
| 0.351 | 0.776 |
| 0.381 | 0.785 |
| 0.329 | 0.791 |
| 0.390 | 0.779 |
| 0.101 | 0.815 |
| 0.265 | 0.787 |

| | |
|---|---|
| 0.438 | 0.775 |

_2 Q61_2 Q66_2 Q71_2

**Inter-Item Correlation Matrix**

| Q17_2 | Q22_2 | Q29_2 | Q34_2 | Q39_2 | Q44_2 | Q49_2 | Q56_2 |
|---|---|---|---|---|---|---|---|
| 0.282 | 0.420 | 0.346 | 0.407 | 0.587 | -0.093 | 0.224 | 0.165 |
| 0.267 | 0.540 | 0.389 | 0.279 | 0.482 | 0.108 | 0.354 | 0.366 |
| 0.241 | 0.550 | 0.497 | 0.403 | 0.346 | 0.123 | 0.059 | 0.159 |
| 1.000 | 0.332 | 0.316 | 0.283 | 0.341 | -0.009 | 0.164 | 0.195 |
| 0.332 | 1.000 | 0.554 | 0.366 | 0.473 | 0.119 | 0.215 | 0.110 |
| 0.316 | 0.554 | 1.000 | 0.385 | 0.467 | 0.015 | 0.294 | 0.263 |
| 0.283 | 0.366 | 0.385 | 1.000 | 0.293 | 0.070 | 0.181 | 0.278 |
| 0.341 | 0.473 | 0.467 | 0.293 | 1.000 | -0.047 | 0.359 | 0.118 |
| -0.009 | 0.119 | 0.015 | 0.070 | -0.047 | 1.000 | 0.002 | -0.093 |
| 0.164 | 0.215 | 0.294 | 0.181 | 0.359 | 0.002 | 1.000 | 0.304 |
| 0.195 | 0.110 | 0.263 | 0.278 | 0.118 | -0.093 | 0.304 | 1.000 |
| 0.316 | 0.245 | 0.288 | 0.345 | 0.249 | -0.042 | 0.110 | 0.177 |
| 0.151 | 0.398 | 0.454 | 0.421 | 0.275 | 0.129 | 0.337 | 0.224 |
| 0.020 | 0.226 | 0.308 | 0.296 | 0.316 | 0.083 | 0.064 | 0.159 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 1.494 | 1.459 | 0.249 | 14 |
| 0.680 | -6.283 | 0.025 | 14 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.541 | 0.828 |
| 0.585 | 0.826 |
| 0.532 | 0.827 |
| 0.245 | 0.842 |
| 0.522 | 0.827 |
| 0.502 | 0.827 |
| 0.399 | 0.833 |
| 0.519 | 0.830 |
| 0.117 | 0.855 |
| 0.294 | 0.845 |
| 0.291 | 0.846 |
| 0.237 | 0.844 |
| 0.425 | 0.835 |

| | |
|---|---|
| 0.281 | 0.845 |

_2 Q54_2 Q57_2 Q62_2 Q67_2 Q72_2 Q74_2

**Inter-Item Correlation Matrix**

| Q18_2 | Q23_2 | Q27_2 | Q30_2 | Q35_2 | Q40_2 | Q45_2 | Q50_2 |
|---|---|---|---|---|---|---|---|
| 0.120 | 0.535 | 0.252 | 0.323 | 0.432 | 0.450 | 0.259 | 0.166 |
| 0.187 | 0.228 | 0.180 | 0.182 | 0.368 | 0.314 | 0.383 | 0.172 |
| 0.375 | 0.460 | 0.303 | 0.231 | 0.582 | 0.418 | 0.159 | 0.097 |
| 1.000 | 0.434 | 0.398 | 0.130 | 0.194 | 0.232 | 0.211 | 0.252 |
| 0.434 | 1.000 | 0.455 | 0.208 | 0.390 | 0.483 | 0.162 | 0.161 |
| 0.398 | 0.455 | 1.000 | 0.321 | 0.213 | 0.371 | 0.310 | 0.316 |
| 0.130 | 0.208 | 0.321 | 1.000 | 0.149 | 0.463 | 0.354 | 0.459 |
| 0.194 | 0.390 | 0.213 | 0.149 | 1.000 | 0.289 | 0.194 | 0.165 |
| 0.232 | 0.483 | 0.371 | 0.463 | 0.289 | 1.000 | 0.306 | 0.249 |
| 0.211 | 0.162 | 0.310 | 0.354 | 0.194 | 0.306 | 1.000 | 0.295 |
| 0.252 | 0.161 | 0.316 | 0.459 | 0.165 | 0.249 | 0.295 | 1.000 |
| 0.194 | 0.097 | 0.369 | 0.535 | 0.139 | 0.340 | 0.330 | 0.326 |
| 0.434 | 0.254 | 0.314 | 0.360 | 0.150 | 0.361 | 0.226 | 0.455 |
| 0.243 | 0.408 | 0.287 | 0.079 | 0.186 | 0.059 | 0.271 | 0.209 |
| 0.172 | 0.239 | 0.236 | 0.338 | 0.314 | 0.332 | 0.192 | 0.474 |
| 0.170 | 0.149 | 0.241 | 0.436 | 0.202 | 0.217 | 0.303 | 0.249 |
| 0.277 | 0.213 | 0.269 | 0.453 | 0.271 | 0.452 | 0.280 | 0.342 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 1.739 | 1.686 | 0.256 | 17 |
| 0.524 | 9.950 | 0.013 | 17 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.534 | 0.866 |
| 0.573 | 0.864 |
| 0.570 | 0.866 |
| 0.439 | 0.869 |
| 0.642 | 0.865 |
| 0.391 | 0.866 |
| 0.543 | 0.864 |

| | |
|---|---|
| 0.454 | 0.868 |
| 0.539 | 0.862 |
| 0.323 | 0.868 |
| 0.466 | 0.867 |
| 0.470 | 0.868 |
| 0.440 | 0.865 |
| 0.547 | 0.870 |
| 0.510 | 0.864 |
| 0.474 | 0.865 |
| 0.452 | 0.863 |

```
_2 Q53_2 Q58_2 Q63_2 Q68_2 Q73_2 Q75_2 Q76_2
```

**Inter-Item Correlation Matrix**

| Q19_2 | Q24_2 | Q26_2 | Q31_2 | Q36_2 | Q41_2 | Q46_2 | Q51_2 |
|---|---|---|---|---|---|---|---|
| 0.287 | 0.238 | 0.254 | 0.071 | 0.357 | 0.220 | 0.267 | 0.305 |
| 0.116 | 0.152 | 0.341 | 0.288 | 0.501 | 0.093 | 0.208 | 0.344 |
| 0.166 | 0.177 | 0.417 | 0.324 | 0.261 | 0.220 | 0.298 | 0.295 |
| 1.000 | 0.477 | 0.406 | 0.226 | 0.299 | 0.263 | 0.344 | 0.239 |
| 0.477 | 1.000 | 0.305 | 0.264 | 0.259 | 0.335 | 0.488 | 0.288 |
| 0.406 | 0.305 | 1.000 | 0.314 | 0.434 | 0.098 | 0.446 | 0.229 |
| 0.226 | 0.264 | 0.314 | 1.000 | 0.389 | 0.056 | 0.303 | 0.322 |
| 0.299 | 0.259 | 0.434 | 0.389 | 1.000 | 0.278 | 0.213 | 0.273 |
| 0.263 | 0.335 | 0.098 | 0.056 | 0.278 | 1.000 | 0.178 | 0.170 |
| 0.344 | 0.488 | 0.446 | 0.303 | 0.213 | 0.178 | 1.000 | 0.258 |
| 0.239 | 0.288 | 0.229 | 0.322 | 0.273 | 0.170 | 0.258 | 1.000 |
| 0.116 | 0.156 | 0.129 | 0.134 | 0.049 | -0.112 | 0.179 | 0.169 |
| 0.100 | 0.180 | 0.200 | 0.152 | 0.106 | 0.280 | 0.188 | 0.065 |
| 0.271 | 0.337 | 0.214 | -0.003 | 0.262 | 0.321 | 0.243 | 0.151 |
| 0.293 | 0.226 | 0.234 | 0.166 | 0.302 | 0.190 | 0.231 | 0.091 |
| 0.132 | 0.248 | 0.098 | 0.265 | 0.281 | 0.265 | 0.193 | 0.126 |
| 0.392 | 0.304 | 0.373 | 0.346 | 0.289 | 0.281 | 0.307 | 0.299 |
| -0.053 | -0.132 | -0.027 | 0.082 | 0.064 | 0.222 | -0.028 | 0.110 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 2.153 | 2.289 | 0.273 | 18 |
| 0.734 | -3.083 | 0.020 | 18 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|

| | |
|---|---|
| 0.465 | 0.814 |
| 0.483 | 0.817 |
| 0.486 | 0.815 |
| 0.400 | 0.816 |
| 0.458 | 0.815 |
| 0.468 | 0.813 |
| 0.379 | 0.819 |
| 0.502 | 0.812 |
| 0.414 | 0.821 |
| 0.384 | 0.815 |
| 0.348 | 0.818 |
| 0.182 | 0.836 |
| 0.381 | 0.829 |
| 0.443 | 0.818 |
| 0.516 | 0.816 |
| 0.288 | 0.824 |
| 0.503 | 0.812 |
| 0.319 | 0.833 |

9_2 Q64_2 Q69_2

**ıter-Item Correlation Matrix**

| Q20_2 | Q25_2 | Q32_2 | Q37_2 | Q42_2 | Q47_2 | Q52_2 | Q59_2 |
|---|---|---|---|---|---|---|---|
| 0.336 | 0.247 | 0.155 | 0.175 | 0.252 | 0.387 | 0.358 | 0.433 |
| 0.096 | 0.220 | 0.201 | -0.001 | 0.089 | 0.097 | 0.129 | 0.176 |
| 0.346 | 0.301 | 0.205 | 0.107 | 0.175 | 0.215 | 0.324 | 0.191 |
| 1.000 | 0.497 | 0.070 | 0.412 | 0.038 | 0.168 | 0.352 | 0.240 |
| 0.497 | 1.000 | 0.152 | 0.223 | 0.221 | 0.120 | 0.420 | 0.290 |
| 0.070 | 0.152 | 1.000 | 0.102 | 0.579 | 0.073 | 0.165 | 0.197 |
| 0.412 | 0.223 | 0.102 | 1.000 | 0.103 | 0.388 | 0.428 | 0.255 |
| 0.038 | 0.221 | 0.579 | 0.103 | 1.000 | 0.110 | 0.279 | 0.278 |
| 0.168 | 0.120 | 0.073 | 0.388 | 0.110 | 1.000 | 0.272 | 0.433 |
| 0.352 | 0.420 | 0.165 | 0.428 | 0.279 | 0.272 | 1.000 | 0.467 |
| 0.240 | 0.290 | 0.197 | 0.255 | 0.278 | 0.433 | 0.467 | 1.000 |
| 0.093 | 0.045 | 0.295 | 0.276 | 0.313 | 0.242 | 0.465 | 0.264 |
| 0.041 | 0.011 | -0.099 | 0.183 | 0.010 | 0.128 | 0.203 | 0.148 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 1.568 | 1.473 | 0.230 | 13 |
| 0.678 | -5.844 | 0.018 | 13 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.334 | 0.742 |
| 0.125 | 0.769 |
| 0.307 | 0.742 |
| 0.442 | 0.741 |
| 0.401 | 0.742 |
| 0.393 | 0.758 |

| | |
|---:|---:|
| 0.397 | 0.749 |
| 0.419 | 0.755 |
| 0.350 | 0.746 |
| 0.502 | 0.716 |
| 0.388 | 0.732 |
| 0.390 | 0.742 |
| 0.095 | 0.772 |

| Q60_2 | Q65_2 | Q70_2 |
|---|---|---|
| -0.052 | 0.250 | 0.347 |
| 0.050 | 0.152 | 0.426 |
| 0.068 | 0.048 | 0.141 |
| 0.072 | 0.255 | 0.270 |
| 0.131 | 0.219 | 0.351 |
| 0.080 | 0.331 | 0.437 |
| -0.018 | 0.043 | 0.284 |
| 0.017 | 0.302 | 0.358 |
| -0.044 | 0.201 | 0.294 |
| 0.038 | 0.168 | 0.126 |
| 0.188 | 0.217 | 0.347 |
| 1.000 | 0.169 | -0.019 |
| 0.169 | 1.000 | 0.344 |
| -0.019 | 0.344 | 1.000 |

| Q61_2 | Q66_2 | Q71_2 |
|---|---|---|
| 0.307 | 0.343 | 0.331 |
| 0.240 | 0.485 | 0.334 |
| 0.290 | 0.397 | 0.410 |
| 0.316 | 0.151 | 0.020 |
| 0.245 | 0.398 | 0.226 |
| 0.288 | 0.454 | 0.308 |
| 0.345 | 0.421 | 0.296 |
| 0.249 | 0.275 | 0.316 |
| -0.042 | 0.129 | 0.083 |
| 0.110 | 0.337 | 0.064 |
| 0.177 | 0.224 | 0.159 |
| 1.000 | 0.088 | 0.095 |
| 0.088 | 1.000 | 0.225 |
| 0.095 | 0.225 | 1.000 |

| Q54_2 | Q57_2 | Q62_2 | Q67_2 | Q72_2 | Q74_2 |
|---|---|---|---|---|---|
| 0.100 | 0.281 | 0.215 | 0.231 | 0.258 | 0.229 |
| 0.216 | 0.239 | 0.448 | 0.510 | 0.394 | 0.293 |
| 0.072 | 0.326 | 0.157 | 0.250 | 0.243 | 0.234 |
| 0.194 | 0.434 | 0.243 | 0.172 | 0.170 | 0.277 |
| 0.097 | 0.254 | 0.408 | 0.239 | 0.149 | 0.213 |
| 0.369 | 0.314 | 0.287 | 0.236 | 0.241 | 0.269 |
| 0.535 | 0.360 | 0.079 | 0.338 | 0.436 | 0.453 |
| 0.139 | 0.150 | 0.186 | 0.314 | 0.202 | 0.271 |
| 0.340 | 0.361 | 0.059 | 0.332 | 0.217 | 0.452 |
| 0.330 | 0.226 | 0.271 | 0.192 | 0.303 | 0.280 |
| 0.326 | 0.455 | 0.209 | 0.474 | 0.249 | 0.342 |
| 1.000 | 0.386 | 0.090 | 0.235 | 0.375 | 0.428 |
| 0.386 | 1.000 | 0.135 | 0.326 | 0.225 | 0.384 |
| 0.090 | 0.135 | 1.000 | 0.225 | 0.447 | 0.280 |
| 0.235 | 0.326 | 0.225 | 1.000 | 0.387 | 0.392 |
| 0.375 | 0.225 | 0.447 | 0.387 | 1.000 | 0.444 |
| 0.428 | 0.384 | 0.280 | 0.392 | 0.444 | 1.000 |

| Q53_2 | Q58_2 | Q63_2 | Q68_2 | Q73_2 | Q75_2 | Q76_2 |
|---|---|---|---|---|---|---|
| 0.044 | 0.012 | 0.554 | 0.436 | 0.133 | 0.274 | 0.163 |
| -0.103 | 0.119 | 0.287 | 0.374 | 0.001 | 0.266 | 0.157 |
| -0.044 | -0.071 | 0.266 | 0.433 | 0.099 | 0.369 | 0.283 |
| 0.116 | 0.100 | 0.271 | 0.293 | 0.132 | 0.392 | -0.053 |
| 0.156 | 0.180 | 0.337 | 0.226 | 0.248 | 0.304 | -0.132 |
| 0.129 | 0.200 | 0.214 | 0.234 | 0.098 | 0.373 | -0.027 |
| 0.134 | 0.152 | -0.003 | 0.166 | 0.265 | 0.346 | 0.082 |
| 0.049 | 0.106 | 0.262 | 0.302 | 0.281 | 0.289 | 0.064 |
| -0.112 | 0.280 | 0.321 | 0.190 | 0.265 | 0.281 | 0.222 |
| 0.179 | 0.188 | 0.243 | 0.231 | 0.193 | 0.307 | -0.028 |
| 0.169 | 0.065 | 0.151 | 0.091 | 0.126 | 0.299 | 0.110 |
| 1.000 | 0.086 | -0.005 | -0.007 | 0.168 | 0.015 | -0.055 |
| 0.086 | 1.000 | 0.028 | -0.180 | 0.105 | 0.326 | -0.062 |
| -0.005 | 0.028 | 1.000 | 0.430 | 0.139 | 0.181 | 0.068 |
| -0.007 | -0.180 | 0.430 | 1.000 | 0.119 | 0.366 | 0.248 |
| 0.168 | 0.105 | 0.139 | 0.119 | 1.000 | 0.268 | 0.184 |
| 0.015 | 0.326 | 0.181 | 0.366 | 0.268 | 1.000 | -0.055 |
| -0.055 | -0.062 | 0.068 | 0.248 | 0.184 | -0.055 | 1.000 |

| Q64_2 | Q69_2 |
|---|---|
| 0.230 | 0.028 |
| 0.157 | 0.021 |
| 0.366 | 0.065 |
| 0.093 | 0.041 |
| 0.045 | 0.011 |
| 0.295 | -0.099 |
| 0.276 | 0.183 |
| 0.313 | 0.010 |
| 0.242 | 0.128 |
| 0.465 | 0.203 |
| 0.264 | 0.148 |
| 1.000 | 0.140 |
| 0.140 | 1.000 |

```
RELIABILITY
  /VARIABLES=q1 q6 q11 q16 q21 q28 q33 q38 q43 q48 q55 q60 q65 q70
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

# Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 04-AUG-2017 08:45:01 |
| Comments | | |
| Input | Active Dataset | DataSet1 |
| | Filter | <none> |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 184 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |
| Syntax | | RELIABILITY /VARIABLES=q1 q6 q11 q16 q21 q28 q33 q38 q43 q48 q55 q60 q65 q70 /SCALE('ALL VARIABLES') ALL /MODEL=ALPHA /STATISTICS=DESCRIPTIVE SCALE CORR /SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.11 |

[DataSet1]

# Scale: ALL VARIABLES

**Case Processing Summary**

| | | N | % |
|---|---|---|---|
| Cases | Valid | 174 | 94.6 |
| | Excluded[a] | 10 | 5.4 |
| | Total | 184 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

## Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.797 | 0.802 | 14 |

## Item Statistics

| | Mean | Std. Deviation | N |
|---|---|---|---|
| q1 | 3.1839 | 1.20719 | 174 |
| q6 | 4.3563 | 0.89284 | 174 |
| q11 | 4.3851 | 0.92867 | 174 |
| q16 | 3.7011 | 1.18385 | 174 |
| q21 | 4.1437 | 0.98371 | 174 |
| q28 | 4.4195 | 0.71472 | 174 |
| q33 | 4.1954 | 0.91030 | 174 |
| q38 | 3.8908 | 1.19953 | 174 |
| q43 | 2.5287 | 1.23849 | 174 |
| q48 | 3.3103 | 1.37954 | 174 |
| q55 | 3.7471 | 1.14011 | 174 |
| q60 | 3.6207 | 1.18020 | 174 |
| q65 | 3.6494 | 1.16206 | 174 |
| q70 | 3.8448 | 1.00522 | 174 |

| | q1 | q6 | q11 |
|---|---|---|---|
| q1 | 1.000 | 0.357 | 0.158 |
| q6 | 0.357 | 1.000 | 0.112 |
| q11 | 0.158 | 0.112 | 1.000 |
| q16 | 0.431 | 0.293 | 0.179 |
| q21 | 0.090 | 0.099 | 0.110 |
| q28 | 0.238 | 0.154 | 0.260 |
| q33 | 0.288 | 0.248 | 0.355 |
| q38 | 0.289 | 0.263 | 0.458 |
| q43 | 0.406 | 0.132 | 0.103 |
| q48 | 0.389 | 0.196 | 0.204 |
| q55 | 0.227 | 0.214 | 0.327 |

| | | | |
|---|---|---|---|
| q60 | 0.171 | 0.156 | 0.118 |
| q65 | 0.285 | 0.099 | 0.190 |
| q70 | 0.167 | 0.268 | 0.102 |

**Summary Item Statistics**

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 3.784 | 2.529 | 4.420 |
| Inter-Item Correlations | 0.225 | 0.015 | 0.480 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| q1 | 49.7931 | 53.749 | 0.524 |
| q6 | 48.6207 | 58.549 | 0.376 |
| q11 | 48.5920 | 58.208 | 0.382 |
| q16 | 49.2759 | 54.374 | 0.499 |
| q21 | 48.8333 | 58.683 | 0.321 |
| q28 | 48.5575 | 59.080 | 0.445 |
| q33 | 48.7816 | 56.484 | 0.524 |
| q38 | 49.0862 | 54.091 | 0.508 |
| q43 | 50.4483 | 56.376 | 0.354 |
| q48 | 49.6667 | 53.796 | 0.434 |
| q55 | 49.2299 | 54.548 | 0.513 |
| q60 | 49.3563 | 57.768 | 0.297 |
| q65 | 49.3276 | 57.447 | 0.323 |
| q70 | 49.1322 | 57.422 | 0.397 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 52.9770 | 64.485 | 8.03026 | 14 |

**Inter-Item Correlation Matrix**

| q16 | q21 | q28 | q33 | q38 | q43 | q48 | q55 |
|---|---|---|---|---|---|---|---|
| 0.431 | 0.090 | 0.238 | 0.288 | 0.289 | 0.406 | 0.389 | 0.227 |
| 0.293 | 0.099 | 0.154 | 0.248 | 0.263 | 0.132 | 0.196 | 0.214 |
| 0.179 | 0.110 | 0.260 | 0.355 | 0.458 | 0.103 | 0.204 | 0.327 |
| 1.000 | 0.201 | 0.333 | 0.339 | 0.217 | 0.313 | 0.354 | 0.291 |
| 0.201 | 1.000 | 0.136 | 0.162 | 0.141 | 0.032 | 0.227 | 0.404 |
| 0.333 | 0.136 | 1.000 | 0.175 | 0.269 | 0.212 | 0.195 | 0.365 |
| 0.339 | 0.162 | 0.175 | 1.000 | 0.480 | 0.282 | 0.264 | 0.310 |
| 0.217 | 0.141 | 0.269 | 0.480 | 1.000 | 0.253 | 0.297 | 0.271 |
| 0.313 | 0.032 | 0.212 | 0.282 | 0.253 | 1.000 | 0.303 | 0.148 |
| 0.354 | 0.227 | 0.195 | 0.264 | 0.297 | 0.303 | 1.000 | 0.205 |
| 0.291 | 0.404 | 0.365 | 0.310 | 0.271 | 0.148 | 0.205 | 1.000 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.071 | 0.132 | 0.251 | 0.274 | 0.150 | 0.015 | 0.112 | 0.328 |
| 0.176 | 0.186 | 0.143 | 0.163 | 0.167 | 0.085 | 0.115 | 0.260 |
| 0.228 | 0.321 | 0.333 | 0.198 | 0.293 | 0.131 | 0.097 | 0.253 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 1.891 | 1.748 | 0.278 | 14 |
| 0.465 | 31.163 | 0.009 | 14 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.397 | 0.775 |
| 0.219 | 0.788 |
| 0.300 | 0.788 |
| 0.350 | 0.777 |
| 0.262 | 0.792 |
| 0.291 | 0.785 |
| 0.370 | 0.778 |
| 0.404 | 0.777 |
| 0.254 | 0.791 |
| 0.269 | 0.784 |
| 0.376 | 0.776 |
| 0.210 | 0.795 |
| 0.165 | 0.793 |
| 0.289 | 0.786 |

| q60 | q65 | q70 |
|---|---|---|
| 0.171 | 0.285 | 0.167 |
| 0.156 | 0.099 | 0.268 |
| 0.118 | 0.190 | 0.102 |
| 0.071 | 0.176 | 0.228 |
| 0.132 | 0.186 | 0.321 |
| 0.251 | 0.143 | 0.333 |
| 0.274 | 0.163 | 0.198 |
| 0.150 | 0.167 | 0.293 |
| 0.015 | 0.085 | 0.131 |
| 0.112 | 0.115 | 0.097 |
| 0.328 | 0.260 | 0.253 |

| | | |
|---|---|---|
| 1.000 | 0.172 | 0.228 |
| 0.172 | 1.000 | 0.230 |
| 0.228 | 0.230 | 1.000 |

```
RELIABILITY
  /VARIABLES=Q1_2 Q6_2 Q11_2 Q16_2 Q21_2 Q28_2 Q33_2 Q38_2 Q43_2 Q48_2 Q55_
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

# Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 15-AUG-2017 09:50:56 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\PRE_POST_2016 (Fixed).sav |
| | Active Dataset | DataSet1 |
| | Filter | GRADE = 3 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 98 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |
| Syntax | | RELIABILITY /VARIABLES=Q1_2 Q6_2 Q11_2 Q16_2 Q21_2 Q28_2 Q33_2 Q38_2 Q43_2 Q48_2 Q55_2 Q60_2 Q65_2 Q70_2 /SCALE('ALL VARIABLES') ALL /MODEL=ALPHA /STATISTICS=DESCRIPTIVE SCALE CORR /SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.01 |

## Scale: ALL VARIABLES

### Case Processing Summary

| | | N | % |
|---|---|---|---|
| Cases | Valid | 90 | 91.8 |
| | Excluded[a] | 8 | 8.2 |
| | Total | 98 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.837 | 0.840 | 14 |

### Item Statistics

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q1_2 | 3.59 | 1.090 | 90 |
| Q6_2 | 4.26 | 0.868 | 90 |
| Q11_2 | 4.03 | 1.126 | 90 |
| Q16_2 | 3.51 | 1.084 | 90 |
| Q21_2 | 3.97 | 1.022 | 90 |
| Q28_2 | 4.24 | 0.812 | 90 |
| Q33_2 | 4.08 | 1.041 | 90 |
| Q38_2 | 3.78 | 1.099 | 90 |
| Q43_2 | 2.61 | 1.224 | 90 |
| Q48_2 | 3.10 | 1.299 | 90 |
| Q55_2 | 3.49 | 1.084 | 90 |
| Q60_2 | 3.31 | 1.278 | 90 |
| Q65_2 | 3.60 | 1.089 | 90 |
| Q70_2 | 3.81 | 1.016 | 90 |

| | Q1_2 | Q6_2 | Q11_2 |
|---|---|---|---|
| Q1_2 | 1.000 | 0.397 | 0.075 |
| Q6_2 | 0.397 | 1.000 | 0.037 |
| Q11_2 | 0.075 | 0.037 | 1.000 |
| Q16_2 | 0.503 | 0.134 | 0.327 |
| Q21_2 | 0.351 | 0.250 | 0.108 |
| Q28_2 | 0.128 | 0.054 | 0.409 |
| Q33_2 | 0.375 | 0.288 | 0.410 |
| Q38_2 | 0.326 | 0.260 | 0.369 |

| | | | |
|---|---|---|---|
| Q43_2 | 0.359 | 0.221 | 0.018 |
| Q48_2 | 0.553 | 0.266 | 0.044 |
| Q55_2 | 0.334 | 0.164 | 0.051 |
| Q60_2 | 0.270 | 0.100 | 0.227 |
| Q65_2 | 0.163 | 0.109 | -0.026 |
| Q70_2 | 0.396 | 0.285 | 0.163 |

**Summary Item Statistics**

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 3.670 | 2.611 | 4.256 |
| Inter-Item Correlations | 0.272 | -0.026 | 0.614 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q1_2 | 47.79 | 63.270 | 0.582 |
| Q6_2 | 47.12 | 68.873 | 0.342 |
| Q11_2 | 47.34 | 68.094 | 0.279 |
| Q16_2 | 47.87 | 63.151 | 0.594 |
| Q21_2 | 47.41 | 65.054 | 0.513 |
| Q28_2 | 47.13 | 68.117 | 0.431 |
| Q33_2 | 47.30 | 62.482 | 0.668 |
| Q38_2 | 47.60 | 63.321 | 0.573 |
| Q43_2 | 48.77 | 65.012 | 0.407 |
| Q48_2 | 48.28 | 63.259 | 0.465 |
| Q55_2 | 47.89 | 65.336 | 0.459 |
| Q60_2 | 48.07 | 62.962 | 0.491 |
| Q65_2 | 47.78 | 68.355 | 0.278 |
| Q70_2 | 47.57 | 63.934 | 0.590 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 51.38 | 74.552 | 8.634 | 14 |

```
RELIABILITY
  /VARIABLES=Q2_2 Q7_2 Q12_2 Q17_2 Q22_2 Q29_2 Q34_2 Q39_2 Q44_2 Q49_2 Q56_
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORRS
  /SUMMARY=TOTAL MEANS CORR.
```

## Reliability

### Notes

| | | |
|---|---|---|
| Output Created | | 15-AUG-2017 09:50:56 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\PRE_POST_2016 (Fixed).sav |
| | Active Dataset | DataSet1 |
| | Filter | GRADE = 3 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 98 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |
| Syntax | | RELIABILITY /VARIABLES=Q2_2 Q7_2 Q12_2 Q17_2 Q22_2 Q29_2 Q34_2 Q39_2 Q44_2 Q49_2 Q56_2 Q61_2 Q66_2 Q71_2 /SCALE('ALL VARIABLES') ALL /MODEL=ALPHA<br><br>/STATISTICS=DESCRIPTIVE SCALE CORRS /SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.00 |
| | Elapsed Time | 00:00:00.01 |

## Scale: ALL VARIABLES

### Case Processing Summary

| | | N | % |
|---|---|---|---|
| Cases | Valid | 91 | 92.9 |
| | Excluded[a] | 7 | 7.1 |
| | Total | 98 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

**Reliability Statistics**

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.814 | 0.822 | 14 |

**Item Statistics**

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q2_2 | 4.02 | 1.054 | 91 |
| Q7_2 | 4.54 | 0.807 | 91 |
| Q12_2 | 4.11 | 1.005 | 91 |
| Q17_2 | 3.62 | 1.052 | 91 |
| Q22_2 | 4.64 | 0.782 | 91 |
| Q29_2 | 3.97 | 1.251 | 91 |
| Q34_2 | 3.44 | 1.231 | 91 |
| Q39_2 | 3.96 | 1.053 | 91 |
| Q44_2 | 4.59 | 0.699 | 91 |
| Q49_2 | 4.84 | 0.429 | 91 |
| Q56_2 | 4.43 | 1.056 | 91 |
| Q61_2 | 3.60 | 0.965 | 91 |
| Q66_2 | 4.46 | 0.958 | 91 |
| Q71_2 | 3.78 | 1.562 | 91 |

| | Q2_2 | Q7_2 | Q12_2 |
|---|---|---|---|
| Q2_2 | 1.000 | 0.509 | 0.470 |
| Q7_2 | 0.509 | 1.000 | 0.433 |
| Q12_2 | 0.470 | 0.433 | 1.000 |
| Q17_2 | 0.268 | 0.155 | 0.051 |
| Q22_2 | 0.468 | 0.524 | 0.320 |
| Q29_2 | 0.557 | 0.425 | 0.462 |
| Q34_2 | 0.361 | 0.151 | 0.086 |
| Q39_2 | 0.411 | 0.329 | 0.372 |
| Q44_2 | 0.193 | 0.176 | 0.064 |
| Q49_2 | 0.205 | 0.292 | -0.035 |
| Q56_2 | 0.181 | 0.326 | -0.003 |
| Q61_2 | 0.304 | 0.319 | 0.137 |
| Q66_2 | 0.331 | 0.350 | 0.328 |
| Q71_2 | 0.212 | 0.121 | 0.136 |

**Summary Item Statistics**

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 4.142 | 3.440 | 4.835 |
| Inter-Item Correlations | 0.248 | -0.075 | 0.567 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q2_2 | 53.97 | 49.854 | 0.632 |
| Q7_2 | 53.45 | 53.206 | 0.553 |
| Q12_2 | 53.88 | 53.507 | 0.398 |
| Q17_2 | 54.37 | 54.592 | 0.300 |
| Q22_2 | 53.35 | 52.564 | 0.634 |
| Q29_2 | 54.02 | 46.688 | 0.708 |
| Q34_2 | 54.55 | 50.828 | 0.457 |
| Q39_2 | 54.03 | 51.188 | 0.535 |
| Q44_2 | 53.40 | 56.664 | 0.305 |
| Q49_2 | 53.15 | 58.465 | 0.262 |
| Q56_2 | 53.56 | 54.627 | 0.296 |
| Q61_2 | 54.38 | 52.484 | 0.497 |
| Q66_2 | 53.53 | 54.341 | 0.362 |
| Q71_2 | 54.21 | 50.145 | 0.352 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 57.99 | 60.367 | 7.770 | 14 |

```
RELIABILITY
  /VARIABLES=Q3_2 Q8_2 Q13_2 Q18_2 Q23_2 Q27_2 Q30_2 Q35_2 Q40_2 Q45_2 Q50_
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

# Reliability

**Notes**

| | |
|---|---|
| Output Created | 15-AUG-2017 09:50:56 |
| Comments | |

| | | |
|---|---|---|
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\PRE_POST_2016 (Fixed).sav |
| | Active Dataset | DataSet1 |
| | Filter | GRADE = 3 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 98 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |
| Syntax | | RELIABILITY /VARIABLES=Q3_2 Q8_2 Q13_2 Q18_2 Q23_2 Q27_2 Q30_2 Q35_2 Q40_2 Q45_2 Q50_2 Q54_2 Q57_2 Q62_2 Q67_2 Q72_2 Q74_2 /SCALE('ALL VARIABLES') ALL /MODEL=ALPHA<br><br>/STATISTICS=DESCRIPTIVE SCALE CORR /SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.01 |

## Scale: ALL VARIABLES

### Case Processing Summary

| | | N | % |
|---|---|---|---|
| Cases | Valid | 90 | 91.8 |
| | Excluded[a] | 8 | 8.2 |
| | Total | 98 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.861 | 0.866 | 17 |

**Item Statistics**

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q3_2 | 4.01 | 1.185 | 90 |
| Q8_2 | 3.19 | 1.179 | 90 |
| Q13_2 | 4.24 | 1.053 | 90 |
| Q18_2 | 4.06 | 0.987 | 90 |
| Q23_2 | 4.04 | 0.982 | 90 |
| Q27_2 | 4.24 | 0.825 | 90 |
| Q30_2 | 3.58 | 1.060 | 90 |
| Q35_2 | 4.17 | 0.997 | 90 |
| Q40_2 | 3.73 | 1.149 | 90 |
| Q45_2 | 3.42 | 1.081 | 90 |
| Q50_2 | 2.93 | 1.261 | 90 |
| Q54_2 | 3.48 | 1.073 | 90 |
| Q57_2 | 3.87 | 0.974 | 90 |
| Q62_2 | 3.20 | 1.351 | 90 |
| Q67_2 | 3.29 | 1.183 | 90 |
| Q72_2 | 3.04 | 1.289 | 90 |
| Q74_2 | 4.03 | 1.043 | 90 |

| | Q3_2 | Q8_2 | Q13_2 |
|---|---|---|---|
| Q3_2 | 1.000 | 0.183 | 0.196 |
| Q8_2 | 0.183 | 1.000 | 0.333 |
| Q13_2 | 0.196 | 0.333 | 1.000 |
| Q18_2 | 0.278 | 0.473 | 0.408 |
| Q23_2 | 0.395 | 0.303 | 0.565 |
| Q27_2 | 0.135 | 0.218 | 0.318 |
| Q30_2 | 0.210 | 0.298 | 0.386 |
| Q35_2 | 0.284 | 0.508 | 0.646 |
| Q40_2 | 0.258 | 0.419 | 0.370 |
| Q45_2 | 0.163 | 0.386 | 0.323 |
| Q50_2 | 0.083 | 0.265 | 0.122 |
| Q54_2 | -0.066 | 0.248 | 0.214 |
| Q57_2 | 0.040 | 0.355 | 0.098 |
| Q62_2 | 0.055 | 0.230 | 0.297 |
| Q67_2 | 0.206 | 0.355 | 0.204 |
| Q72_2 | 0.265 | 0.453 | 0.307 |

| | | | |
|---|---|---|---|
| Q74_2 | 0.318 | 0.351 | 0.391 |

**Summary Item Statistics**

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 3.678 | 2.933 | 4.244 |
| Inter-Item Correlations | 0.275 | -0.066 | 0.646 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q3_2 | 58.52 | 100.657 | 0.323 |
| Q8_2 | 59.34 | 94.520 | 0.603 |
| Q13_2 | 58.29 | 96.837 | 0.569 |
| Q18_2 | 58.48 | 97.376 | 0.584 |
| Q23_2 | 58.49 | 98.455 | 0.529 |
| Q27_2 | 58.29 | 100.994 | 0.486 |
| Q30_2 | 58.96 | 96.785 | 0.567 |
| Q35_2 | 58.37 | 96.909 | 0.603 |
| Q40_2 | 58.80 | 94.499 | 0.623 |
| Q45_2 | 59.11 | 97.426 | 0.522 |
| Q50_2 | 59.60 | 101.411 | 0.265 |
| Q54_2 | 59.06 | 103.491 | 0.233 |
| Q57_2 | 58.67 | 102.270 | 0.331 |
| Q62_2 | 59.33 | 98.135 | 0.365 |
| Q67_2 | 59.24 | 98.097 | 0.437 |
| Q72_2 | 59.49 | 93.623 | 0.579 |
| Q74_2 | 58.50 | 95.331 | 0.653 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 62.53 | 109.735 | 10.475 | 17 |

```
RELIABILITY
  /VARIABLES=Q4_2 Q9_2 Q14_2 Q19_2 Q24_2 Q26_2 Q31_2 Q36_2 Q41_2 Q46_2 Q51_
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

# Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 15-AUG-2017 09:50:56 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\PRE_POST_2016 (Fixed).sav |
| | Active Dataset | DataSet1 |
| | Filter | GRADE = 3 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 98 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |
| Syntax | | RELIABILITY /VARIABLES=Q4_2 Q9_2 Q14_2 Q19_2 Q24_2 Q26_2 Q31_2 Q36_2 Q41_2 Q46_2 Q51_2 Q53_2 Q58_2 Q63_2 Q68_2 Q73_2 Q75_2 Q76_2 /SCALE('ALL VARIABLES') ALL /MODEL=ALPHA<br><br>/STATISTICS=DESCRIPTIVE SCALE CORR /SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.01 |

## Scale: ALL VARIABLES

### Case Processing Summary

| | | N | % |
|---|---|---|---|
| Cases | Valid | 92 | 93.9 |
| | Excluded[a] | 6 | 6.1 |
| | Total | 98 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

## Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.777 | 0.780 | 18 |

## Item Statistics

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q4_2 | 2.73 | 1.110 | 92 |
| Q9_2 | 3.01 | 1.218 | 92 |
| Q14_2 | 3.67 | 0.772 | 92 |
| Q19_2 | 2.85 | 1.109 | 92 |
| Q24_2 | 3.23 | 1.214 | 92 |
| Q26_2 | 3.30 | 1.165 | 92 |
| Q31_2 | 3.48 | 1.084 | 92 |
| Q36_2 | 2.41 | 1.018 | 92 |
| Q41_2 | 3.30 | 1.290 | 92 |
| Q46_2 | 3.40 | 0.973 | 92 |
| Q51_2 | 3.03 | 1.094 | 92 |
| Q53_2 | 3.80 | 1.030 | 92 |
| Q58_2 | 1.59 | 0.814 | 92 |
| Q63_2 | 2.51 | 1.172 | 92 |
| Q68_2 | 3.32 | 1.342 | 92 |
| Q73_2 | 3.80 | 1.082 | 92 |
| Q75_2 | 3.20 | 1.170 | 92 |
| Q76_2 | 3.83 | 1.125 | 92 |

| | Q4_2 | Q9_2 | Q14_2 |
|---|---|---|---|
| Q4_2 | 1.000 | 0.262 | 0.408 |
| Q9_2 | 0.262 | 1.000 | 0.226 |
| Q14_2 | 0.408 | 0.226 | 1.000 |
| Q19_2 | 0.287 | 0.188 | 0.134 |
| Q24_2 | 0.014 | 0.177 | 0.045 |
| Q26_2 | 0.447 | 0.230 | 0.429 |
| Q31_2 | 0.210 | 0.038 | 0.385 |
| Q36_2 | 0.305 | 0.457 | 0.327 |
| Q41_2 | 0.120 | 0.040 | 0.046 |
| Q46_2 | 0.346 | 0.154 | 0.206 |
| Q51_2 | -0.011 | 0.090 | 0.091 |
| Q53_2 | 0.203 | 0.037 | -0.026 |
| Q58_2 | 0.130 | 0.071 | 0.063 |

| | | | |
|---|---|---|---|
| Q63_2 | 0.505 | 0.204 | 0.296 |
| Q68_2 | 0.242 | 0.132 | 0.143 |
| Q73_2 | 0.367 | 0.168 | 0.252 |
| Q75_2 | 0.219 | 0.369 | 0.291 |
| Q76_2 | 0.305 | 0.194 | 0.200 |

**Summary Item Statistics**

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 3.137 | 1.587 | 3.826 |
| Inter-Item Correlations | 0.165 | -0.248 | 0.505 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q4_2 | 53.74 | 71.250 | 0.561 |
| Q9_2 | 53.46 | 73.460 | 0.386 |
| Q14_2 | 52.79 | 76.320 | 0.451 |
| Q19_2 | 53.62 | 73.161 | 0.454 |
| Q24_2 | 53.24 | 76.514 | 0.236 |
| Q26_2 | 53.16 | 71.127 | 0.535 |
| Q31_2 | 52.99 | 79.000 | 0.147 |
| Q36_2 | 54.05 | 73.700 | 0.473 |
| Q41_2 | 53.16 | 74.138 | 0.324 |
| Q46_2 | 53.07 | 74.259 | 0.465 |
| Q51_2 | 53.43 | 75.611 | 0.325 |
| Q53_2 | 52.66 | 79.127 | 0.153 |
| Q58_2 | 54.88 | 78.546 | 0.263 |
| Q63_2 | 53.96 | 72.042 | 0.482 |
| Q68_2 | 53.15 | 72.592 | 0.376 |
| Q73_2 | 52.66 | 75.303 | 0.348 |
| Q75_2 | 53.27 | 73.475 | 0.407 |
| Q76_2 | 52.64 | 80.452 | 0.063 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 56.47 | 82.999 | 9.110 | 18 |

```
RELIABILITY
  /VARIABLES=Q5_2 Q10_2 Q15_2 Q20_2 Q25_2 Q32_2 Q37_2 Q42_2 Q47_2 Q52_2 Q5
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

# Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 15-AUG-2017 09:50:56 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\PRE_POST_2016 (Fixed).sav |
| | Active Dataset | DataSet1 |
| | Filter | GRADE = 3 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 98 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |
| Syntax | | RELIABILITY /VARIABLES=Q5_2 Q10_2 Q15_2 Q20_2 Q25_2 Q32_2 Q37_2 Q42_2 Q47_2 Q52_2 Q59_2 Q64_2 Q69_2 /SCALE('ALL VARIABLES') ALL /MODEL=ALPHA /STATISTICS=DESCRIPTIVE SCALE CORR /SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.03 |
| | Elapsed Time | 00:00:00.01 |

# Scale: ALL VARIABLES

**Case Processing Summary**

| | | N | % |
|---|---|---|---|
| Cases | Valid | 90 | 91.8 |

| | | | |
|---|---|---|---|
| | Excluded[a] | 8 | 8.2 |
| | Total | 98 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

## Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.806 | 0.832 | 13 |

## Item Statistics

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q5_2 | 4.61 | 0.760 | 90 |
| Q10_2 | 4.00 | 1.142 | 90 |
| Q15_2 | 3.84 | 1.244 | 90 |
| Q20_2 | 4.70 | 0.726 | 90 |
| Q25_2 | 3.41 | 1.315 | 90 |
| Q32_2 | 4.76 | 0.605 | 90 |
| Q37_2 | 4.82 | 0.663 | 90 |
| Q42_2 | 4.83 | 0.480 | 90 |
| Q47_2 | 4.34 | 0.850 | 90 |
| Q52_2 | 4.34 | 0.850 | 90 |
| Q59_2 | 4.24 | 1.009 | 90 |
| Q64_2 | 4.49 | 0.902 | 90 |
| Q69_2 | 4.41 | 0.947 | 90 |

**Ir**

| | Q5_2 | Q10_2 | Q15_2 |
|---|---|---|---|
| Q5_2 | 1.000 | 0.142 | 0.090 |
| Q10_2 | 0.142 | 1.000 | 0.111 |
| Q15_2 | 0.090 | 0.111 | 1.000 |
| Q20_2 | 0.295 | 0.108 | -0.002 |
| Q25_2 | 0.229 | 0.329 | -0.036 |
| Q32_2 | 0.280 | 0.244 | 0.247 |
| Q37_2 | 0.619 | 0.163 | 0.129 |
| Q42_2 | 0.313 | 0.185 | 0.182 |
| Q47_2 | 0.592 | 0.266 | 0.094 |
| Q52_2 | 0.488 | 0.382 | 0.147 |
| Q59_2 | 0.477 | 0.205 | 0.299 |
| Q64_2 | 0.379 | 0.273 | 0.319 |
| Q69_2 | 0.178 | 0.156 | 0.188 |

## Summary Item Statistics

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 4.370 | 3.411 | 4.833 |
| Inter-Item Correlations | 0.276 | -0.036 | 0.628 |

## Item-Total Statistics

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q5_2 | 52.20 | 36.813 | 0.565 |
| Q10_2 | 52.81 | 36.155 | 0.375 |
| Q15_2 | 52.97 | 37.471 | 0.235 |
| Q20_2 | 52.11 | 38.976 | 0.342 |
| Q25_2 | 53.40 | 35.097 | 0.371 |
| Q32_2 | 52.06 | 38.795 | 0.457 |
| Q37_2 | 51.99 | 37.427 | 0.584 |
| Q42_2 | 51.98 | 39.977 | 0.395 |
| Q47_2 | 52.47 | 35.555 | 0.624 |
| Q52_2 | 52.47 | 35.083 | 0.675 |
| Q59_2 | 52.57 | 34.833 | 0.567 |
| Q64_2 | 52.32 | 34.828 | 0.654 |
| Q69_2 | 52.40 | 38.535 | 0.270 |

## Scale Statistics

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 56.81 | 42.604 | 6.527 | 13 |

_2 Q60_2 Q65_2 Q70_2

**Inter-Item Correlation Matrix**

| Q16_2 | Q21_2 | Q28_2 | Q33_2 | Q38_2 | Q43_2 | Q48_2 | Q55_2 |
|---|---|---|---|---|---|---|---|
| 0.503 | 0.351 | 0.128 | 0.375 | 0.326 | 0.359 | 0.553 | 0.334 |
| 0.134 | 0.250 | 0.054 | 0.288 | 0.260 | 0.221 | 0.266 | 0.164 |
| 0.327 | 0.108 | 0.409 | 0.410 | 0.369 | 0.018 | 0.044 | 0.051 |
| 1.000 | 0.198 | 0.380 | 0.433 | 0.474 | 0.355 | 0.554 | 0.129 |
| 0.198 | 1.000 | 0.078 | 0.531 | 0.283 | 0.295 | 0.206 | 0.441 |
| 0.380 | 0.078 | 1.000 | 0.350 | 0.565 | 0.176 | 0.126 | 0.284 |
| 0.433 | 0.531 | 0.350 | 1.000 | 0.614 | 0.280 | 0.343 | 0.265 |
| 0.474 | 0.283 | 0.565 | 0.614 | 1.000 | 0.244 | 0.307 | 0.168 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.355 | 0.295 | 0.176 | 0.280 | 0.244 | 1.000 | 0.208 | 0.162 |
| 0.554 | 0.206 | 0.126 | 0.343 | 0.307 | 0.208 | 1.000 | 0.268 |
| 0.129 | 0.441 | 0.284 | 0.265 | 0.168 | 0.162 | 0.268 | 1.000 |
| 0.314 | 0.352 | 0.164 | 0.379 | 0.234 | 0.337 | 0.225 | 0.465 |
| 0.051 | 0.361 | 0.175 | 0.186 | 0.103 | 0.059 | 0.084 | 0.367 |
| 0.446 | 0.319 | 0.343 | 0.418 | 0.365 | 0.347 | 0.279 | 0.320 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 1.644 | 1.630 | 0.210 | 14 |
| 0.640 | -23.950 | 0.019 | 14 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.498 | 0.820 |
| 0.248 | 0.834 |
| 0.347 | 0.840 |
| 0.582 | 0.819 |
| 0.475 | 0.824 |
| 0.512 | 0.830 |
| 0.590 | 0.814 |
| 0.558 | 0.820 |
| 0.296 | 0.832 |
| 0.467 | 0.828 |
| 0.473 | 0.828 |
| 0.383 | 0.826 |
| 0.264 | 0.839 |
| 0.407 | 0.820 |

_2 Q61_2 Q66_2 Q71_2

**Inter-Item Correlation Matrix**

| Q17_2 | Q22_2 | Q29_2 | Q34_2 | Q39_2 | Q44_2 | Q49_2 | Q56_2 |
|---|---|---|---|---|---|---|---|
| 0.268 | 0.468 | 0.557 | 0.361 | 0.411 | 0.193 | 0.205 | 0.181 |
| 0.155 | 0.524 | 0.425 | 0.151 | 0.329 | 0.176 | 0.292 | 0.326 |
| 0.051 | 0.320 | 0.462 | 0.086 | 0.372 | 0.064 | -0.035 | -0.003 |
| 1.000 | 0.207 | 0.311 | 0.286 | 0.125 | -0.019 | 0.277 | 0.200 |
| 0.207 | 1.000 | 0.567 | 0.283 | 0.304 | 0.235 | 0.184 | 0.325 |
| 0.311 | 0.567 | 1.000 | 0.341 | 0.412 | 0.162 | 0.156 | 0.238 |
| 0.286 | 0.283 | 0.341 | 1.000 | 0.418 | 0.236 | 0.181 | 0.059 |
| 0.125 | 0.304 | 0.412 | 0.418 | 1.000 | 0.262 | 0.255 | 0.107 |
| -0.019 | 0.235 | 0.162 | 0.236 | 0.262 | 1.000 | 0.108 | 0.118 |
| 0.277 | 0.184 | 0.156 | 0.181 | 0.255 | 0.108 | 1.000 | 0.305 |
| 0.200 | 0.325 | 0.238 | 0.059 | 0.107 | 0.118 | 0.305 | 1.000 |
| 0.286 | 0.426 | 0.440 | 0.373 | 0.278 | 0.369 | 0.109 | 0.310 |
| -0.075 | 0.300 | 0.411 | 0.184 | 0.197 | 0.167 | -0.056 | 0.121 |
| 0.131 | 0.307 | 0.366 | 0.282 | 0.318 | 0.172 | 0.012 | 0.105 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 1.396 | 1.406 | 0.196 | 14 |
| 0.642 | -7.508 | 0.020 | 14 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.483 | 0.787 |
| 0.486 | 0.796 |
| 0.425 | 0.805 |
| 0.272 | 0.812 |
| 0.474 | 0.792 |
| 0.582 | 0.777 |
| 0.362 | 0.801 |
| 0.394 | 0.795 |
| 0.221 | 0.811 |
| 0.287 | 0.813 |
| 0.258 | 0.813 |
| 0.425 | 0.798 |
| 0.307 | 0.807 |
| 0.240 | 0.817 |

_2 Q54_2 Q57_2 Q62_2 Q67_2 Q72_2 Q74_2

**Inter-Item Correlation Matrix**

| Q18_2 | Q23_2 | Q27_2 | Q30_2 | Q35_2 | Q40_2 | Q45_2 | Q50_2 |
|---|---|---|---|---|---|---|---|
| 0.278 | 0.395 | 0.135 | 0.210 | 0.284 | 0.258 | 0.163 | 0.083 |
| 0.473 | 0.303 | 0.218 | 0.298 | 0.508 | 0.419 | 0.386 | 0.265 |
| 0.408 | 0.565 | 0.318 | 0.386 | 0.646 | 0.370 | 0.323 | 0.122 |
| 1.000 | 0.368 | 0.328 | 0.356 | 0.401 | 0.350 | 0.367 | 0.310 |
| 0.368 | 1.000 | 0.319 | 0.267 | 0.497 | 0.369 | 0.353 | 0.166 |
| 0.328 | 0.319 | 1.000 | 0.479 | 0.250 | 0.425 | 0.223 | 0.178 |
| 0.356 | 0.267 | 0.479 | 1.000 | 0.280 | 0.368 | 0.383 | 0.214 |
| 0.401 | 0.497 | 0.250 | 0.280 | 1.000 | 0.343 | 0.372 | 0.205 |
| 0.350 | 0.369 | 0.425 | 0.368 | 0.343 | 1.000 | 0.372 | 0.135 |
| 0.367 | 0.353 | 0.223 | 0.383 | 0.372 | 0.372 | 1.000 | 0.210 |
| 0.310 | 0.166 | 0.178 | 0.214 | 0.205 | 0.135 | 0.210 | 1.000 |
| 0.144 | 0.022 | 0.209 | 0.160 | 0.145 | 0.168 | 0.095 | 0.082 |
| 0.253 | 0.089 | 0.027 | 0.315 | 0.208 | 0.199 | 0.225 | 0.075 |
| 0.236 | 0.180 | 0.379 | 0.177 | 0.350 | 0.245 | 0.126 | -0.025 |
| 0.207 | 0.153 | 0.192 | 0.340 | 0.225 | 0.462 | 0.211 | -0.017 |
| 0.360 | 0.371 | 0.317 | 0.442 | 0.318 | 0.478 | 0.454 | 0.327 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.402 | 0.382 | 0.369 | 0.470 | 0.351 | 0.607 | 0.456 | 0.164 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 1.311 | 1.447 | 0.195 | 17 |
| 0.712 | -9.773 | 0.018 | 17 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.284 | 0.861 |
| 0.497 | 0.848 |
| 0.583 | 0.850 |
| 0.399 | 0.850 |
| 0.476 | 0.852 |
| 0.437 | 0.854 |
| 0.481 | 0.850 |
| 0.578 | 0.849 |
| 0.554 | 0.847 |
| 0.366 | 0.852 |
| 0.208 | 0.865 |
| 0.193 | 0.864 |
| 0.395 | 0.860 |
| 0.384 | 0.860 |
| 0.433 | 0.856 |
| 0.450 | 0.849 |
| 0.584 | 0.846 |

_2 Q53_2 Q58_2 Q63_2 Q68_2 Q73_2 Q75_2 Q76_2

**Inter-Item Correlation Matrix**

| Q19_2 | Q24_2 | Q26_2 | Q31_2 | Q36_2 | Q41_2 | Q46_2 | Q51_2 |
|---|---|---|---|---|---|---|---|
| 0.287 | 0.014 | 0.447 | 0.210 | 0.305 | 0.120 | 0.346 | -0.011 |
| 0.188 | 0.177 | 0.230 | 0.038 | 0.457 | 0.040 | 0.154 | 0.090 |
| 0.134 | 0.045 | 0.429 | 0.385 | 0.327 | 0.046 | 0.206 | 0.091 |
| 1.000 | 0.238 | 0.172 | 0.006 | 0.280 | 0.217 | 0.312 | 0.294 |
| 0.238 | 1.000 | 0.160 | -0.134 | 0.163 | 0.194 | 0.331 | 0.143 |
| 0.172 | 0.160 | 1.000 | 0.145 | 0.264 | 0.340 | 0.250 | 0.156 |
| 0.006 | -0.134 | 0.145 | 1.000 | 0.148 | -0.027 | 0.003 | 0.061 |
| 0.280 | 0.163 | 0.264 | 0.148 | 1.000 | 0.104 | 0.052 | 0.086 |
| 0.217 | 0.194 | 0.340 | -0.027 | 0.104 | 1.000 | 0.383 | 0.328 |
| 0.312 | 0.331 | 0.250 | 0.003 | 0.052 | 0.383 | 1.000 | 0.184 |
| 0.294 | 0.143 | 0.156 | 0.061 | 0.086 | 0.328 | 0.184 | 1.000 |
| 0.051 | -0.043 | 0.096 | -0.053 | 0.057 | 0.153 | 0.123 | 0.103 |
| 0.173 | 0.219 | 0.180 | -0.060 | 0.115 | 0.100 | 0.254 | 0.361 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.272 | 0.087 | 0.432 | 0.177 | 0.374 | 0.136 | 0.309 | 0.253 |
| 0.321 | 0.077 | 0.212 | 0.069 | 0.217 | 0.211 | 0.121 | 0.255 |
| 0.167 | 0.143 | 0.170 | 0.109 | 0.124 | 0.059 | 0.295 | 0.108 |
| 0.311 | 0.177 | 0.311 | 0.047 | 0.347 | 0.164 | 0.316 | 0.184 |
| 0.049 | -0.091 | 0.141 | 0.141 | 0.207 | -0.039 | -0.056 | -0.129 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 2.239 | 2.411 | 0.326 | 18 |
| 0.753 | -2.036 | 0.018 | 18 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.592 | 0.751 |
| 0.310 | 0.764 |
| 0.403 | 0.763 |
| 0.319 | 0.759 |
| 0.246 | 0.776 |
| 0.444 | 0.753 |
| 0.203 | 0.781 |
| 0.441 | 0.759 |
| 0.360 | 0.770 |
| 0.452 | 0.760 |
| 0.367 | 0.769 |
| 0.309 | 0.780 |
| 0.285 | 0.773 |
| 0.546 | 0.757 |
| 0.263 | 0.765 |
| 0.333 | 0.767 |
| 0.391 | 0.763 |
| 0.429 | 0.787 |

ϑ_2 Q64_2 Q69_2

**ıter-Item Correlation Matrix**

| Q20_2 | Q25_2 | Q32_2 | Q37_2 | Q42_2 | Q47_2 | Q52_2 | Q59_2 |
|---|---|---|---|---|---|---|---|
| 0.295 | 0.229 | 0.280 | 0.619 | 0.313 | 0.592 | 0.488 | 0.477 |
| 0.108 | 0.329 | 0.244 | 0.163 | 0.185 | 0.266 | 0.382 | 0.205 |
| -0.002 | -0.036 | 0.247 | 0.129 | 0.182 | 0.094 | 0.147 | 0.299 |
| 1.000 | 0.284 | 0.061 | 0.331 | 0.210 | 0.224 | 0.406 | 0.301 |
| 0.284 | 1.000 | 0.283 | 0.149 | 0.128 | 0.254 | 0.495 | 0.262 |
| 0.061 | 0.283 | 1.000 | 0.114 | 0.516 | 0.340 | 0.296 | 0.320 |
| 0.331 | 0.149 | 0.114 | 1.000 | 0.224 | 0.628 | 0.548 | 0.469 |
| 0.210 | 0.128 | 0.516 | 0.224 | 1.000 | 0.252 | 0.252 | 0.108 |
| 0.224 | 0.254 | 0.340 | 0.628 | 0.252 | 1.000 | 0.565 | 0.490 |
| 0.406 | 0.495 | 0.296 | 0.548 | 0.252 | 0.565 | 1.000 | 0.359 |
| 0.301 | 0.262 | 0.320 | 0.469 | 0.108 | 0.490 | 0.359 | 1.000 |
| 0.226 | 0.293 | 0.345 | 0.503 | 0.502 | 0.408 | 0.496 | 0.398 |
| 0.018 | -0.011 | 0.138 | 0.225 | 0.054 | 0.283 | 0.115 | 0.188 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 1.422 | 1.417 | 0.175 | 13 |
| 0.664 | -17.430 | 0.024 | 13 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.515 | 0.785 |
| 0.219 | 0.801 |
| 0.226 | 0.819 |
| 0.281 | 0.801 |
| 0.375 | 0.806 |
| 0.447 | 0.795 |
| 0.613 | 0.786 |
| 0.506 | 0.800 |
| 0.577 | 0.779 |
| 0.601 | 0.775 |
| 0.474 | 0.782 |
| 0.586 | 0.775 |
| 0.255 | 0.808 |

| Q60_2 | Q65_2 | Q70_2 |
|---|---|---|
| 0.270 | 0.163 | 0.396 |
| 0.100 | 0.109 | 0.285 |
| 0.227 | -0.026 | 0.163 |
| 0.314 | 0.051 | 0.446 |
| 0.352 | 0.361 | 0.319 |
| 0.164 | 0.175 | 0.343 |
| 0.379 | 0.186 | 0.418 |
| 0.234 | 0.103 | 0.365 |

| | | |
|---|---|---|
| 0.337 | 0.059 | 0.347 |
| 0.225 | 0.084 | 0.279 |
| 0.465 | 0.367 | 0.320 |
| 1.000 | 0.203 | 0.340 |
| 0.203 | 1.000 | 0.337 |
| 0.340 | 0.337 | 1.000 |

| Q61_2 | Q66_2 | Q71_2 |
|---|---|---|
| 0.304 | 0.331 | 0.212 |
| 0.319 | 0.350 | 0.121 |
| 0.137 | 0.328 | 0.136 |
| 0.286 | -0.075 | 0.131 |
| 0.426 | 0.300 | 0.307 |
| 0.440 | 0.411 | 0.366 |
| 0.373 | 0.184 | 0.282 |
| 0.278 | 0.197 | 0.318 |
| 0.369 | 0.167 | 0.172 |
| 0.109 | -0.056 | 0.012 |
| 0.310 | 0.121 | 0.105 |
| 1.000 | 0.128 | 0.126 |
| 0.128 | 1.000 | 0.165 |
| 0.126 | 0.165 | 1.000 |

| Q54_2 | Q57_2 | Q62_2 | Q67_2 | Q72_2 | Q74_2 |
|---|---|---|---|---|---|
| -0.066 | 0.040 | 0.055 | 0.206 | 0.265 | 0.318 |
| 0.248 | 0.355 | 0.230 | 0.355 | 0.453 | 0.351 |
| 0.214 | 0.098 | 0.297 | 0.204 | 0.307 | 0.391 |
| 0.144 | 0.253 | 0.236 | 0.207 | 0.360 | 0.402 |
| 0.022 | 0.089 | 0.180 | 0.153 | 0.371 | 0.382 |
| 0.209 | 0.027 | 0.379 | 0.192 | 0.317 | 0.369 |
| 0.160 | 0.315 | 0.177 | 0.340 | 0.442 | 0.470 |
| 0.145 | 0.208 | 0.350 | 0.225 | 0.318 | 0.351 |
| 0.168 | 0.199 | 0.245 | 0.462 | 0.478 | 0.607 |
| 0.095 | 0.225 | 0.126 | 0.211 | 0.454 | 0.456 |
| 0.082 | 0.075 | -0.025 | -0.017 | 0.327 | 0.164 |
| 1.000 | 0.158 | 0.259 | 0.041 | 0.123 | 0.166 |
| 0.158 | 1.000 | 0.089 | 0.326 | 0.130 | 0.447 |
| 0.259 | 0.089 | 1.000 | 0.392 | 0.182 | 0.250 |
| 0.041 | 0.326 | 0.392 | 1.000 | 0.272 | 0.356 |
| 0.123 | 0.130 | 0.182 | 0.272 | 1.000 | 0.375 |

| | | | | | |
|---|---|---|---|---|---|
| 0.166 | 0.447 | 0.250 | 0.356 | 0.375 | 1.000 |

| Q53_2 | Q58_2 | Q63_2 | Q68_2 | Q73_2 | Q75_2 | Q76_2 |
|---|---|---|---|---|---|---|
| 0.203 | 0.130 | 0.505 | 0.242 | 0.367 | 0.219 | 0.305 |
| 0.037 | 0.071 | 0.204 | 0.132 | 0.168 | 0.369 | 0.194 |
| -0.026 | 0.063 | 0.296 | 0.143 | 0.252 | 0.291 | 0.200 |
| 0.051 | 0.173 | 0.272 | 0.321 | 0.167 | 0.311 | 0.049 |
| -0.043 | 0.219 | 0.087 | 0.077 | 0.143 | 0.177 | -0.091 |
| 0.096 | 0.180 | 0.432 | 0.212 | 0.170 | 0.311 | 0.141 |
| -0.053 | -0.060 | 0.177 | 0.069 | 0.109 | 0.047 | 0.141 |
| 0.057 | 0.115 | 0.374 | 0.217 | 0.124 | 0.347 | 0.207 |
| 0.153 | 0.100 | 0.136 | 0.211 | 0.059 | 0.164 | -0.039 |
| 0.123 | 0.254 | 0.309 | 0.121 | 0.295 | 0.316 | -0.056 |
| 0.103 | 0.361 | 0.253 | 0.255 | 0.108 | 0.184 | -0.129 |
| 1.000 | 0.034 | 0.075 | 0.204 | 0.291 | 0.123 | -0.248 |
| 0.034 | 1.000 | 0.201 | 0.171 | 0.020 | 0.224 | -0.199 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 0.075 | 0.201 | 1.000 | 0.274 | 0.071 | 0.207 | -0.099 |
| 0.204 | 0.171 | 0.274 | 1.000 | 0.225 | 0.016 | 0.066 |
| 0.291 | 0.020 | 0.071 | 0.225 | 1.000 | 0.048 | 0.152 |
| 0.123 | 0.224 | 0.207 | 0.016 | 0.048 | 1.000 | -0.091 |
| -0.248 | -0.199 | -0.099 | 0.066 | 0.152 | -0.091 | 1.000 |

| Q64_2 | Q69_2 |
|---|---|
| 0.379 | 0.178 |
| 0.273 | 0.156 |
| 0.319 | 0.188 |
| 0.226 | 0.018 |
| 0.293 | -0.011 |
| 0.345 | 0.138 |
| 0.503 | 0.225 |
| 0.502 | 0.054 |
| 0.408 | 0.283 |
| 0.496 | 0.115 |
| 0.398 | 0.188 |
| 1.000 | 0.380 |
| 0.380 | 1.000 |

```
USE ALL.
COMPUTE filter_$=(GRADE = 2).
VARIABLE LABELS filter_$ 'GRADE = 2 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
RELIABILITY
  /VARIABLES=Q1 Q6 Q11 Q16 Q21 Q28 Q33 Q38 Q43 Q48 Q55 Q60 Q65 Q70
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

## Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 15-AUG-2017 09:47:13 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\PRE_POST_2016 (Fixed).sav |
| | Active Dataset | DataSet1 |
| | Filter | GRADE = 2 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 97 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |

| | | |
|---|---|---|
| Syntax | | RELIABILITY<br>/VARIABLES=Q1 Q6 Q11 Q16 Q21 Q28 Q33 Q38 Q43 Q48 Q55 Q60 Q65 Q70<br>/SCALE('ALL VARIABLES') ALL<br>/MODEL=ALPHA<br><br>/STATISTICS=DESCRIPTIVE SCALE CORR<br>/SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.02 |

## Scale: ALL VARIABLES

### Case Processing Summary

| | | N | % |
|---|---|---|---|
| Cases | Valid | 93 | 95.9 |
| | Excluded[a] | 4 | 4.1 |
| | Total | 97 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.807 | 0.814 | 14 |

### Item Statistics

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q1 | 3.30 | 1.178 | 93 |
| Q6 | 4.48 | 0.716 | 93 |
| Q11 | 4.30 | 0.998 | 93 |
| Q16 | 3.87 | 1.086 | 93 |
| Q21 | 4.12 | 1.169 | 93 |
| Q28 | 4.23 | 0.809 | 93 |
| Q33 | 4.12 | 1.041 | 93 |
| Q38 | 3.66 | 1.323 | 93 |
| Q43 | 2.58 | 1.254 | 93 |
| Q48 | 3.37 | 1.350 | 93 |
| Q55 | 3.69 | 1.161 | 93 |

| | | | |
|---|---|---|---|
| Q60 | 3.40 | 1.278 | 93 |
| Q65 | 3.42 | 1.228 | 93 |
| Q70 | 3.49 | 1.299 | 93 |

| | Q1 | Q6 | Q11 |
|---|---|---|---|
| Q1 | 1.000 | 0.315 | 0.283 |
| Q6 | 0.315 | 1.000 | 0.144 |
| Q11 | 0.283 | 0.144 | 1.000 |
| Q16 | 0.447 | 0.347 | 0.307 |
| Q21 | 0.227 | 0.152 | 0.118 |
| Q28 | 0.373 | 0.184 | 0.575 |
| Q33 | 0.361 | 0.068 | 0.541 |
| Q38 | 0.423 | 0.155 | 0.475 |
| Q43 | 0.469 | 0.071 | 0.311 |
| Q48 | 0.183 | 0.164 | 0.151 |
| Q55 | 0.380 | 0.066 | 0.345 |
| Q60 | 0.107 | 0.239 | 0.041 |
| Q65 | -0.013 | 0.051 | -0.007 |
| Q70 | 0.264 | 0.149 | 0.127 |

**Summary Item Statistics**

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 3.716 | 2.581 | 4.484 |
| Inter-Item Correlations | 0.239 | -0.044 | 0.575 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q1 | 48.72 | 62.312 | 0.537 |
| Q6 | 47.54 | 69.664 | 0.292 |
| Q11 | 47.72 | 65.160 | 0.467 |
| Q16 | 48.15 | 63.260 | 0.535 |
| Q21 | 47.90 | 65.893 | 0.338 |
| Q28 | 47.80 | 65.317 | 0.589 |
| Q33 | 47.90 | 64.219 | 0.502 |
| Q38 | 48.37 | 61.626 | 0.496 |
| Q43 | 49.44 | 61.249 | 0.553 |
| Q48 | 48.66 | 64.902 | 0.320 |
| Q55 | 48.33 | 62.333 | 0.545 |
| Q60 | 48.62 | 67.194 | 0.231 |
| Q65 | 48.60 | 67.851 | 0.213 |
| Q70 | 48.53 | 61.600 | 0.509 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 52.02 | 73.673 | 8.583 | 14 |

```
RELIABILITY
  /VARIABLES=Q2 Q7 Q12 Q17 Q22 Q29 Q34 Q39 Q44 Q49 Q56 Q61 Q66 Q71
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

# Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 15-AUG-2017 09:47:13 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\PRE_POST_2016 (Fixed).sav |
| | Active Dataset | DataSet1 |
| | Filter | GRADE = 2 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 97 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |

| | | |
|---|---|---|
| Syntax | | RELIABILITY<br>/VARIABLES=Q2 Q7 Q12 Q17 Q22 Q29 Q34 Q39 Q44 Q49 Q56 Q61 Q66 Q71<br>/SCALE('ALL VARIABLES') ALL<br>/MODEL=ALPHA<br><br>/STATISTICS=DESCRIPTIVE SCALE CORR<br>/SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.02 |

## Scale: ALL VARIABLES

### Case Processing Summary

| | | N | % |
|---|---|---|---|
| Cases | Valid | 95 | 97.9 |
| | Excluded[a] | 2 | 2.1 |
| | Total | 97 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.824 | 0.818 | 14 |

### Item Statistics

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q2 | 3.28 | 1.389 | 95 |
| Q7 | 4.09 | 1.177 | 95 |
| Q12 | 3.53 | 1.351 | 95 |
| Q17 | 3.63 | 1.158 | 95 |
| Q22 | 4.25 | 1.185 | 95 |
| Q29 | 3.25 | 1.421 | 95 |
| Q34 | 3.25 | 1.203 | 95 |
| Q39 | 3.25 | 1.421 | 95 |
| Q44 | 4.53 | 0.897 | 95 |
| Q49 | 4.69 | 0.826 | 95 |
| Q56 | 4.26 | 1.094 | 95 |

| | | | |
|---|---|---|---|
| Q61 | 3.31 | 1.032 | 95 |
| Q66 | 4.17 | 1.068 | 95 |
| Q71 | 3.39 | 1.646 | 95 |

| | Q2 | Q7 | Q12 |
|---|---|---|---|
| Q2 | 1.000 | 0.465 | 0.367 |
| Q7 | 0.465 | 1.000 | 0.463 |
| Q12 | 0.367 | 0.463 | 1.000 |
| Q17 | 0.224 | 0.221 | 0.118 |
| Q22 | 0.408 | 0.471 | 0.381 |
| Q29 | 0.470 | 0.380 | 0.428 |
| Q34 | 0.364 | 0.329 | 0.074 |
| Q39 | 0.621 | 0.431 | 0.356 |
| Q44 | 0.152 | 0.285 | 0.243 |
| Q49 | 0.123 | 0.216 | 0.136 |
| Q56 | 0.076 | 0.154 | 0.186 |
| Q61 | 0.028 | 0.125 | 0.151 |
| Q66 | 0.261 | 0.334 | 0.211 |
| Q71 | 0.286 | 0.349 | 0.304 |

**Summary Item Statistics**

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 3.778 | 3.253 | 4.695 |
| Inter-Item Correlations | 0.243 | -0.015 | 0.621 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q2 | 49.61 | 73.964 | 0.567 |
| Q7 | 48.80 | 75.587 | 0.609 |
| Q12 | 49.37 | 76.086 | 0.489 |
| Q17 | 49.26 | 81.622 | 0.309 |
| Q22 | 48.64 | 76.594 | 0.552 |
| Q29 | 49.64 | 72.424 | 0.620 |
| Q34 | 49.64 | 79.019 | 0.420 |
| Q39 | 49.64 | 73.126 | 0.588 |
| Q44 | 48.37 | 84.108 | 0.275 |
| Q49 | 48.20 | 84.034 | 0.312 |
| Q56 | 48.63 | 82.639 | 0.282 |
| Q61 | 49.59 | 82.989 | 0.286 |
| Q66 | 48.73 | 79.967 | 0.436 |
| Q71 | 49.51 | 72.040 | 0.526 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 52.89 | 89.436 | 9.457 | 14 |

```
RELIABILITY
  /VARIABLES=Q3 Q8 Q13 Q18 Q23 Q27 Q30 Q35 Q40 Q45 Q50 Q54 Q57 Q62 Q67 Q72
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

# Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 15-AUG-2017 09:47:13 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\PRE_POST_2016 (Fixed).sav |
| | Active Dataset | DataSet1 |
| | Filter | GRADE = 2 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 97 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |

| | | |
|---|---|---|
| Syntax | | RELIABILITY<br>/VARIABLES=Q3 Q8 Q13 Q18 Q23 Q27 Q30 Q35 Q40 Q45 Q50 Q54 Q57 Q62 Q67 Q72 Q74<br>/SCALE('ALL VARIABLES') ALL<br>/MODEL=ALPHA<br><br>/STATISTICS=DESCRIPTIVE SCALE CORR<br>/SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.33 |

## Scale: ALL VARIABLES

### Case Processing Summary

| | | N | % |
|---|---|---|---|
| Cases | Valid | 90 | 92.8 |
| | Excluded[a] | 7 | 7.2 |
| | Total | 97 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.863 | 0.865 | 17 |

### Item Statistics

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q3 | 4.01 | 1.232 | 90 |
| Q8 | 3.07 | 1.356 | 90 |
| Q13 | 4.13 | 1.153 | 90 |
| Q18 | 3.96 | 1.027 | 90 |
| Q23 | 4.01 | 1.022 | 90 |
| Q27 | 4.27 | 0.946 | 90 |
| Q30 | 3.73 | 1.197 | 90 |
| Q35 | 3.97 | 1.106 | 90 |
| Q40 | 4.06 | 0.987 | 90 |
| Q45 | 3.27 | 1.100 | 90 |
| Q50 | 2.74 | 1.250 | 90 |

| | | | |
|---|---|---|---|
| Q54 | 3.61 | 1.109 | 90 |
| Q57 | 3.67 | 1.209 | 90 |
| Q62 | 3.21 | 1.302 | 90 |
| Q67 | 2.83 | 1.376 | 90 |
| Q72 | 2.98 | 1.324 | 90 |
| Q74 | 3.90 | 1.071 | 90 |

| | Q3 | Q8 | Q13 |
|---|---|---|---|
| Q3 | 1.000 | 0.289 | 0.497 |
| Q8 | 0.289 | 1.000 | 0.318 |
| Q13 | 0.497 | 0.318 | 1.000 |
| Q18 | 0.223 | 0.406 | 0.280 |
| Q23 | 0.553 | 0.243 | 0.389 |
| Q27 | 0.306 | 0.310 | 0.358 |
| Q30 | 0.314 | 0.350 | 0.335 |
| Q35 | 0.371 | 0.354 | 0.717 |
| Q40 | 0.425 | 0.409 | 0.319 |
| Q45 | 0.189 | 0.274 | 0.167 |
| Q50 | 0.133 | 0.229 | 0.094 |
| Q54 | 0.085 | 0.361 | 0.234 |
| Q57 | 0.161 | 0.315 | 0.298 |
| Q62 | 0.167 | 0.393 | 0.146 |
| Q67 | 0.386 | 0.428 | 0.460 |
| Q72 | 0.221 | 0.283 | 0.201 |
| Q74 | 0.222 | 0.314 | 0.275 |

**Summary Item Statistics**

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 3.612 | 2.744 | 4.267 |
| Inter-Item Correlations | 0.273 | -0.011 | 0.717 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q3 | 57.40 | 109.321 | 0.497 |
| Q8 | 58.34 | 105.329 | 0.592 |
| Q13 | 57.28 | 108.742 | 0.564 |
| Q18 | 57.46 | 112.813 | 0.448 |
| Q23 | 57.40 | 112.715 | 0.455 |
| Q27 | 57.14 | 113.518 | 0.458 |
| Q30 | 57.68 | 109.412 | 0.511 |
| Q35 | 57.44 | 110.272 | 0.523 |

| | | | |
|---|---|---|---|
| Q40 | 57.36 | 110.232 | 0.600 |
| Q45 | 58.14 | 113.294 | 0.390 |
| Q50 | 58.67 | 114.292 | 0.291 |
| Q54 | 57.80 | 111.712 | 0.456 |
| Q57 | 57.74 | 109.114 | 0.517 |
| Q62 | 58.20 | 110.679 | 0.411 |
| Q67 | 58.58 | 104.449 | 0.615 |
| Q72 | 58.43 | 111.642 | 0.366 |
| Q74 | 57.51 | 110.298 | 0.542 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 61.41 | 123.638 | 11.119 | 17 |

```
RELIABILITY
  /VARIABLES=Q4 Q9 Q14 Q19 Q24 Q26 Q31 Q36 Q41 Q46 Q51 Q53 Q58 Q63 Q68 Q73
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

# Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 15-AUG-2017 09:47:14 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\PRE_POST_2016 (Fixed).sav |
| | Active Dataset | DataSet1 |
| | Filter | GRADE = 2 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 97 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |

| | | |
|---|---|---|
| Syntax | | RELIABILITY<br>/VARIABLES=Q4 Q9 Q14 Q19 Q24 Q26 Q31 Q36 Q41 Q46 Q51 Q53 Q58 Q63 Q68 Q73 Q75 Q76<br>/SCALE('ALL VARIABLES') ALL<br>/MODEL=ALPHA<br><br>/STATISTICS=DESCRIPTIVE SCALE CORR<br>/SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.02 |

## Scale: ALL VARIABLES

### Case Processing Summary

| | | N | % |
|---|---|---|---|
| Cases | Valid | 82 | 84.5 |
| | Excluded[a] | 15 | 15.5 |
| | Total | 97 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.789 | 0.790 | 18 |

### Item Statistics

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q4 | 2.56 | 1.166 | 82 |
| Q9 | 3.12 | 1.409 | 82 |
| Q14 | 3.52 | 0.984 | 82 |
| Q19 | 3.00 | 1.165 | 82 |
| Q24 | 3.54 | 1.102 | 82 |
| Q26 | 3.45 | 1.198 | 82 |
| Q31 | 3.55 | 1.177 | 82 |
| Q36 | 2.62 | 1.244 | 82 |
| Q41 | 2.87 | 1.421 | 82 |
| Q46 | 3.06 | 1.137 | 82 |
| Q51 | 3.10 | 1.223 | 82 |

| | | | |
|---|---|---|---|
| Q53 | 3.71 | 1.232 | 82 |
| Q58 | 1.79 | 1.097 | 82 |
| Q63 | 2.10 | 1.118 | 82 |
| Q68 | 2.90 | 1.282 | 82 |
| Q73 | 3.77 | 1.081 | 82 |
| Q75 | 3.22 | 1.228 | 82 |
| Q76 | 3.63 | 1.139 | 82 |

| | Q4 | Q9 | Q14 |
|---|---|---|---|
| Q4 | 1.000 | 0.138 | 0.332 |
| Q9 | 0.138 | 1.000 | 0.407 |
| Q14 | 0.332 | 0.407 | 1.000 |
| Q19 | 0.327 | 0.203 | 0.334 |
| Q24 | 0.205 | 0.013 | 0.090 |
| Q26 | 0.294 | 0.216 | 0.278 |
| Q31 | 0.196 | 0.123 | 0.079 |
| Q36 | 0.420 | 0.323 | 0.366 |
| Q41 | 0.262 | 0.119 | 0.060 |
| Q46 | 0.188 | 0.242 | 0.313 |
| Q51 | 0.299 | 0.172 | 0.275 |
| Q53 | 0.056 | 0.206 | 0.077 |
| Q58 | -0.091 | -0.023 | -0.001 |
| Q63 | 0.393 | 0.180 | 0.368 |
| Q68 | 0.285 | 0.171 | 0.364 |
| Q73 | 0.173 | 0.092 | 0.023 |
| Q75 | 0.318 | 0.034 | 0.384 |
| Q76 | 0.249 | 0.190 | 0.217 |

**Summary Item Statistics**

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 3.084 | 1.793 | 3.768 |
| Inter-Item Correlations | 0.173 | -0.220 | 0.492 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q4 | 52.95 | 88.195 | 0.513 |
| Q9 | 52.39 | 89.574 | 0.346 |
| Q14 | 51.99 | 90.333 | 0.508 |
| Q19 | 52.51 | 86.747 | 0.585 |
| Q24 | 51.98 | 91.209 | 0.398 |
| Q26 | 52.06 | 89.021 | 0.457 |

| | | | |
|---|---|---|---|
| Q31 | 51.96 | 92.357 | 0.312 |
| Q36 | 52.89 | 85.753 | 0.586 |
| Q41 | 52.65 | 88.775 | 0.374 |
| Q46 | 52.45 | 88.769 | 0.501 |
| Q51 | 52.41 | 89.851 | 0.407 |
| Q53 | 51.80 | 97.171 | 0.087 |
| Q58 | 53.72 | 97.982 | 0.074 |
| Q63 | 53.41 | 91.702 | 0.366 |
| Q68 | 52.61 | 88.908 | 0.424 |
| Q73 | 51.74 | 95.897 | 0.176 |
| Q75 | 52.29 | 88.728 | 0.457 |
| Q76 | 51.88 | 97.417 | 0.093 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 55.51 | 100.796 | 10.040 | 18 |

```
RELIABILITY
  /VARIABLES=Q5 Q10 Q15 Q20 Q25 Q32 Q37 Q42 Q47 Q52 Q59 Q64 Q69
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

# Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 15-AUG-2017 09:47:14 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\PRE_POST_2016 (Fixed).sav |
| | Active Dataset | DataSet1 |
| | Filter | GRADE = 2 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 97 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |

| | | |
|---|---|---|
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |
| Syntax | | RELIABILITY<br>/VARIABLES=Q5 Q10 Q15 Q20 Q25 Q32 Q37 Q42 Q47 Q52 Q59 Q64 Q69<br>/SCALE('ALL VARIABLES') ALL<br>/MODEL=ALPHA<br><br>/STATISTICS=DESCRIPTIVE SCALE CORR<br>/SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.00 |
| | Elapsed Time | 00:00:00.01 |

## Scale: ALL VARIABLES

### Case Processing Summary

| | | N | % |
|---|---|---|---|
| Cases | Valid | 93 | 95.9 |
| | Excluded[a] | 4 | 4.1 |
| | Total | 97 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.762 | 0.762 | 13 |

### Item Statistics

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q5 | 4.15 | 1.042 | 93 |
| Q10 | 3.91 | 1.186 | 93 |
| Q15 | 3.24 | 1.455 | 93 |
| Q20 | 4.25 | 0.996 | 93 |
| Q25 | 2.96 | 1.293 | 93 |
| Q32 | 4.68 | 0.740 | 93 |
| Q37 | 4.61 | 0.676 | 93 |

| | | | |
|---|---|---|---|
| Q42 | 4.67 | 0.712 | 93 |
| Q47 | 3.98 | 1.161 | 93 |
| Q52 | 3.59 | 1.262 | 93 |
| Q59 | 3.96 | 1.141 | 93 |
| Q64 | 4.30 | 1.040 | 93 |
| Q69 | 4.25 | 1.028 | 93 |

**Ir**

| | Q5 | Q10 | Q15 |
|---|---|---|---|
| Q5 | 1.000 | 0.283 | 0.220 |
| Q10 | 0.283 | 1.000 | -0.013 |
| Q15 | 0.220 | -0.013 | 1.000 |
| Q20 | 0.205 | 0.359 | 0.327 |
| Q25 | 0.142 | 0.366 | 0.364 |
| Q32 | 0.177 | 0.030 | 0.314 |
| Q37 | 0.207 | 0.053 | 0.326 |
| Q42 | 0.024 | 0.146 | 0.192 |
| Q47 | 0.389 | 0.109 | 0.434 |
| Q52 | 0.254 | 0.042 | 0.444 |
| Q59 | 0.234 | 0.029 | 0.248 |
| Q64 | 0.048 | 0.118 | 0.419 |
| Q69 | 0.036 | 0.009 | 0.287 |

**Summary Item Statistics**

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 4.041 | 2.957 | 4.677 |
| Inter-Item Correlations | 0.197 | -0.017 | 0.548 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q5 | 48.39 | 44.914 | 0.367 |
| Q10 | 48.62 | 45.889 | 0.238 |
| Q15 | 49.30 | 38.300 | 0.594 |
| Q20 | 48.29 | 44.013 | 0.463 |
| Q25 | 49.58 | 41.746 | 0.461 |
| Q32 | 47.86 | 47.904 | 0.261 |
| Q37 | 47.92 | 47.201 | 0.373 |
| Q42 | 47.87 | 47.092 | 0.360 |
| Q47 | 48.56 | 43.249 | 0.427 |
| Q52 | 48.95 | 41.943 | 0.464 |
| Q59 | 48.58 | 44.246 | 0.367 |
| Q64 | 48.24 | 44.313 | 0.413 |

| | | | |
|---|---|---|---|
| Q69 | 48.29 | 46.687 | 0.240 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 52.54 | 51.121 | 7.150 | 13 |

**Inter-Item Correlation Matrix**

| Q16 | Q21 | Q28 | Q33 | Q38 | Q43 | Q48 | Q55 |
|---|---|---|---|---|---|---|---|
| 0.447 | 0.227 | 0.373 | 0.361 | 0.423 | 0.469 | 0.183 | 0.380 |
| 0.347 | 0.152 | 0.184 | 0.068 | 0.155 | 0.071 | 0.164 | 0.066 |
| 0.307 | 0.118 | 0.575 | 0.541 | 0.475 | 0.311 | 0.151 | 0.345 |
| 1.000 | 0.312 | 0.405 | 0.244 | 0.370 | 0.311 | 0.292 | 0.304 |
| 0.312 | 1.000 | 0.282 | 0.310 | 0.216 | 0.294 | 0.124 | 0.236 |
| 0.405 | 0.282 | 1.000 | 0.574 | 0.510 | 0.298 | 0.033 | 0.562 |
| 0.244 | 0.310 | 0.574 | 1.000 | 0.472 | 0.355 | 0.031 | 0.301 |
| 0.370 | 0.216 | 0.510 | 0.472 | 1.000 | 0.279 | 0.059 | 0.276 |
| 0.311 | 0.294 | 0.298 | 0.355 | 0.279 | 1.000 | 0.259 | 0.372 |
| 0.292 | 0.124 | 0.033 | 0.031 | 0.059 | 0.259 | 1.000 | 0.198 |
| 0.304 | 0.236 | 0.562 | 0.301 | 0.276 | 0.372 | 0.198 | 1.000 |
| 0.233 | -0.032 | 0.164 | -0.044 | 0.088 | 0.071 | 0.242 | 0.275 |
| -0.016 | 0.041 | -0.009 | 0.080 | -0.017 | 0.228 | 0.280 | 0.177 |
| 0.246 | 0.197 | 0.234 | 0.318 | 0.315 | 0.462 | 0.218 | 0.327 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 1.903 | 1.738 | 0.259 | 14 |
| 0.618 | -13.080 | 0.023 | 14 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.453 | 0.786 |
| 0.243 | 0.804 |
| 0.490 | 0.792 |
| 0.399 | 0.787 |
| 0.231 | 0.802 |
| 0.612 | 0.787 |
| 0.509 | 0.790 |
| 0.426 | 0.789 |
| 0.428 | 0.784 |
| 0.247 | 0.805 |
| 0.462 | 0.785 |
| 0.215 | 0.811 |
| 0.312 | 0.812 |
| 0.440 | 0.788 |

**Inter-Item Correlation Matrix**

| Q17 | Q22 | Q29 | Q34 | Q39 | Q44 | Q49 | Q56 |
|---|---|---|---|---|---|---|---|
| 0.224 | 0.408 | 0.470 | 0.364 | 0.621 | 0.152 | 0.123 | 0.076 |
| 0.221 | 0.471 | 0.380 | 0.329 | 0.431 | 0.285 | 0.216 | 0.154 |
| 0.118 | 0.381 | 0.428 | 0.074 | 0.356 | 0.243 | 0.136 | 0.186 |
| 1.000 | 0.262 | 0.199 | 0.167 | 0.283 | 0.107 | 0.215 | 0.044 |
| 0.262 | 1.000 | 0.505 | 0.291 | 0.429 | 0.124 | 0.069 | 0.194 |
| 0.199 | 0.505 | 1.000 | 0.336 | 0.331 | 0.095 | 0.220 | 0.237 |
| 0.167 | 0.291 | 0.336 | 1.000 | 0.373 | 0.221 | 0.046 | 0.054 |
| 0.283 | 0.429 | 0.331 | 0.373 | 1.000 | 0.128 | 0.139 | 0.087 |
| 0.107 | 0.124 | 0.095 | 0.221 | 0.128 | 1.000 | 0.162 | 0.356 |
| 0.215 | 0.069 | 0.220 | 0.046 | 0.139 | 0.162 | 1.000 | 0.102 |
| 0.044 | 0.194 | 0.237 | 0.054 | 0.087 | 0.356 | 0.102 | 1.000 |
| 0.095 | 0.189 | 0.302 | 0.220 | 0.106 | -0.015 | 0.285 | 0.211 |
| -0.010 | 0.185 | 0.329 | 0.248 | 0.245 | 0.106 | 0.384 | 0.235 |
| 0.277 | 0.265 | 0.426 | 0.245 | 0.440 | 0.105 | 0.237 | 0.208 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 1.442 | 1.443 | 0.280 | 14 |
| 0.635 | -42.776 | 0.017 | 14 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.521 | 0.804 |
| 0.444 | 0.803 |
| 0.376 | 0.811 |
| 0.204 | 0.823 |
| 0.416 | 0.807 |
| 0.499 | 0.800 |
| 0.339 | 0.816 |
| 0.520 | 0.803 |
| 0.282 | 0.824 |
| 0.280 | 0.822 |
| 0.250 | 0.824 |
| 0.245 | 0.823 |
| 0.346 | 0.815 |
| 0.368 | 0.809 |

Q74

**Inter-Item Correlation Matrix**

| Q18 | Q23 | Q27 | Q30 | Q35 | Q40 | Q45 | Q50 |
|---|---|---|---|---|---|---|---|
| 0.223 | 0.553 | 0.306 | 0.314 | 0.371 | 0.425 | 0.189 | 0.133 |
| 0.406 | 0.243 | 0.310 | 0.350 | 0.354 | 0.409 | 0.274 | 0.229 |
| 0.280 | 0.389 | 0.358 | 0.335 | 0.717 | 0.319 | 0.167 | 0.094 |
| 1.000 | 0.279 | 0.174 | 0.274 | 0.246 | 0.435 | 0.070 | 0.210 |
| 0.279 | 1.000 | 0.136 | 0.296 | 0.259 | 0.289 | 0.157 | 0.204 |
| 0.174 | 0.136 | 1.000 | 0.272 | 0.342 | 0.297 | 0.104 | 0.201 |
| 0.274 | 0.296 | 0.272 | 1.000 | 0.409 | 0.469 | 0.259 | 0.089 |
| 0.246 | 0.259 | 0.342 | 0.409 | 1.000 | 0.259 | 0.155 | 0.018 |
| 0.435 | 0.289 | 0.297 | 0.469 | 0.259 | 1.000 | 0.245 | 0.166 |
| 0.070 | 0.157 | 0.104 | 0.259 | 0.155 | 0.245 | 1.000 | 0.140 |
| 0.210 | 0.204 | 0.201 | 0.089 | 0.018 | 0.166 | 0.140 | 1.000 |
| 0.182 | 0.143 | 0.218 | 0.420 | 0.209 | 0.349 | 0.436 | 0.106 |
| 0.305 | 0.267 | 0.374 | 0.326 | 0.219 | 0.430 | 0.287 | 0.196 |
| 0.217 | 0.125 | 0.173 | 0.116 | 0.145 | 0.218 | 0.415 | 0.178 |
| 0.305 | 0.249 | 0.285 | 0.307 | 0.395 | 0.421 | 0.290 | 0.236 |
| 0.206 | 0.175 | 0.301 | 0.152 | 0.253 | 0.225 | -0.011 | 0.221 |
| 0.231 | 0.360 | 0.260 | 0.286 | 0.358 | 0.409 | 0.347 | 0.249 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 1.522 | 1.555 | 0.244 | 17 |
| 0.728 | -63.315 | 0.013 | 17 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.515 | 0.854 |
| 0.401 | 0.850 |
| 0.642 | 0.852 |
| 0.312 | 0.857 |
| 0.439 | 0.856 |
| 0.313 | 0.856 |
| 0.406 | 0.854 |
| 0.626 | 0.853 |

| | |
|---|---|
| 0.485 | 0.851 |
| 0.373 | 0.859 |
| 0.179 | 0.864 |
| 0.387 | 0.856 |
| 0.430 | 0.854 |
| 0.324 | 0.859 |
| 0.456 | 0.848 |
| 0.303 | 0.861 |
| 0.476 | 0.853 |

Q75 Q76

**Inter-Item Correlation Matrix**

| Q19 | Q24 | Q26 | Q31 | Q36 | Q41 | Q46 | Q51 |
|---|---|---|---|---|---|---|---|
| 0.327 | 0.205 | 0.294 | 0.196 | 0.420 | 0.262 | 0.188 | 0.299 |
| 0.203 | 0.013 | 0.216 | 0.123 | 0.323 | 0.119 | 0.242 | 0.172 |
| 0.334 | 0.090 | 0.278 | 0.079 | 0.366 | 0.060 | 0.313 | 0.275 |
| 1.000 | 0.317 | 0.362 | 0.333 | 0.417 | 0.127 | 0.438 | 0.390 |
| 0.317 | 1.000 | 0.160 | 0.332 | 0.240 | 0.283 | 0.180 | 0.135 |
| 0.362 | 0.160 | 1.000 | 0.234 | 0.315 | 0.239 | 0.342 | 0.315 |
| 0.333 | 0.332 | 0.234 | 1.000 | 0.278 | 0.111 | 0.279 | 0.245 |
| 0.417 | 0.240 | 0.315 | 0.278 | 1.000 | 0.243 | 0.409 | 0.341 |
| 0.127 | 0.283 | 0.239 | 0.111 | 0.243 | 1.000 | 0.265 | 0.228 |
| 0.438 | 0.180 | 0.342 | 0.279 | 0.409 | 0.265 | 1.000 | 0.351 |
| 0.390 | 0.135 | 0.315 | 0.245 | 0.341 | 0.228 | 0.351 | 1.000 |
| 0.034 | 0.099 | -0.085 | -0.058 | 0.032 | 0.020 | 0.207 | -0.022 |
| 0.232 | 0.144 | 0.157 | 0.041 | 0.114 | 0.148 | -0.019 | 0.070 |
| 0.246 | 0.097 | 0.169 | 0.062 | 0.400 | 0.063 | 0.160 | 0.273 |
| 0.215 | 0.212 | 0.174 | 0.183 | 0.302 | 0.216 | 0.300 | 0.061 |
| 0.176 | 0.158 | 0.101 | -0.015 | 0.136 | 0.237 | 0.012 | -0.057 |
| 0.492 | 0.414 | 0.419 | 0.112 | 0.306 | 0.208 | 0.282 | 0.175 |
| -0.037 | 0.080 | -0.077 | -0.033 | -0.073 | 0.160 | -0.059 | -0.001 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 1.976 | 2.102 | 0.303 | 18 |
| 0.712 | -2.240 | 0.021 | 18 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.436 | 0.770 |
| 0.317 | 0.782 |
| 0.463 | 0.772 |
| 0.503 | 0.765 |
| 0.367 | 0.778 |
| 0.338 | 0.773 |

| | |
|---|---|
| 0.306 | 0.783 |
| 0.472 | 0.764 |
| 0.331 | 0.780 |
| 0.422 | 0.771 |
| 0.334 | 0.777 |
| 0.265 | 0.799 |
| 0.251 | 0.797 |
| 0.336 | 0.780 |
| 0.387 | 0.776 |
| 0.183 | 0.791 |
| 0.570 | 0.773 |
| 0.374 | 0.797 |

**ıter-Item Correlation Matrix**

| Q20 | Q25 | Q32 | Q37 | Q42 | Q47 | Q52 | Q59 |
|---|---|---|---|---|---|---|---|
| 0.205 | 0.142 | 0.177 | 0.207 | 0.024 | 0.389 | 0.254 | 0.234 |
| 0.359 | 0.366 | 0.030 | 0.053 | 0.146 | 0.109 | 0.042 | 0.029 |
| 0.327 | 0.364 | 0.314 | 0.326 | 0.192 | 0.434 | 0.444 | 0.248 |
| 1.000 | 0.548 | 0.036 | 0.224 | 0.240 | 0.117 | 0.246 | 0.296 |
| 0.548 | 1.000 | 0.122 | 0.155 | 0.256 | 0.144 | 0.336 | 0.153 |
| 0.036 | 0.122 | 1.000 | 0.247 | 0.186 | 0.118 | 0.044 | 0.048 |
| 0.224 | 0.155 | 0.247 | 1.000 | 0.271 | 0.169 | 0.220 | 0.288 |
| 0.240 | 0.256 | 0.186 | 0.271 | 1.000 | 0.083 | 0.149 | 0.156 |
| 0.117 | 0.144 | 0.118 | 0.169 | 0.083 | 1.000 | 0.350 | 0.180 |
| 0.246 | 0.336 | 0.044 | 0.220 | 0.149 | 0.350 | 1.000 | 0.252 |
| 0.296 | 0.153 | 0.048 | 0.288 | 0.156 | 0.180 | 0.252 | 1.000 |
| 0.116 | 0.163 | 0.354 | 0.214 | 0.460 | 0.131 | 0.194 | 0.212 |
| -0.007 | 0.008 | 0.020 | -0.017 | 0.158 | 0.287 | 0.179 | 0.213 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 1.720 | 1.582 | 0.278 | 13 |
| 0.565 | -31.988 | 0.016 | 13 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.296 | 0.749 |
| 0.315 | 0.764 |
| 0.535 | 0.719 |
| 0.430 | 0.740 |
| 0.433 | 0.738 |
| 0.232 | 0.758 |
| 0.245 | 0.751 |
| 0.303 | 0.751 |
| 0.338 | 0.742 |
| 0.307 | 0.738 |
| 0.240 | 0.749 |
| 0.409 | 0.744 |

| | |
|---|---|
| 0.221 | 0.761 |

| Q60 | Q65 | Q70 |
|---|---|---|
| 0.107 | -0.013 | 0.264 |
| 0.239 | 0.051 | 0.149 |
| 0.041 | -0.007 | 0.127 |
| 0.233 | -0.016 | 0.246 |
| -0.032 | 0.041 | 0.197 |
| 0.164 | -0.009 | 0.234 |
| -0.044 | 0.080 | 0.318 |
| 0.088 | -0.017 | 0.315 |
| 0.071 | 0.228 | 0.462 |
| 0.242 | 0.280 | 0.218 |
| 0.275 | 0.177 | 0.327 |
| 1.000 | 0.156 | 0.162 |
| 0.156 | 1.000 | 0.455 |
| 0.162 | 0.455 | 1.000 |

| Q61 | Q66 | Q71 |
|---|---|---|
| 0.028 | 0.261 | 0.286 |
| 0.125 | 0.334 | 0.349 |
| 0.151 | 0.211 | 0.304 |
| 0.095 | -0.010 | 0.277 |
| 0.189 | 0.185 | 0.265 |
| 0.302 | 0.329 | 0.426 |
| 0.220 | 0.248 | 0.245 |
| 0.106 | 0.245 | 0.440 |
| -0.015 | 0.106 | 0.105 |
| 0.285 | 0.384 | 0.237 |
| 0.211 | 0.235 | 0.208 |
| 1.000 | 0.271 | 0.180 |
| 0.271 | 1.000 | 0.356 |
| 0.180 | 0.356 | 1.000 |

| Q54 | Q57 | Q62 | Q67 | Q72 | Q74 |
|---|---|---|---|---|---|
| 0.085 | 0.161 | 0.167 | 0.386 | 0.221 | 0.222 |
| 0.361 | 0.315 | 0.393 | 0.428 | 0.283 | 0.314 |
| 0.234 | 0.298 | 0.146 | 0.460 | 0.201 | 0.275 |
| 0.182 | 0.305 | 0.217 | 0.305 | 0.206 | 0.231 |
| 0.143 | 0.267 | 0.125 | 0.249 | 0.175 | 0.360 |
| 0.218 | 0.374 | 0.173 | 0.285 | 0.301 | 0.260 |
| 0.420 | 0.326 | 0.116 | 0.307 | 0.152 | 0.286 |
| 0.209 | 0.219 | 0.145 | 0.395 | 0.253 | 0.358 |
| 0.349 | 0.430 | 0.218 | 0.421 | 0.225 | 0.409 |
| 0.436 | 0.287 | 0.415 | 0.290 | -0.011 | 0.347 |
| 0.106 | 0.196 | 0.178 | 0.236 | 0.221 | 0.249 |
| 1.000 | 0.355 | 0.275 | 0.259 | 0.147 | 0.364 |
| 0.355 | 1.000 | 0.252 | 0.291 | 0.150 | 0.521 |
| 0.275 | 0.252 | 1.000 | 0.358 | 0.257 | 0.249 |
| 0.259 | 0.291 | 0.358 | 1.000 | 0.411 | 0.355 |
| 0.147 | 0.150 | 0.257 | 0.411 | 1.000 | 0.109 |
| 0.364 | 0.521 | 0.249 | 0.355 | 0.109 | 1.000 |

| Q53 | Q58 | Q63 | Q68 | Q73 | Q75 | Q76 |
|---|---|---|---|---|---|---|
| 0.056 | -0.091 | 0.393 | 0.285 | 0.173 | 0.318 | 0.249 |
| 0.206 | -0.023 | 0.180 | 0.171 | 0.092 | 0.034 | 0.190 |
| 0.077 | -0.001 | 0.368 | 0.364 | 0.023 | 0.384 | 0.217 |
| 0.034 | 0.232 | 0.246 | 0.215 | 0.176 | 0.492 | -0.037 |
| 0.099 | 0.144 | 0.097 | 0.212 | 0.158 | 0.414 | 0.080 |
| -0.085 | 0.157 | 0.169 | 0.174 | 0.101 | 0.419 | -0.077 |
| -0.058 | 0.041 | 0.062 | 0.183 | -0.015 | 0.112 | -0.033 |
| 0.032 | 0.114 | 0.400 | 0.302 | 0.136 | 0.306 | -0.073 |
| 0.020 | 0.148 | 0.063 | 0.216 | 0.237 | 0.208 | 0.160 |
| 0.207 | -0.019 | 0.160 | 0.300 | 0.012 | 0.282 | -0.059 |
| -0.022 | 0.070 | 0.273 | 0.061 | -0.057 | 0.175 | -0.001 |
| 1.000 | -0.055 | -0.087 | 0.224 | 0.106 | -0.047 | -0.016 |
| -0.055 | 1.000 | 0.017 | -0.155 | 0.011 | 0.227 | -0.220 |
| -0.087 | 0.017 | 1.000 | 0.256 | 0.050 | 0.128 | 0.184 |
| 0.224 | -0.155 | 0.256 | 1.000 | 0.028 | 0.312 | 0.220 |
| 0.106 | 0.011 | 0.050 | 0.028 | 1.000 | 0.067 | 0.111 |
| -0.047 | 0.227 | 0.128 | 0.312 | 0.067 | 1.000 | -0.154 |
| -0.016 | -0.220 | 0.184 | 0.220 | 0.111 | -0.154 | 1.000 |

| Q64 | Q69 |
|---|---|
| 0.048 | 0.036 |
| 0.118 | 0.009 |
| 0.419 | 0.287 |
| 0.116 | -0.007 |
| 0.163 | 0.008 |
| 0.354 | 0.020 |
| 0.214 | -0.017 |
| 0.460 | 0.158 |
| 0.131 | 0.287 |
| 0.194 | 0.179 |
| 0.212 | 0.213 |
| 1.000 | 0.245 |
| 0.245 | 1.000 |

```
GET
  FILE='C:\Users\20396236\Desktop\Jordaan_T\DATA USE\Jordaan_T Pre 2017 (re
DATASET NAME DataSet1 WINDOW=FRONT.
RELIABILITY
  /VARIABLES=Q1 Q6 Q11 Q16 Q21 Q28 Q33 Q38 Q43 Q48 Q55 Q60 Q65 Q70
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

# Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 04-AUG-2017 13:14:39 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\Jordaan_T Pre 2017 (reversed)(Fixed).sav |
| | Active Dataset | DataSet1 |
| | Filter | <none> |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 94 |
| | Matrix Input | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\Jordaan_T Pre 2017 (reversed)(Fixed).sav |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |

| | | |
|---|---|---|
| Syntax | | RELIABILITY<br>/VARIABLES=Q1 Q6 Q11 Q16 Q21 Q28 Q33 Q38 Q43 Q48 Q55 Q60 Q65 Q70<br>/SCALE('ALL VARIABLES') ALL<br>/MODEL=ALPHA<br><br>/STATISTICS=DESCRIPTIVE SCALE CORR<br>/SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.00 |
| | Elapsed Time | 00:00:00.00 |

[DataSet1] C:\Users\20396236\Desktop\Jordaan_T\DATA USE\Jordaan_T Pr

## Scale: ALL VARIABLES

### Case Processing Summary

| | | N | % |
|---|---|---|---|
| Cases | Valid | 86 | 91.5 |
| | Excluded[a] | 8 | 8.5 |
| | Total | 94 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.842 | 0.845 | 14 |

### Item Statistics

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q1 | 3.26 | 1.160 | 86 |
| Q6 | 4.56 | 0.761 | 86 |
| Q11 | 4.51 | 0.904 | 86 |
| Q16 | 4.05 | 1.073 | 86 |
| Q21 | 4.31 | 1.009 | 86 |
| Q28 | 4.37 | 0.798 | 86 |
| Q33 | 4.34 | 0.965 | 86 |
| Q38 | 4.08 | 0.948 | 86 |

| | | | |
|---|---|---|---|
| Q43 | 3.00 | 1.227 | 86 |
| Q48 | 3.45 | 1.214 | 86 |
| Q55 | 4.01 | 0.964 | 86 |
| Q60 | 3.71 | 1.282 | 86 |
| Q65 | 3.91 | 1.134 | 86 |
| Q70 | 4.01 | 0.927 | 86 |

| | Q1 | Q6 | Q11 |
|---|---|---|---|
| Q1 | 1.000 | 0.250 | 0.121 |
| Q6 | 0.250 | 1.000 | -0.010 |
| Q11 | 0.121 | -0.010 | 1.000 |
| Q16 | 0.340 | 0.126 | 0.278 |
| Q21 | 0.292 | 0.183 | 0.260 |
| Q28 | 0.379 | 0.255 | 0.353 |
| Q33 | 0.216 | 0.301 | 0.407 |
| Q38 | 0.184 | 0.148 | 0.459 |
| Q43 | 0.422 | 0.101 | 0.011 |
| Q48 | 0.401 | 0.207 | 0.129 |
| Q55 | 0.355 | 0.103 | 0.263 |
| Q60 | 0.185 | 0.192 | 0.140 |
| Q65 | 0.215 | 0.334 | 0.081 |
| Q70 | 0.150 | 0.441 | 0.105 |

**Summary Item Statistics**

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 3.969 | 3.000 | 4.558 |
| Inter-Item Correlations | 0.281 | -0.010 | 0.535 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q1 | 52.31 | 59.465 | 0.468 |
| Q6 | 51.01 | 64.435 | 0.342 |
| Q11 | 51.06 | 63.679 | 0.325 |
| Q16 | 51.52 | 59.664 | 0.505 |
| Q21 | 51.26 | 59.157 | 0.581 |
| Q28 | 51.20 | 61.337 | 0.577 |
| Q33 | 51.23 | 61.004 | 0.481 |
| Q38 | 51.49 | 60.441 | 0.532 |
| Q43 | 52.57 | 59.283 | 0.445 |
| Q48 | 52.12 | 57.233 | 0.571 |
| Q55 | 51.56 | 59.473 | 0.591 |

| | | | |
|---|---|---|---|
| Q60 | 51.86 | 58.592 | 0.456 |
| Q65 | 51.66 | 59.450 | 0.484 |
| Q70 | 51.56 | 62.132 | 0.424 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 55.57 | 69.189 | 8.318 | 14 |

```
RELIABILITY
  /VARIABLES=Q2 Q7 Q12 Q17 Q22 Q29 Q34 Q39 Q44 Q49 Q56 Q61 Q66 Q71
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

# Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 04-AUG-2017 13:14:39 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\Jordaan_T Pre 2017 (reversed)(Fixed).sav |
| | Active Dataset | DataSet1 |
| | Filter | <none> |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 94 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |

| | | |
|---|---|---|
| Syntax | | RELIABILITY<br>/VARIABLES=Q2 Q7 Q12 Q17 Q22 Q29 Q34 Q39 Q44 Q49 Q56 Q61 Q66 Q71<br>/SCALE('ALL VARIABLES') ALL<br>/MODEL=ALPHA<br><br>/STATISTICS=DESCRIPTIVE SCALE CORR<br>/SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.03 |
| | Elapsed Time | 00:00:00.02 |

## Scale: ALL VARIABLES

### Case Processing Summary

| | | N | % |
|---|---|---|---|
| Cases | Valid | 81 | 86.2 |
| | Excluded[a] | 13 | 13.8 |
| | Total | 94 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.808 | 0.799 | 14 |

### Item Statistics

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q2 | 3.72 | 1.287 | 81 |
| Q7 | 4.65 | 0.655 | 81 |
| Q12 | 3.95 | 1.128 | 81 |
| Q17 | 3.72 | 1.207 | 81 |
| Q22 | 4.30 | 1.156 | 81 |
| Q29 | 3.60 | 1.375 | 81 |
| Q34 | 3.42 | 1.264 | 81 |
| Q39 | 3.62 | 1.280 | 81 |
| Q44 | 4.73 | 0.725 | 81 |
| Q49 | 4.73 | 0.689 | 81 |
| Q56 | 4.52 | 0.868 | 81 |

| | | | |
|---|---|---|---|
| Q61 | 3.40 | 1.069 | 81 |
| Q66 | 3.85 | 1.141 | 81 |
| Q71 | 3.30 | 1.616 | 81 |

| | Q2 | Q7 | Q12 |
|---|---|---|---|
| Q2 | 1.000 | 0.253 | 0.464 |
| Q7 | 0.253 | 1.000 | 0.213 |
| Q12 | 0.464 | 0.213 | 1.000 |
| Q17 | 0.302 | 0.080 | 0.192 |
| Q22 | 0.402 | 0.286 | 0.289 |
| Q29 | 0.367 | 0.360 | 0.205 |
| Q34 | 0.482 | 0.147 | 0.339 |
| Q39 | 0.548 | 0.064 | 0.229 |
| Q44 | 0.104 | 0.116 | 0.045 |
| Q49 | -0.003 | -0.072 | -0.050 |
| Q56 | 0.022 | 0.253 | 0.180 |
| Q61 | 0.183 | 0.019 | 0.286 |
| Q66 | 0.320 | 0.198 | 0.334 |
| Q71 | 0.324 | 0.051 | 0.296 |

**Summary Item Statistics**

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 3.964 | 3.296 | 4.728 |
| Inter-Item Correlations | 0.221 | -0.075 | 0.548 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q2 | 51.78 | 59.200 | 0.586 |
| Q7 | 50.84 | 68.961 | 0.282 |
| Q12 | 51.54 | 63.001 | 0.457 |
| Q17 | 51.78 | 62.625 | 0.438 |
| Q22 | 51.20 | 62.910 | 0.448 |
| Q29 | 51.89 | 62.150 | 0.388 |
| Q34 | 52.07 | 58.319 | 0.650 |
| Q39 | 51.88 | 59.610 | 0.567 |
| Q44 | 50.77 | 68.357 | 0.298 |
| Q49 | 50.77 | 69.932 | 0.177 |
| Q56 | 50.98 | 67.549 | 0.291 |
| Q61 | 52.10 | 65.840 | 0.315 |
| Q66 | 51.64 | 62.283 | 0.492 |
| Q71 | 52.20 | 56.785 | 0.536 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 55.49 | 72.453 | 8.512 | 14 |

```
RELIABILITY
  /VARIABLES=Q3 Q8 Q13 Q18 Q23 Q27 Q30 Q35 Q40 Q45 Q50 Q54 Q57 Q62 Q67 Q72
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

# Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 04-AUG-2017 13:14:39 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\Jordaan_T Pre 2017 (reversed)(Fixed).sav |
| | Active Dataset | DataSet1 |
| | Filter | <none> |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 94 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |

| | | |
|---|---|---|
| Syntax | | RELIABILITY<br>/VARIABLES=Q3 Q8 Q13 Q18 Q23 Q27 Q30 Q35 Q40 Q45 Q50 Q54 Q57 Q62 Q67 Q72 Q74<br>/SCALE('ALL VARIABLES') ALL<br>/MODEL=ALPHA<br><br>/STATISTICS=DESCRIPTIVE SCALE CORR<br>/SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.00 |
| | Elapsed Time | 00:00:00.00 |

## Scale: ALL VARIABLES

### Case Processing Summary

| | | N | % |
|---|---|---|---|
| Cases | Valid | 88 | 93.6 |
| | Excluded[a] | 6 | 6.4 |
| | Total | 94 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.876 | 0.881 | 17 |

### Item Statistics

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q3 | 4.28 | 1.061 | 88 |
| Q8 | 3.25 | 1.234 | 88 |
| Q13 | 4.53 | 0.922 | 88 |
| Q18 | 3.86 | 1.136 | 88 |
| Q23 | 4.41 | 0.839 | 88 |
| Q27 | 4.33 | 0.854 | 88 |
| Q30 | 4.14 | 0.949 | 88 |
| Q35 | 4.24 | 0.922 | 88 |
| Q40 | 4.14 | 0.985 | 88 |
| Q45 | 3.49 | 1.194 | 88 |
| Q50 | 3.10 | 1.155 | 88 |

| | | | |
|---|---|---|---|
| Q54 | 3.78 | 1.098 | 88 |
| Q57 | 3.83 | 1.127 | 88 |
| Q62 | 3.28 | 1.259 | 88 |
| Q67 | 3.23 | 1.248 | 88 |
| Q72 | 3.02 | 1.213 | 88 |
| Q74 | 4.19 | 0.957 | 88 |

| | Q3 | Q8 | Q13 |
|---|---|---|---|
| Q3 | 1.000 | 0.270 | 0.137 |
| Q8 | 0.270 | 1.000 | 0.225 |
| Q13 | 0.137 | 0.225 | 1.000 |
| Q18 | 0.128 | 0.311 | 0.257 |
| Q23 | 0.436 | 0.388 | 0.428 |
| Q27 | 0.251 | 0.357 | 0.373 |
| Q30 | 0.349 | 0.373 | 0.323 |
| Q35 | 0.165 | 0.210 | 0.538 |
| Q40 | 0.260 | 0.312 | 0.375 |
| Q45 | 0.189 | 0.369 | 0.366 |
| Q50 | 0.211 | 0.111 | 0.078 |
| Q54 | 0.251 | 0.295 | 0.161 |
| Q57 | 0.176 | 0.320 | 0.199 |
| Q62 | 0.214 | 0.353 | 0.254 |
| Q67 | 0.124 | 0.381 | 0.073 |
| Q72 | 0.209 | 0.311 | 0.236 |
| Q74 | 0.274 | 0.328 | 0.390 |

**Summary Item Statistics**

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 3.830 | 3.023 | 4.534 |
| Inter-Item Correlations | 0.304 | 0.050 | 0.581 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q3 | 60.83 | 102.948 | 0.375 |
| Q8 | 61.86 | 97.797 | 0.526 |
| Q13 | 60.58 | 102.890 | 0.450 |
| Q18 | 61.25 | 101.247 | 0.420 |
| Q23 | 60.70 | 100.394 | 0.657 |
| Q27 | 60.78 | 101.459 | 0.579 |
| Q30 | 60.98 | 99.976 | 0.594 |
| Q35 | 60.88 | 102.777 | 0.456 |

| | | | |
|---|---|---|---|
| Q40 | 60.98 | 98.551 | 0.646 |
| Q45 | 61.63 | 96.605 | 0.602 |
| Q50 | 62.01 | 101.506 | 0.400 |
| Q54 | 61.33 | 100.269 | 0.485 |
| Q57 | 61.28 | 98.849 | 0.537 |
| Q62 | 61.83 | 98.304 | 0.491 |
| Q67 | 61.89 | 98.608 | 0.484 |
| Q72 | 62.09 | 99.647 | 0.456 |
| Q74 | 60.92 | 100.097 | 0.581 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 65.11 | 112.148 | 10.590 | 17 |

```
RELIABILITY
  /VARIABLES=Q4 Q9 Q14 Q19 Q24 Q26 Q31 Q36 Q41 Q46 Q51 Q53 Q58 Q63 Q68 Q73
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

# Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 04-AUG-2017 13:14:39 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\Jordaan_T Pre 2017 (reversed)(Fixed).sav |
| | Active Dataset | DataSet1 |
| | Filter | <none> |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 94 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |

| | | |
|---|---|---|
| Syntax | | RELIABILITY<br>/VARIABLES=Q4 Q9 Q14 Q19 Q24 Q26 Q31 Q36 Q41 Q46 Q51 Q53 Q58 Q63 Q68 Q73 Q75 Q76<br>/SCALE('ALL VARIABLES') ALL<br>/MODEL=ALPHA<br><br>/STATISTICS=DESCRIPTIVE SCALE CORR<br>/SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.00 |
| | Elapsed Time | 00:00:00.00 |

## Scale: ALL VARIABLES

### Case Processing Summary

| | | N | % |
|---|---|---|---|
| Cases | Valid | 84 | 89.4 |
| | Excluded[a] | 10 | 10.6 |
| | Total | 94 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.757 | 0.759 | 18 |

### Item Statistics

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q4 | 2.85 | 1.256 | 84 |
| Q9 | 3.31 | 1.232 | 84 |
| Q14 | 3.60 | 0.933 | 84 |
| Q19 | 2.98 | 1.192 | 84 |
| Q24 | 3.71 | 1.001 | 84 |
| Q26 | 3.50 | 1.081 | 84 |
| Q31 | 3.62 | 1.140 | 84 |
| Q36 | 2.88 | 1.293 | 84 |
| Q41 | 3.08 | 1.301 | 84 |
| Q46 | 3.37 | 1.180 | 84 |
| Q51 | 3.35 | 1.167 | 84 |

| | | | |
|---|---|---|---|
| Q53 | 3.40 | 1.223 | 84 |
| Q58 | 2.18 | 1.346 | 84 |
| Q63 | 2.65 | 1.227 | 84 |
| Q68 | 3.42 | 1.224 | 84 |
| Q73 | 3.62 | 1.211 | 84 |
| Q75 | 3.65 | 1.237 | 84 |
| Q76 | 3.58 | 1.143 | 84 |

| | Q4 | Q9 | Q14 |
|---|---|---|---|
| Q4 | 1.000 | 0.140 | 0.080 |
| Q9 | 0.140 | 1.000 | 0.278 |
| Q14 | 0.080 | 0.278 | 1.000 |
| Q19 | 0.102 | 0.358 | 0.305 |
| Q24 | 0.079 | 0.131 | -0.048 |
| Q26 | 0.013 | 0.271 | 0.287 |
| Q31 | 0.118 | 0.257 | 0.340 |
| Q36 | 0.211 | 0.454 | 0.229 |
| Q41 | 0.119 | 0.277 | 0.078 |
| Q46 | 0.137 | 0.194 | 0.115 |
| Q51 | 0.308 | 0.126 | 0.152 |
| Q53 | -0.006 | 0.084 | -0.024 |
| Q58 | 0.066 | 0.177 | 0.173 |
| Q63 | 0.418 | 0.271 | 0.097 |
| Q68 | 0.317 | 0.241 | 0.118 |
| Q73 | 0.087 | 0.015 | -0.117 |
| Q75 | 0.198 | 0.324 | 0.212 |
| Q76 | -0.155 | 0.016 | 0.213 |

**Summary Item Statistics**

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 3.264 | 2.179 | 3.714 |
| Inter-Item Correlations | 0.149 | -0.241 | 0.454 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q4 | 55.90 | 81.509 | 0.299 |
| Q9 | 55.44 | 77.743 | 0.489 |
| Q14 | 55.15 | 83.409 | 0.328 |
| Q19 | 55.77 | 77.695 | 0.512 |
| Q24 | 55.04 | 83.457 | 0.296 |
| Q26 | 55.25 | 79.202 | 0.494 |

| | | | |
|---|---|---|---|
| Q31 | 55.13 | 81.730 | 0.332 |
| Q36 | 55.87 | 78.236 | 0.436 |
| Q41 | 55.67 | 81.502 | 0.285 |
| Q46 | 55.38 | 80.431 | 0.380 |
| Q51 | 55.40 | 79.786 | 0.419 |
| Q53 | 55.35 | 87.675 | 0.031 |
| Q58 | 56.57 | 82.127 | 0.243 |
| Q63 | 56.10 | 78.858 | 0.436 |
| Q68 | 55.33 | 78.153 | 0.472 |
| Q73 | 55.13 | 85.609 | 0.125 |
| Q75 | 55.10 | 79.099 | 0.420 |
| Q76 | 55.17 | 87.394 | 0.055 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 58.75 | 89.877 | 9.480 | 18 |

```
RELIABILITY
  /VARIABLES=Q5 Q10 Q15 Q20 Q25 Q32 Q37 Q42 Q47 Q52 Q59 Q64 Q69
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

# Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 04-AUG-2017 13:14:39 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\Jordaan_T Pre 2017 (reversed)(Fixed).sav |
| | Active Dataset | DataSet1 |
| | Filter | <none> |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 94 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |

| | | |
|---|---|---|
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |
| Syntax | | RELIABILITY<br>/VARIABLES=Q5 Q10 Q15 Q20 Q25 Q32 Q37 Q42 Q47 Q52 Q59 Q64 Q69<br>/SCALE('ALL VARIABLES') ALL<br>/MODEL=ALPHA<br><br>/STATISTICS=DESCRIPTIVE SCALE CORR<br>/SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.02 |

## Scale: ALL VARIABLES

### Case Processing Summary

| | | N | % |
|---|---|---|---|
| Cases | Valid | 88 | 93.6 |
| | Excluded[a] | 6 | 6.4 |
| | Total | 94 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.805 | 0.814 | 13 |

### Item Statistics

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q5 | 4.28 | 0.970 | 88 |
| Q10 | 4.15 | 1.056 | 88 |
| Q15 | 3.57 | 1.239 | 88 |
| Q20 | 4.09 | 1.210 | 88 |
| Q25 | 3.27 | 1.328 | 88 |
| Q32 | 4.81 | 0.725 | 88 |
| Q37 | 4.51 | 0.935 | 88 |

| | | | |
|---|---|---|---|
| Q42 | 4.74 | 0.703 | 88 |
| Q47 | 4.18 | 0.977 | 88 |
| Q52 | 3.94 | 1.158 | 88 |
| Q59 | 4.08 | 1.031 | 88 |
| Q64 | 4.51 | 0.830 | 88 |
| Q69 | 4.16 | 1.049 | 88 |

**Ir**

| | Q5 | Q10 | Q15 |
|---|---|---|---|
| Q5 | 1.000 | -0.008 | 0.323 |
| Q10 | -0.008 | 1.000 | 0.076 |
| Q15 | 0.323 | 0.076 | 1.000 |
| Q20 | 0.272 | -0.020 | 0.372 |
| Q25 | 0.225 | 0.176 | 0.205 |
| Q32 | 0.112 | 0.083 | 0.200 |
| Q37 | 0.332 | 0.016 | 0.302 |
| Q42 | 0.127 | 0.207 | 0.186 |
| Q47 | 0.490 | 0.040 | 0.160 |
| Q52 | 0.321 | 0.026 | 0.335 |
| Q59 | 0.460 | 0.000 | 0.315 |
| Q64 | 0.288 | 0.214 | 0.150 |
| Q69 | 0.023 | 0.196 | -0.017 |

**Summary Item Statistics**

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 4.177 | 3.273 | 4.807 |
| Inter-Item Correlations | 0.252 | -0.020 | 0.619 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q5 | 50.01 | 47.115 | 0.450 |
| Q10 | 50.15 | 50.886 | 0.136 |
| Q15 | 50.73 | 45.948 | 0.391 |
| Q20 | 50.20 | 44.073 | 0.530 |
| Q25 | 51.02 | 45.103 | 0.403 |
| Q32 | 49.49 | 49.609 | 0.383 |
| Q37 | 49.78 | 45.574 | 0.603 |
| Q42 | 49.56 | 48.778 | 0.487 |
| Q47 | 50.11 | 46.493 | 0.495 |
| Q52 | 50.35 | 42.438 | 0.681 |
| Q59 | 50.22 | 44.585 | 0.610 |
| Q64 | 49.78 | 47.941 | 0.471 |

| | | | |
|---|---|---|---|
| Q69 | 50.14 | 49.866 | 0.208 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 54.30 | 54.050 | 7.352 | 13 |

eversed)(Fixed).sav'.

e 2017 (reversed)(Fixed).sav

**Inter-Item Correlation Matrix**

| Q16 | Q21 | Q28 | Q33 | Q38 | Q43 | Q48 | Q55 |
|---|---|---|---|---|---|---|---|
| 0.340 | 0.292 | 0.379 | 0.216 | 0.184 | 0.422 | 0.401 | 0.355 |
| 0.126 | 0.183 | 0.255 | 0.301 | 0.148 | 0.101 | 0.207 | 0.103 |
| 0.278 | 0.260 | 0.353 | 0.407 | 0.459 | 0.011 | 0.129 | 0.263 |
| 1.000 | 0.356 | 0.227 | 0.280 | 0.494 | 0.259 | 0.507 | 0.273 |
| 0.356 | 1.000 | 0.482 | 0.240 | 0.293 | 0.209 | 0.411 | 0.347 |
| 0.227 | 0.482 | 1.000 | 0.446 | 0.364 | 0.228 | 0.310 | 0.407 |
| 0.280 | 0.240 | 0.446 | 1.000 | 0.535 | 0.209 | 0.249 | 0.299 |
| 0.494 | 0.293 | 0.364 | 0.535 | 1.000 | 0.182 | 0.366 | 0.321 |
| 0.259 | 0.209 | 0.228 | 0.209 | 0.182 | 1.000 | 0.332 | 0.467 |
| 0.507 | 0.411 | 0.310 | 0.249 | 0.366 | 0.332 | 1.000 | 0.468 |
| 0.273 | 0.347 | 0.407 | 0.299 | 0.321 | 0.467 | 0.468 | 1.000 |
| 0.104 | 0.444 | 0.314 | 0.261 | 0.223 | 0.366 | 0.252 | 0.460 |
| 0.265 | 0.406 | 0.377 | 0.255 | 0.314 | 0.237 | 0.304 | 0.227 |
| 0.272 | 0.386 | 0.201 | 0.035 | 0.160 | 0.228 | 0.278 | 0.303 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 1.558 | 1.519 | 0.220 | 14 |
| 0.545 | -56.065 | 0.014 | 14 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.364 | 0.833 |
| 0.385 | 0.840 |
| 0.359 | 0.841 |
| 0.440 | 0.830 |
| 0.465 | 0.826 |
| 0.451 | 0.828 |
| 0.469 | 0.832 |
| 0.486 | 0.829 |
| 0.373 | 0.835 |
| 0.440 | 0.826 |
| 0.477 | 0.826 |

| | |
|---:|---:|
| 0.371 | 0.835 |
| 0.351 | 0.832 |
| 0.445 | 0.835 |

**Inter-Item Correlation Matrix**

| Q17 | Q22 | Q29 | Q34 | Q39 | Q44 | Q49 | Q56 |
|---|---|---|---|---|---|---|---|
| 0.302 | 0.402 | 0.367 | 0.482 | 0.548 | 0.104 | -0.003 | 0.022 |
| 0.080 | 0.286 | 0.360 | 0.147 | 0.064 | 0.116 | -0.072 | 0.253 |
| 0.192 | 0.289 | 0.205 | 0.339 | 0.229 | 0.045 | -0.050 | 0.180 |
| 1.000 | 0.187 | 0.022 | 0.383 | 0.374 | 0.168 | 0.177 | 0.238 |
| 0.187 | 1.000 | 0.381 | 0.316 | 0.238 | -0.007 | 0.040 | 0.107 |
| 0.022 | 0.381 | 1.000 | 0.391 | 0.303 | 0.117 | 0.017 | 0.205 |
| 0.383 | 0.316 | 0.391 | 1.000 | 0.518 | 0.181 | 0.061 | 0.095 |
| 0.374 | 0.238 | 0.303 | 0.518 | 1.000 | 0.196 | 0.178 | 0.147 |
| 0.168 | -0.007 | 0.117 | 0.181 | 0.196 | 1.000 | 0.401 | 0.187 |
| 0.177 | 0.040 | 0.017 | 0.061 | 0.178 | 0.401 | 1.000 | 0.301 |
| 0.238 | 0.107 | 0.205 | 0.095 | 0.147 | 0.187 | 0.301 | 1.000 |
| 0.282 | 0.147 | 0.116 | 0.413 | 0.121 | 0.189 | -0.056 | -0.075 |
| 0.269 | 0.166 | 0.129 | 0.399 | 0.329 | 0.298 | 0.187 | 0.243 |
| 0.339 | 0.374 | 0.138 | 0.422 | 0.418 | 0.240 | 0.185 | 0.281 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 1.432 | 1.434 | 0.270 | 14 |
| 0.623 | -7.265 | 0.019 | 14 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.521 | 0.783 |
| 0.277 | 0.806 |
| 0.341 | 0.794 |
| 0.319 | 0.796 |
| 0.343 | 0.795 |
| 0.385 | 0.801 |
| 0.513 | 0.777 |
| 0.476 | 0.784 |
| 0.288 | 0.805 |
| 0.287 | 0.811 |
| 0.330 | 0.805 |
| 0.303 | 0.805 |
| 0.315 | 0.791 |
| 0.395 | 0.788 |

Q74

**Inter-Item Correlation Matrix**

| Q18 | Q23 | Q27 | Q30 | Q35 | Q40 | Q45 | Q50 |
|---|---|---|---|---|---|---|---|
| 0.128 | 0.436 | 0.251 | 0.349 | 0.165 | 0.260 | 0.189 | 0.211 |
| 0.311 | 0.388 | 0.357 | 0.373 | 0.210 | 0.312 | 0.369 | 0.111 |
| 0.257 | 0.428 | 0.373 | 0.323 | 0.538 | 0.375 | 0.366 | 0.078 |
| 1.000 | 0.228 | 0.272 | 0.081 | 0.196 | 0.243 | 0.465 | 0.116 |
| 0.228 | 1.000 | 0.467 | 0.535 | 0.407 | 0.516 | 0.441 | 0.253 |
| 0.272 | 0.467 | 1.000 | 0.412 | 0.454 | 0.520 | 0.449 | 0.280 |
| 0.081 | 0.535 | 0.412 | 1.000 | 0.356 | 0.460 | 0.265 | 0.375 |
| 0.196 | 0.407 | 0.454 | 0.356 | 1.000 | 0.394 | 0.269 | 0.171 |
| 0.243 | 0.516 | 0.520 | 0.460 | 0.394 | 1.000 | 0.490 | 0.291 |
| 0.465 | 0.441 | 0.449 | 0.265 | 0.269 | 0.490 | 1.000 | 0.188 |
| 0.116 | 0.253 | 0.280 | 0.375 | 0.171 | 0.291 | 0.188 | 1.000 |
| 0.050 | 0.509 | 0.273 | 0.481 | 0.233 | 0.400 | 0.292 | 0.353 |
| 0.395 | 0.318 | 0.238 | 0.452 | 0.172 | 0.353 | 0.413 | 0.340 |
| 0.212 | 0.357 | 0.318 | 0.333 | 0.287 | 0.256 | 0.274 | 0.169 |
| 0.233 | 0.229 | 0.242 | 0.294 | 0.222 | 0.386 | 0.388 | 0.351 |
| 0.469 | 0.217 | 0.126 | 0.157 | 0.088 | 0.276 | 0.381 | 0.261 |
| 0.246 | 0.487 | 0.498 | 0.388 | 0.312 | 0.581 | 0.379 | 0.263 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 1.511 | 1.500 | 0.255 | 17 |
| 0.532 | 11.670 | 0.013 | 17 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.248 | 0.874 |
| 0.362 | 0.868 |
| 0.456 | 0.871 |
| 0.416 | 0.873 |
| 0.554 | 0.865 |
| 0.499 | 0.867 |
| 0.520 | 0.866 |
| 0.421 | 0.871 |

| | |
|---|---|
| 0.532 | 0.864 |
| 0.493 | 0.865 |
| 0.336 | 0.874 |
| 0.442 | 0.870 |
| 0.429 | 0.868 |
| 0.352 | 0.870 |
| 0.432 | 0.870 |
| 0.396 | 0.871 |
| 0.482 | 0.866 |

Q75 Q76

**Inter-Item Correlation Matrix**

| Q19 | Q24 | Q26 | Q31 | Q36 | Q41 | Q46 | Q51 |
|---|---|---|---|---|---|---|---|
| 0.102 | 0.079 | 0.013 | 0.118 | 0.211 | 0.119 | 0.137 | 0.308 |
| 0.358 | 0.131 | 0.271 | 0.257 | 0.454 | 0.277 | 0.194 | 0.126 |
| 0.305 | -0.048 | 0.287 | 0.340 | 0.229 | 0.078 | 0.115 | 0.152 |
| 1.000 | 0.085 | 0.411 | 0.259 | 0.420 | 0.110 | 0.160 | 0.326 |
| 0.085 | 1.000 | 0.178 | 0.157 | -0.055 | 0.204 | 0.223 | 0.230 |
| 0.411 | 0.178 | 1.000 | 0.274 | 0.224 | 0.193 | 0.231 | 0.224 |
| 0.259 | 0.157 | 0.274 | 1.000 | 0.214 | 0.225 | 0.088 | 0.136 |
| 0.420 | -0.055 | 0.224 | 0.214 | 1.000 | 0.113 | 0.187 | 0.171 |
| 0.110 | 0.204 | 0.193 | 0.225 | 0.113 | 1.000 | 0.254 | 0.163 |
| 0.160 | 0.223 | 0.231 | 0.088 | 0.187 | 0.254 | 1.000 | 0.186 |
| 0.326 | 0.230 | 0.224 | 0.136 | 0.171 | 0.163 | 0.186 | 1.000 |
| 0.031 | 0.027 | 0.027 | 0.121 | 0.077 | -0.241 | 0.154 | 0.044 |
| 0.100 | 0.208 | 0.104 | 0.116 | 0.026 | 0.391 | 0.284 | 0.213 |
| 0.274 | 0.331 | 0.223 | 0.034 | 0.323 | 0.222 | 0.181 | 0.253 |
| 0.321 | 0.324 | 0.350 | 0.115 | 0.184 | 0.084 | 0.218 | 0.278 |
| 0.194 | 0.148 | 0.156 | -0.037 | -0.052 | -0.094 | -0.002 | 0.077 |
| 0.346 | 0.026 | 0.419 | 0.085 | 0.433 | 0.115 | 0.130 | 0.167 |
| 0.010 | -0.032 | 0.122 | 0.071 | 0.080 | -0.057 | 0.106 | 0.082 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 1.536 | 1.705 | 0.172 | 18 |
| 0.696 | -1.886 | 0.018 | 18 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.366 | 0.749 |
| 0.351 | 0.733 |
| 0.303 | 0.748 |
| 0.409 | 0.732 |
| 0.317 | 0.749 |
| 0.388 | 0.735 |

| | |
|---|---|
| 0.288 | 0.747 |
| 0.439 | 0.738 |
| 0.354 | 0.751 |
| 0.236 | 0.743 |
| 0.265 | 0.740 |
| 0.262 | 0.771 |
| 0.265 | 0.755 |
| 0.453 | 0.738 |
| 0.359 | 0.735 |
| 0.219 | 0.763 |
| 0.373 | 0.739 |
| 0.145 | 0.767 |

**ıter-Item Correlation Matrix**

| Q20 | Q25 | Q32 | Q37 | Q42 | Q47 | Q52 | Q59 |
|---|---|---|---|---|---|---|---|
| 0.272 | 0.225 | 0.112 | 0.332 | 0.127 | 0.490 | 0.321 | 0.460 |
| -0.020 | 0.176 | 0.083 | 0.016 | 0.207 | 0.040 | 0.026 | 0.000 |
| 0.372 | 0.205 | 0.200 | 0.302 | 0.186 | 0.160 | 0.335 | 0.315 |
| 1.000 | 0.335 | 0.191 | 0.345 | 0.136 | 0.346 | 0.619 | 0.381 |
| 0.335 | 1.000 | 0.031 | 0.220 | 0.250 | 0.271 | 0.436 | 0.236 |
| 0.191 | 0.031 | 1.000 | 0.606 | 0.373 | 0.083 | 0.261 | 0.313 |
| 0.345 | 0.220 | 0.606 | 1.000 | 0.451 | 0.275 | 0.431 | 0.530 |
| 0.136 | 0.250 | 0.373 | 0.451 | 1.000 | 0.338 | 0.433 | 0.346 |
| 0.346 | 0.271 | 0.083 | 0.275 | 0.338 | 1.000 | 0.446 | 0.567 |
| 0.619 | 0.436 | 0.261 | 0.431 | 0.433 | 0.446 | 1.000 | 0.514 |
| 0.381 | 0.236 | 0.313 | 0.530 | 0.346 | 0.567 | 0.514 | 1.000 |
| 0.171 | 0.101 | 0.491 | 0.444 | 0.468 | 0.182 | 0.329 | 0.328 |
| 0.215 | 0.133 | 0.041 | 0.197 | 0.057 | 0.072 | 0.206 | 0.073 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 1.534 | 1.469 | 0.184 | 13 |
| 0.639 | -31.540 | 0.025 | 13 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.408 | 0.792 |
| 0.163 | 0.818 |
| 0.260 | 0.798 |
| 0.475 | 0.784 |
| 0.264 | 0.798 |
| 0.477 | 0.798 |
| 0.578 | 0.780 |
| 0.460 | 0.792 |
| 0.481 | 0.788 |
| 0.586 | 0.769 |
| 0.524 | 0.778 |
| 0.440 | 0.791 |

| | |
|---|---|
| 0.190 | 0.812 |

| Q60 | Q65 | Q70 |
|---|---|---|
| 0.185 | 0.215 | 0.150 |
| 0.192 | 0.334 | 0.441 |
| 0.140 | 0.081 | 0.105 |
| 0.104 | 0.265 | 0.272 |
| 0.444 | 0.406 | 0.386 |
| 0.314 | 0.377 | 0.201 |
| 0.261 | 0.255 | 0.035 |
| 0.223 | 0.314 | 0.160 |
| 0.366 | 0.237 | 0.228 |
| 0.252 | 0.304 | 0.278 |
| 0.460 | 0.227 | 0.303 |
| 1.000 | 0.264 | 0.250 |
| 0.264 | 1.000 | 0.427 |
| 0.250 | 0.427 | 1.000 |

| Q61 | Q66 | Q71 |
|---|---|---|
| 0.183 | 0.320 | 0.324 |
| 0.019 | 0.198 | 0.051 |
| 0.286 | 0.334 | 0.296 |
| 0.282 | 0.269 | 0.339 |
| 0.147 | 0.166 | 0.374 |
| 0.116 | 0.129 | 0.138 |
| 0.413 | 0.399 | 0.422 |
| 0.121 | 0.329 | 0.418 |
| 0.189 | 0.298 | 0.240 |
| -0.056 | 0.187 | 0.185 |
| -0.075 | 0.243 | 0.281 |
| 1.000 | 0.233 | 0.214 |
| 0.233 | 1.000 | 0.336 |
| 0.214 | 0.336 | 1.000 |

| Q54 | Q57 | Q62 | Q67 | Q72 | Q74 |
|---|---|---|---|---|---|
| 0.251 | 0.176 | 0.214 | 0.124 | 0.209 | 0.274 |
| 0.295 | 0.320 | 0.353 | 0.381 | 0.311 | 0.328 |
| 0.161 | 0.199 | 0.254 | 0.073 | 0.236 | 0.390 |
| 0.050 | 0.395 | 0.212 | 0.233 | 0.469 | 0.246 |
| 0.509 | 0.318 | 0.357 | 0.229 | 0.217 | 0.487 |
| 0.273 | 0.238 | 0.318 | 0.242 | 0.126 | 0.498 |
| 0.481 | 0.452 | 0.333 | 0.294 | 0.157 | 0.388 |
| 0.233 | 0.172 | 0.287 | 0.222 | 0.088 | 0.312 |
| 0.400 | 0.353 | 0.256 | 0.386 | 0.276 | 0.581 |
| 0.292 | 0.413 | 0.274 | 0.388 | 0.381 | 0.379 |
| 0.353 | 0.340 | 0.169 | 0.351 | 0.261 | 0.263 |
| 1.000 | 0.277 | 0.278 | 0.170 | 0.202 | 0.445 |
| 0.277 | 1.000 | 0.367 | 0.371 | 0.314 | 0.233 |
| 0.278 | 0.367 | 1.000 | 0.405 | 0.312 | 0.211 |
| 0.170 | 0.371 | 0.405 | 1.000 | 0.323 | 0.242 |
| 0.202 | 0.314 | 0.312 | 0.323 | 1.000 | 0.283 |
| 0.445 | 0.233 | 0.211 | 0.242 | 0.283 | 1.000 |

| Q53 | Q58 | Q63 | Q68 | Q73 | Q75 | Q76 |
|---|---|---|---|---|---|---|
| -0.006 | 0.066 | 0.418 | 0.317 | 0.087 | 0.198 | -0.155 |
| 0.084 | 0.177 | 0.271 | 0.241 | 0.015 | 0.324 | 0.016 |
| -0.024 | 0.173 | 0.097 | 0.118 | -0.117 | 0.212 | 0.213 |
| 0.031 | 0.100 | 0.274 | 0.321 | 0.194 | 0.346 | 0.010 |
| 0.027 | 0.208 | 0.331 | 0.324 | 0.148 | 0.026 | -0.032 |
| 0.027 | 0.104 | 0.223 | 0.350 | 0.156 | 0.419 | 0.122 |
| 0.121 | 0.116 | 0.034 | 0.115 | -0.037 | 0.085 | 0.071 |
| 0.077 | 0.026 | 0.323 | 0.184 | -0.052 | 0.433 | 0.080 |
| -0.241 | 0.391 | 0.222 | 0.084 | -0.094 | 0.115 | -0.057 |
| 0.154 | 0.284 | 0.181 | 0.218 | -0.002 | 0.130 | 0.106 |
| 0.044 | 0.213 | 0.253 | 0.278 | 0.077 | 0.167 | 0.082 |
| 1.000 | -0.044 | -0.227 | -0.025 | 0.113 | 0.093 | 0.070 |
| -0.044 | 1.000 | 0.133 | 0.101 | -0.054 | -0.064 | -0.037 |
| -0.227 | 0.133 | 1.000 | 0.345 | 0.186 | 0.222 | -0.044 |
| -0.025 | 0.101 | 0.345 | 1.000 | 0.271 | 0.231 | 0.074 |
| 0.113 | -0.054 | 0.186 | 0.271 | 1.000 | 0.160 | -0.081 |
| 0.093 | -0.064 | 0.222 | 0.231 | 0.160 | 1.000 | 0.059 |
| 0.070 | -0.037 | -0.044 | 0.074 | -0.081 | 0.059 | 1.000 |

| Q64 | Q69 |
|---|---|
| 0.288 | 0.023 |
| 0.214 | 0.196 |
| 0.150 | -0.017 |
| 0.171 | 0.215 |
| 0.101 | 0.133 |
| 0.491 | 0.041 |
| 0.444 | 0.197 |
| 0.468 | 0.057 |
| 0.182 | 0.072 |
| 0.329 | 0.206 |
| 0.328 | 0.073 |
| 1.000 | 0.222 |
| 0.222 | 1.000 |

```
USE ALL.
COMPUTE filter_$=(GRADE = 3).
VARIABLE LABELS filter_$ 'GRADE = 3 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
RELIABILITY
  /VARIABLES=Q1 Q6 Q11 Q16 Q21 Q28 Q33 Q38 Q43 Q48 Q55 Q60 Q65 Q70
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

## Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 15-AUG-2017 09:48:06 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\PRE_POST_2016 (Fixed).sav |
| | Active Dataset | DataSet1 |
| | Filter | GRADE = 3 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 98 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |

| | | |
|---|---|---|
| Syntax | | RELIABILITY<br>/VARIABLES=Q1 Q6 Q11 Q16 Q21 Q28 Q33 Q38 Q43 Q48 Q55 Q60 Q65 Q70<br>/SCALE('ALL VARIABLES') ALL<br>/MODEL=ALPHA<br><br>/STATISTICS=DESCRIPTIVE SCALE CORR<br>/SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.03 |
| | Elapsed Time | 00:00:00.01 |

## Scale: ALL VARIABLES

### Case Processing Summary

| | | N | % |
|---|---|---|---|
| Cases | Valid | 97 | 99.0 |
| | Excluded[a] | 1 | 1.0 |
| | Total | 98 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.805 | 0.814 | 14 |

### Item Statistics

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q1 | 3.46 | 1.061 | 97 |
| Q6 | 4.22 | 0.927 | 97 |
| Q11 | 4.20 | 1.007 | 97 |
| Q16 | 3.58 | 1.088 | 97 |
| Q21 | 4.00 | 1.031 | 97 |
| Q28 | 4.30 | 0.738 | 97 |
| Q33 | 4.13 | 0.920 | 97 |
| Q38 | 3.66 | 1.050 | 97 |
| Q43 | 2.41 | 1.087 | 97 |
| Q48 | 3.11 | 1.384 | 97 |
| Q55 | 3.70 | 1.129 | 97 |

| | | | |
|---|---|---|---|
| Q60 | 3.34 | 1.224 | 97 |
| Q65 | 3.65 | 1.250 | 97 |
| Q70 | 3.71 | 1.060 | 97 |

| | Q1 | Q6 | Q11 |
|---|---|---|---|
| Q1 | 1.000 | 0.289 | 0.207 |
| Q6 | 0.289 | 1.000 | 0.055 |
| Q11 | 0.207 | 0.055 | 1.000 |
| Q16 | 0.289 | 0.226 | 0.229 |
| Q21 | 0.143 | 0.000 | 0.030 |
| Q28 | 0.180 | 0.133 | 0.397 |
| Q33 | 0.373 | 0.259 | 0.522 |
| Q38 | 0.283 | 0.184 | 0.507 |
| Q43 | 0.464 | 0.241 | 0.125 |
| Q48 | 0.219 | 0.208 | 0.238 |
| Q55 | 0.195 | 0.152 | 0.263 |
| Q60 | 0.070 | 0.035 | -0.029 |
| Q65 | 0.006 | 0.048 | -0.052 |
| Q70 | 0.389 | 0.319 | 0.034 |

**Summary Item Statistics**

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 3.677 | 2.412 | 4.299 |
| Inter-Item Correlations | 0.239 | -0.052 | 0.619 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q1 | 48.01 | 56.406 | 0.432 |
| Q6 | 47.26 | 59.297 | 0.299 |
| Q11 | 47.28 | 58.265 | 0.334 |
| Q16 | 47.90 | 54.593 | 0.537 |
| Q21 | 47.47 | 57.710 | 0.361 |
| Q28 | 47.18 | 57.167 | 0.601 |
| Q33 | 47.34 | 55.227 | 0.610 |
| Q38 | 47.81 | 55.715 | 0.485 |
| Q43 | 49.06 | 56.579 | 0.407 |
| Q48 | 48.36 | 52.900 | 0.477 |
| Q55 | 47.77 | 55.031 | 0.484 |
| Q60 | 48.13 | 58.096 | 0.259 |
| Q65 | 47.82 | 57.625 | 0.276 |
| Q70 | 47.76 | 54.704 | 0.548 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 51.47 | 64.419 | 8.026 | 14 |

```
RELIABILITY
  /VARIABLES=Q2 Q7 Q12 Q17 Q22 Q29 Q34 Q39 Q44 Q49 Q56 Q61 Q66 Q71
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

# Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 15-AUG-2017 09:48:06 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\PRE_POST_2016 (Fixed).sav |
| | Active Dataset | DataSet1 |
| | Filter | GRADE = 3 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 98 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |

| | | |
|---|---|---|
| Syntax | | RELIABILITY<br>/VARIABLES=Q2 Q7 Q12 Q17 Q22 Q29 Q34 Q39 Q44 Q49 Q56 Q61 Q66 Q71<br>/SCALE('ALL VARIABLES') ALL<br>/MODEL=ALPHA<br><br>/STATISTICS=DESCRIPTIVE SCALE CORR<br>/SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.00 |
| | Elapsed Time | 00:00:00.06 |

## Scale: ALL VARIABLES

### Case Processing Summary

| | | N | % |
|---|---|---|---|
| Cases | Valid | 96 | 98.0 |
| | Excluded[a] | 2 | 2.0 |
| | Total | 98 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.767 | 0.765 | 14 |

### Item Statistics

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q2 | 3.51 | 1.188 | 96 |
| Q7 | 4.47 | 0.870 | 96 |
| Q12 | 3.80 | 1.193 | 96 |
| Q17 | 3.35 | 1.231 | 96 |
| Q22 | 4.47 | 1.025 | 96 |
| Q29 | 3.45 | 1.493 | 96 |
| Q34 | 2.96 | 1.281 | 96 |
| Q39 | 3.65 | 1.322 | 96 |
| Q44 | 4.53 | 0.906 | 96 |
| Q49 | 4.79 | 0.614 | 96 |
| Q56 | 4.42 | 1.167 | 96 |

| | | | |
|---|---|---|---|
| Q61 | 3.27 | 1.021 | 96 |
| Q66 | 4.28 | 1.073 | 96 |
| Q71 | 3.76 | 1.442 | 96 |

| | Q2 | Q7 | Q12 |
|---|---|---|---|
| Q2 | 1.000 | 0.449 | 0.354 |
| Q7 | 0.449 | 1.000 | 0.526 |
| Q12 | 0.354 | 0.526 | 1.000 |
| Q17 | 0.321 | 0.197 | 0.220 |
| Q22 | 0.139 | 0.388 | 0.102 |
| Q29 | 0.469 | 0.436 | 0.393 |
| Q34 | 0.201 | 0.235 | 0.160 |
| Q39 | 0.438 | 0.439 | 0.376 |
| Q44 | -0.030 | 0.215 | 0.157 |
| Q49 | 0.176 | 0.165 | 0.202 |
| Q56 | 0.202 | 0.117 | -0.038 |
| Q61 | 0.276 | 0.389 | 0.036 |
| Q66 | 0.349 | 0.331 | 0.282 |
| Q71 | 0.011 | 0.124 | 0.082 |

**Summary Item Statistics**

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 3.908 | 2.958 | 4.792 |
| Inter-Item Correlations | 0.189 | -0.145 | 0.535 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q2 | 51.20 | 54.076 | 0.527 |
| Q7 | 50.24 | 55.763 | 0.629 |
| Q12 | 50.91 | 55.581 | 0.432 |
| Q17 | 51.35 | 56.779 | 0.345 |
| Q22 | 50.24 | 57.384 | 0.403 |
| Q29 | 51.26 | 48.216 | 0.687 |
| Q34 | 51.75 | 55.663 | 0.387 |
| Q39 | 51.06 | 52.249 | 0.560 |
| Q44 | 50.18 | 61.431 | 0.172 |
| Q49 | 49.92 | 62.582 | 0.178 |
| Q56 | 50.29 | 61.325 | 0.110 |
| Q61 | 51.44 | 58.270 | 0.345 |
| Q66 | 50.43 | 58.016 | 0.338 |
| Q71 | 50.95 | 57.587 | 0.230 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 54.71 | 64.693 | 8.043 | 14 |

```
RELIABILITY
  /VARIABLES=Q3 Q8 Q13 Q18 Q23 Q27 Q30 Q35 Q40 Q45 Q50 Q54 Q57 Q62 Q67 Q72
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

# Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 15-AUG-2017 09:48:06 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\PRE_POST_2016 (Fixed).sav |
| | Active Dataset | DataSet1 |
| | Filter | GRADE = 3 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 98 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |

| | | |
|---|---|---|
| Syntax | | RELIABILITY<br>/VARIABLES=Q3 Q8 Q13 Q18 Q23 Q27 Q30 Q35 Q40 Q45 Q50 Q54 Q57 Q62 Q67 Q72 Q74<br>/SCALE('ALL VARIABLES') ALL<br>/MODEL=ALPHA<br><br>/STATISTICS=DESCRIPTIVE SCALE CORR<br>/SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.03 |

## Scale: ALL VARIABLES

### Case Processing Summary

| | | N | % |
|---|---|---|---|
| Cases | Valid | 94 | 95.9 |
| | Excluded[a] | 4 | 4.1 |
| | Total | 98 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.851 | 0.854 | 17 |

### Item Statistics

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q3 | 4.21 | 1.144 | 94 |
| Q8 | 2.93 | 1.184 | 94 |
| Q13 | 4.21 | 1.046 | 94 |
| Q18 | 3.94 | 1.003 | 94 |
| Q23 | 4.14 | 1.012 | 94 |
| Q27 | 4.10 | 0.940 | 94 |
| Q30 | 3.56 | 1.122 | 94 |
| Q35 | 4.07 | 1.050 | 94 |
| Q40 | 3.68 | 1.138 | 94 |
| Q45 | 3.26 | 1.145 | 94 |
| Q50 | 2.57 | 1.214 | 94 |

| | | | |
|---|---|---|---|
| Q54 | 3.65 | 1.124 | 94 |
| Q57 | 3.68 | 1.090 | 94 |
| Q62 | 3.21 | 1.252 | 94 |
| Q67 | 2.80 | 1.223 | 94 |
| Q72 | 2.81 | 1.221 | 94 |
| Q74 | 3.78 | 1.028 | 94 |

| | Q3 | Q8 | Q13 |
|---|---|---|---|
| Q3 | 1.000 | 0.171 | 0.231 |
| Q8 | 0.171 | 1.000 | 0.187 |
| Q13 | 0.231 | 0.187 | 1.000 |
| Q18 | 0.209 | 0.295 | 0.269 |
| Q23 | 0.337 | 0.197 | 0.622 |
| Q27 | 0.101 | 0.248 | 0.373 |
| Q30 | 0.165 | 0.218 | 0.428 |
| Q35 | 0.139 | 0.203 | 0.700 |
| Q40 | 0.053 | 0.078 | 0.365 |
| Q45 | 0.221 | 0.260 | 0.313 |
| Q50 | 0.120 | 0.329 | 0.106 |
| Q54 | -0.083 | 0.021 | 0.156 |
| Q57 | 0.176 | 0.048 | 0.258 |
| Q62 | 0.073 | 0.134 | 0.318 |
| Q67 | 0.246 | 0.294 | 0.362 |
| Q72 | 0.122 | 0.332 | 0.352 |
| Q74 | 0.178 | 0.278 | 0.405 |

**Summary Item Statistics**

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 3.564 | 2.574 | 4.213 |
| Inter-Item Correlations | 0.256 | -0.083 | 0.700 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q3 | 56.38 | 98.863 | 0.272 |
| Q8 | 57.67 | 96.288 | 0.373 |
| Q13 | 56.38 | 92.712 | 0.623 |
| Q18 | 56.66 | 96.098 | 0.470 |
| Q23 | 56.46 | 93.971 | 0.579 |
| Q27 | 56.50 | 96.489 | 0.486 |
| Q30 | 57.03 | 93.365 | 0.541 |
| Q35 | 56.52 | 93.908 | 0.557 |

| | | | |
|---|---|---|---|
| Q40 | 56.91 | 93.175 | 0.541 |
| Q45 | 57.34 | 94.205 | 0.488 |
| Q50 | 58.02 | 99.096 | 0.239 |
| Q54 | 56.95 | 99.965 | 0.228 |
| Q57 | 56.91 | 96.960 | 0.382 |
| Q62 | 57.38 | 93.852 | 0.451 |
| Q67 | 57.80 | 90.937 | 0.597 |
| Q72 | 57.79 | 93.911 | 0.463 |
| Q74 | 56.82 | 92.687 | 0.637 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 60.60 | 106.351 | 10.313 | 17 |

```
RELIABILITY
  /VARIABLES=Q4 Q9 Q14 Q19 Q24 Q26 Q31 Q36 Q41 Q46 Q51 Q53 Q58 Q63 Q68 Q73
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

# Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 15-AUG-2017 09:48:06 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\PRE_POST_2016 (Fixed).sav |
| | Active Dataset | DataSet1 |
| | Filter | GRADE = 3 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 98 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |

| | | |
|---|---|---|
| Syntax | | RELIABILITY<br>/VARIABLES=Q4 Q9 Q14 Q19 Q24 Q26 Q31 Q36 Q41 Q46 Q51 Q53 Q58 Q63 Q68 Q73 Q75 Q76<br>/SCALE('ALL VARIABLES') ALL<br>/MODEL=ALPHA<br><br>/STATISTICS=DESCRIPTIVE SCALE CORR<br>/SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.02 |

## Scale: ALL VARIABLES

### Case Processing Summary

| | | N | % |
|---|---|---|---|
| Cases | Valid | 92 | 93.9 |
| | Excluded[a] | 6 | 6.1 |
| | Total | 98 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.754 | 0.755 | 18 |

### Item Statistics

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q4 | 2.78 | 1.256 | 92 |
| Q9 | 2.97 | 1.104 | 92 |
| Q14 | 3.45 | 0.894 | 92 |
| Q19 | 2.75 | 1.106 | 92 |
| Q24 | 3.10 | 1.070 | 92 |
| Q26 | 3.35 | 1.094 | 92 |
| Q31 | 3.53 | 0.977 | 92 |
| Q36 | 2.18 | 0.994 | 92 |
| Q41 | 3.12 | 1.308 | 92 |
| Q46 | 3.15 | 1.068 | 92 |
| Q51 | 3.12 | 1.308 | 92 |

| | | | |
|---|---|---|---|
| Q53 | 3.70 | 1.184 | 92 |
| Q58 | 1.67 | 0.891 | 92 |
| Q63 | 2.54 | 1.253 | 92 |
| Q68 | 3.17 | 1.210 | 92 |
| Q73 | 3.84 | 1.141 | 92 |
| Q75 | 3.08 | 1.112 | 92 |
| Q76 | 3.54 | 1.123 | 92 |

| | Q4 | Q9 | Q14 |
|---|---|---|---|
| Q4 | 1.000 | 0.106 | 0.293 |
| Q9 | 0.106 | 1.000 | 0.204 |
| Q14 | 0.293 | 0.204 | 1.000 |
| Q19 | 0.301 | 0.164 | 0.203 |
| Q24 | -0.066 | 0.207 | -0.115 |
| Q26 | 0.375 | 0.210 | 0.256 |
| Q31 | 0.149 | 0.393 | 0.279 |
| Q36 | 0.288 | 0.416 | 0.339 |
| Q41 | 0.176 | 0.048 | 0.123 |
| Q46 | 0.320 | 0.172 | 0.250 |
| Q51 | 0.003 | 0.163 | -0.055 |
| Q53 | 0.265 | 0.135 | 0.254 |
| Q58 | -0.035 | 0.179 | -0.160 |
| Q63 | 0.474 | 0.164 | 0.243 |
| Q68 | 0.126 | -0.020 | 0.070 |
| Q73 | 0.013 | -0.022 | -0.122 |
| Q75 | 0.043 | 0.306 | 0.087 |
| Q76 | 0.116 | 0.023 | 0.314 |

**Summary Item Statistics**

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 3.058 | 1.674 | 3.837 |
| Inter-Item Correlations | 0.146 | -0.292 | 0.474 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q4 | 52.26 | 68.986 | 0.395 |
| Q9 | 52.08 | 70.862 | 0.362 |
| Q14 | 51.60 | 73.012 | 0.327 |
| Q19 | 52.29 | 67.462 | 0.558 |
| Q24 | 51.95 | 73.898 | 0.205 |
| Q26 | 51.70 | 68.236 | 0.519 |

| | | | |
|---|---|---|---|
| Q31 | 51.51 | 72.275 | 0.336 |
| Q36 | 52.86 | 68.936 | 0.539 |
| Q41 | 51.92 | 70.137 | 0.318 |
| Q46 | 51.89 | 68.186 | 0.538 |
| Q51 | 51.92 | 70.071 | 0.321 |
| Q53 | 51.35 | 70.537 | 0.346 |
| Q58 | 53.37 | 76.367 | 0.106 |
| Q63 | 52.50 | 67.132 | 0.492 |
| Q68 | 51.87 | 73.126 | 0.204 |
| Q73 | 51.21 | 75.023 | 0.126 |
| Q75 | 51.97 | 70.999 | 0.351 |
| Q76 | 51.50 | 78.429 | -0.044 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 55.04 | 78.811 | 8.878 | 18 |

```
RELIABILITY
  /VARIABLES=Q5 Q10 Q15 Q20 Q25 Q32 Q37 Q42 Q47 Q52 Q59 Q64 Q69
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

# Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 15-AUG-2017 09:48:06 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\DATA USE\PRE_POST_2016 (Fixed).sav |
| | Active Dataset | DataSet1 |
| | Filter | GRADE = 3 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 98 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |

| | | |
|---|---|---|
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |
| Syntax | | RELIABILITY<br>/VARIABLES=Q5 Q10 Q15 Q20 Q25 Q32 Q37 Q42 Q47 Q52 Q59 Q64 Q69<br>/SCALE('ALL VARIABLES') ALL<br>/MODEL=ALPHA<br><br>/STATISTICS=DESCRIPTIVE SCALE CORR<br>/SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.04 |

## Scale: ALL VARIABLES

### Case Processing Summary

| | | N | % |
|---|---|---|---|
| Cases | Valid | 95 | 96.9 |
| | Excluded[a] | 3 | 3.1 |
| | Total | 98 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.756 | 0.782 | 13 |

### Item Statistics

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q5 | 4.42 | 0.807 | 95 |
| Q10 | 4.00 | 1.062 | 95 |
| Q15 | 3.47 | 1.450 | 95 |
| Q20 | 4.65 | 0.809 | 95 |
| Q25 | 3.13 | 1.315 | 95 |
| Q32 | 4.73 | 0.691 | 95 |
| Q37 | 4.77 | 0.750 | 95 |

| | | | |
|---|---|---|---|
| Q42 | 4.85 | 0.505 | 95 |
| Q47 | 4.09 | 0.990 | 95 |
| Q52 | 4.07 | 1.003 | 95 |
| Q59 | 3.99 | 1.005 | 95 |
| Q64 | 4.47 | 0.955 | 95 |
| Q69 | 4.28 | 0.986 | 95 |

**Ir**

| | Q5 | Q10 | Q15 |
|---|---|---|---|
| Q5 | 1.000 | 0.137 | 0.346 |
| Q10 | 0.137 | 1.000 | 0.193 |
| Q15 | 0.346 | 0.193 | 1.000 |
| Q20 | 0.390 | -0.074 | -0.012 |
| Q25 | 0.190 | 0.160 | 0.013 |
| Q32 | 0.514 | 0.145 | 0.269 |
| Q37 | 0.409 | 0.134 | 0.073 |
| Q42 | 0.154 | 0.258 | 0.300 |
| Q47 | 0.589 | 0.051 | 0.080 |
| Q52 | 0.290 | 0.250 | 0.217 |
| Q59 | 0.412 | 0.060 | 0.171 |
| Q64 | 0.346 | 0.220 | 0.436 |
| Q69 | 0.289 | 0.051 | 0.240 |

**Summary Item Statistics**

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 4.226 | 3.126 | 4.853 |
| Inter-Item Correlations | 0.216 | -0.074 | 0.589 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q5 | 50.52 | 34.338 | 0.658 |
| Q10 | 50.94 | 36.911 | 0.246 |
| Q15 | 51.46 | 33.294 | 0.347 |
| Q20 | 50.28 | 36.759 | 0.387 |
| Q25 | 51.81 | 35.623 | 0.246 |
| Q32 | 50.21 | 37.359 | 0.399 |
| Q37 | 50.17 | 37.290 | 0.366 |
| Q42 | 50.08 | 38.397 | 0.409 |
| Q47 | 50.84 | 35.517 | 0.399 |
| Q52 | 50.86 | 34.226 | 0.510 |
| Q59 | 50.95 | 35.731 | 0.372 |
| Q64 | 50.46 | 34.060 | 0.560 |

| | | | |
|---|---|---|---|
| Q69 | 50.65 | 36.229 | 0.338 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 54.94 | 41.209 | 6.419 | 13 |

**Inter-Item Correlation Matrix**

| Q16 | Q21 | Q28 | Q33 | Q38 | Q43 | Q48 | Q55 |
|---|---|---|---|---|---|---|---|
| 0.289 | 0.143 | 0.180 | 0.373 | 0.283 | 0.464 | 0.219 | 0.195 |
| 0.226 | 0.000 | 0.133 | 0.259 | 0.184 | 0.241 | 0.208 | 0.152 |
| 0.229 | 0.030 | 0.397 | 0.522 | 0.507 | 0.125 | 0.238 | 0.263 |
| 1.000 | 0.204 | 0.340 | 0.317 | 0.292 | 0.210 | 0.496 | 0.227 |
| 0.204 | 1.000 | 0.342 | 0.373 | 0.193 | 0.093 | 0.110 | 0.242 |
| 0.340 | 0.342 | 1.000 | 0.416 | 0.482 | 0.234 | 0.303 | 0.408 |
| 0.317 | 0.373 | 0.416 | 1.000 | 0.619 | 0.267 | 0.307 | 0.360 |
| 0.292 | 0.193 | 0.482 | 0.619 | 1.000 | 0.170 | 0.185 | 0.291 |
| 0.210 | 0.093 | 0.234 | 0.267 | 0.170 | 1.000 | 0.329 | 0.263 |
| 0.496 | 0.110 | 0.303 | 0.307 | 0.185 | 0.329 | 1.000 | 0.249 |
| 0.227 | 0.242 | 0.408 | 0.360 | 0.291 | 0.263 | 0.249 | 1.000 |
| 0.211 | 0.248 | 0.301 | 0.172 | 0.115 | 0.034 | 0.088 | 0.346 |
| 0.250 | 0.315 | 0.284 | 0.077 | 0.091 | 0.061 | 0.228 | 0.154 |
| 0.399 | 0.295 | 0.338 | 0.243 | 0.164 | 0.402 | 0.399 | 0.284 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 1.887 | 1.782 | 0.258 | 14 |
| 0.672 | -11.804 | 0.018 | 14 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.358 | 0.792 |
| 0.199 | 0.801 |
| 0.451 | 0.799 |
| 0.368 | 0.783 |
| 0.333 | 0.797 |
| 0.460 | 0.785 |
| 0.584 | 0.780 |
| 0.490 | 0.788 |
| 0.331 | 0.794 |
| 0.367 | 0.789 |
| 0.301 | 0.788 |
| 0.226 | 0.807 |
| 0.245 | 0.806 |
| 0.439 | 0.783 |

**Inter-Item Correlation Matrix**

| Q17 | Q22 | Q29 | Q34 | Q39 | Q44 | Q49 | Q56 |
|---|---|---|---|---|---|---|---|
| 0.321 | 0.139 | 0.469 | 0.201 | 0.438 | -0.030 | 0.176 | 0.202 |
| 0.197 | 0.388 | 0.436 | 0.235 | 0.439 | 0.215 | 0.165 | 0.117 |
| 0.220 | 0.102 | 0.393 | 0.160 | 0.376 | 0.157 | 0.202 | -0.038 |
| 1.000 | -0.008 | 0.360 | 0.377 | 0.337 | 0.028 | 0.071 | 0.065 |
| -0.008 | 1.000 | 0.370 | 0.352 | 0.201 | 0.160 | 0.006 | -0.024 |
| 0.360 | 0.370 | 1.000 | 0.357 | 0.535 | 0.087 | 0.091 | 0.025 |
| 0.377 | 0.352 | 0.357 | 1.000 | 0.265 | 0.019 | -0.145 | 0.047 |
| 0.337 | 0.201 | 0.535 | 0.265 | 1.000 | 0.045 | 0.038 | 0.151 |
| 0.028 | 0.160 | 0.087 | 0.019 | 0.045 | 1.000 | 0.258 | 0.237 |
| 0.071 | 0.006 | 0.091 | -0.145 | 0.038 | 0.258 | 1.000 | 0.255 |
| 0.065 | -0.024 | 0.025 | 0.047 | 0.151 | 0.237 | 0.255 | 1.000 |
| 0.183 | 0.239 | 0.230 | 0.323 | 0.283 | 0.105 | -0.010 | 0.063 |
| -0.012 | 0.271 | 0.282 | 0.093 | 0.108 | 0.083 | 0.266 | -0.095 |
| 0.007 | 0.354 | 0.471 | 0.091 | 0.204 | -0.022 | -0.057 | -0.084 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 1.833 | 1.620 | 0.329 | 14 |
| 0.680 | -3.688 | 0.025 | 14 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.475 | 0.739 |
| 0.534 | 0.737 |
| 0.437 | 0.748 |
| 0.314 | 0.757 |
| 0.387 | 0.752 |
| 0.587 | 0.715 |
| 0.363 | 0.753 |
| 0.419 | 0.734 |
| 0.199 | 0.770 |
| 0.258 | 0.768 |
| 0.241 | 0.779 |
| 0.293 | 0.757 |
| 0.327 | 0.757 |
| 0.373 | 0.772 |

Q74

**Inter-Item Correlation Matrix**

| Q18 | Q23 | Q27 | Q30 | Q35 | Q40 | Q45 | Q50 |
|---|---|---|---|---|---|---|---|
| 0.209 | 0.337 | 0.101 | 0.165 | 0.139 | 0.053 | 0.221 | 0.120 |
| 0.295 | 0.197 | 0.248 | 0.218 | 0.203 | 0.078 | 0.260 | 0.329 |
| 0.269 | 0.622 | 0.373 | 0.428 | 0.700 | 0.365 | 0.313 | 0.106 |
| 1.000 | 0.252 | 0.428 | 0.262 | 0.209 | 0.189 | 0.211 | 0.128 |
| 0.252 | 1.000 | 0.370 | 0.451 | 0.486 | 0.366 | 0.331 | 0.092 |
| 0.428 | 0.370 | 1.000 | 0.326 | 0.418 | 0.351 | 0.187 | -0.068 |
| 0.262 | 0.451 | 0.326 | 1.000 | 0.356 | 0.302 | 0.314 | 0.225 |
| 0.209 | 0.486 | 0.418 | 0.356 | 1.000 | 0.371 | 0.163 | 0.034 |
| 0.189 | 0.366 | 0.351 | 0.302 | 0.371 | 1.000 | 0.344 | 0.017 |
| 0.211 | 0.331 | 0.187 | 0.314 | 0.163 | 0.344 | 1.000 | 0.118 |
| 0.128 | 0.092 | -0.068 | 0.225 | 0.034 | 0.017 | 0.118 | 1.000 |
| 0.171 | -0.014 | 0.063 | 0.235 | 0.050 | 0.340 | 0.112 | 0.157 |
| 0.335 | 0.216 | 0.272 | 0.307 | 0.294 | 0.385 | 0.290 | -0.014 |
| 0.268 | 0.291 | 0.275 | 0.105 | 0.430 | 0.320 | 0.269 | 0.124 |
| 0.287 | 0.414 | 0.382 | 0.319 | 0.364 | 0.455 | 0.421 | 0.209 |
| 0.139 | 0.292 | 0.232 | 0.386 | 0.322 | 0.257 | 0.297 | 0.373 |
| 0.528 | 0.361 | 0.367 | 0.353 | 0.364 | 0.563 | 0.396 | 0.113 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 1.638 | 1.636 | 0.294 | 17 |
| 0.784 | -8.391 | 0.019 | 17 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.202 | 0.852 |
| 0.282 | 0.847 |
| 0.636 | 0.835 |
| 0.448 | 0.842 |
| 0.529 | 0.837 |
| 0.403 | 0.842 |
| 0.427 | 0.839 |
| 0.617 | 0.838 |

| | |
|---|---|
| 0.543 | 0.839 |
| 0.362 | 0.841 |
| 0.295 | 0.854 |
| 0.293 | 0.854 |
| 0.382 | 0.846 |
| 0.372 | 0.843 |
| 0.465 | 0.835 |
| 0.388 | 0.843 |
| 0.548 | 0.835 |

Q75 Q76

**Inter-Item Correlation Matrix**

| Q19 | Q24 | Q26 | Q31 | Q36 | Q41 | Q46 | Q51 |
|---|---|---|---|---|---|---|---|
| 0.301 | -0.066 | 0.375 | 0.149 | 0.288 | 0.176 | 0.320 | 0.003 |
| 0.164 | 0.207 | 0.210 | 0.393 | 0.416 | 0.048 | 0.172 | 0.163 |
| 0.203 | -0.115 | 0.256 | 0.279 | 0.339 | 0.123 | 0.250 | -0.055 |
| 1.000 | 0.151 | 0.409 | 0.348 | 0.343 | 0.150 | 0.405 | 0.241 |
| 0.151 | 1.000 | 0.177 | 0.065 | 0.148 | 0.172 | 0.256 | 0.164 |
| 0.409 | 0.177 | 1.000 | 0.246 | 0.405 | 0.170 | 0.377 | 0.193 |
| 0.348 | 0.065 | 0.246 | 1.000 | 0.237 | 0.156 | 0.153 | 0.122 |
| 0.343 | 0.148 | 0.405 | 0.237 | 1.000 | 0.160 | 0.273 | 0.177 |
| 0.150 | 0.172 | 0.170 | 0.156 | 0.160 | 1.000 | 0.349 | 0.358 |
| 0.405 | 0.256 | 0.377 | 0.153 | 0.273 | 0.349 | 1.000 | 0.238 |
| 0.241 | 0.164 | 0.193 | 0.122 | 0.177 | 0.358 | 0.238 | 1.000 |
| 0.193 | 0.024 | 0.261 | 0.047 | 0.104 | 0.144 | 0.237 | 0.137 |
| 0.039 | 0.011 | -0.018 | -0.076 | 0.168 | -0.098 | 0.064 | 0.232 |
| 0.337 | 0.034 | 0.310 | 0.057 | 0.360 | 0.248 | 0.438 | 0.128 |
| 0.214 | -0.107 | 0.004 | 0.023 | 0.137 | 0.264 | 0.115 | 0.126 |
| 0.246 | 0.211 | 0.152 | 0.089 | 0.104 | -0.075 | 0.192 | 0.160 |
| 0.427 | 0.308 | 0.204 | 0.195 | 0.365 | 0.009 | 0.240 | 0.311 |
| -0.084 | -0.090 | 0.095 | 0.084 | -0.012 | -0.045 | -0.189 | -0.292 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 2.163 | 2.292 | 0.286 | 18 |
| 0.765 | -1.625 | 0.022 | 18 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.345 | 0.737 |
| 0.356 | 0.741 |
| 0.396 | 0.744 |
| 0.465 | 0.724 |
| 0.280 | 0.753 |
| 0.384 | 0.728 |

| | |
|---|---|
| 0.322 | 0.743 |
| 0.455 | 0.728 |
| 0.382 | 0.745 |
| 0.450 | 0.727 |
| 0.370 | 0.744 |
| 0.276 | 0.742 |
| 0.247 | 0.758 |
| 0.455 | 0.728 |
| 0.219 | 0.754 |
| 0.215 | 0.760 |
| 0.413 | 0.741 |
| 0.306 | 0.772 |

**ıter-Item Correlation Matrix**

| Q20 | Q25 | Q32 | Q37 | Q42 | Q47 | Q52 | Q59 |
|---|---|---|---|---|---|---|---|
| 0.390 | 0.190 | 0.514 | 0.409 | 0.154 | 0.589 | 0.290 | 0.412 |
| -0.074 | 0.160 | 0.145 | 0.134 | 0.258 | 0.051 | 0.250 | 0.060 |
| -0.012 | 0.013 | 0.269 | 0.073 | 0.300 | 0.080 | 0.217 | 0.171 |
| 1.000 | 0.312 | 0.190 | 0.287 | 0.004 | 0.307 | 0.412 | 0.231 |
| 0.312 | 1.000 | 0.027 | 0.019 | 0.109 | 0.040 | 0.388 | 0.178 |
| 0.190 | 0.027 | 1.000 | 0.266 | 0.310 | 0.147 | 0.198 | 0.149 |
| 0.287 | 0.019 | 0.266 | 1.000 | 0.077 | 0.302 | 0.193 | 0.194 |
| 0.004 | 0.109 | 0.310 | 0.077 | 1.000 | 0.092 | 0.337 | 0.186 |
| 0.307 | 0.040 | 0.147 | 0.302 | 0.092 | 1.000 | 0.143 | 0.364 |
| 0.412 | 0.388 | 0.198 | 0.193 | 0.337 | 0.143 | 1.000 | 0.096 |
| 0.231 | 0.178 | 0.149 | 0.194 | 0.186 | 0.364 | 0.096 | 1.000 |
| 0.270 | 0.181 | 0.376 | 0.199 | 0.566 | 0.177 | 0.374 | 0.271 |
| 0.165 | 0.005 | 0.084 | 0.306 | 0.128 | 0.386 | 0.280 | 0.100 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 1.726 | 1.552 | 0.262 | 13 |
| 0.663 | -7.927 | 0.019 | 13 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.649 | 0.716 |
| 0.172 | 0.757 |
| 0.348 | 0.752 |
| 0.409 | 0.741 |
| 0.254 | 0.763 |
| 0.392 | 0.742 |
| 0.262 | 0.743 |
| 0.423 | 0.745 |
| 0.485 | 0.739 |
| 0.421 | 0.726 |
| 0.255 | 0.742 |
| 0.497 | 0.722 |

| | |
|---|---|
| 0.283 | 0.746 |

| Q60 | Q65 | Q70 |
|---|---|---|
| 0.070 | 0.006 | 0.389 |
| 0.035 | 0.048 | 0.319 |
| -0.029 | -0.052 | 0.034 |
| 0.211 | 0.250 | 0.399 |
| 0.248 | 0.315 | 0.295 |
| 0.301 | 0.284 | 0.338 |
| 0.172 | 0.077 | 0.243 |
| 0.115 | 0.091 | 0.164 |
| 0.034 | 0.061 | 0.402 |
| 0.088 | 0.228 | 0.399 |
| 0.346 | 0.154 | 0.284 |
| 1.000 | 0.160 | 0.149 |
| 0.160 | 1.000 | 0.347 |
| 0.149 | 0.347 | 1.000 |

| Q61 | Q66 | Q71 |
|---|---|---|
| 0.276 | 0.349 | 0.011 |
| 0.389 | 0.331 | 0.124 |
| 0.036 | 0.282 | 0.082 |
| 0.183 | -0.012 | 0.007 |
| 0.239 | 0.271 | 0.354 |
| 0.230 | 0.282 | 0.471 |
| 0.323 | 0.093 | 0.091 |
| 0.283 | 0.108 | 0.204 |
| 0.105 | 0.083 | -0.022 |
| -0.010 | 0.266 | -0.057 |
| 0.063 | -0.095 | -0.084 |
| 1.000 | 0.160 | -0.006 |
| 0.160 | 1.000 | 0.207 |
| -0.006 | 0.207 | 1.000 |

| Q54 | Q57 | Q62 | Q67 | Q72 | Q74 |
|---|---|---|---|---|---|
| -0.083 | 0.176 | 0.073 | 0.246 | 0.122 | 0.178 |
| 0.021 | 0.048 | 0.134 | 0.294 | 0.332 | 0.278 |
| 0.156 | 0.258 | 0.318 | 0.362 | 0.352 | 0.405 |
| 0.171 | 0.335 | 0.268 | 0.287 | 0.139 | 0.528 |
| -0.014 | 0.216 | 0.291 | 0.414 | 0.292 | 0.361 |
| 0.063 | 0.272 | 0.275 | 0.382 | 0.232 | 0.367 |
| 0.235 | 0.307 | 0.105 | 0.319 | 0.386 | 0.353 |
| 0.050 | 0.294 | 0.430 | 0.364 | 0.322 | 0.364 |
| 0.340 | 0.385 | 0.320 | 0.455 | 0.257 | 0.563 |
| 0.112 | 0.290 | 0.269 | 0.421 | 0.297 | 0.396 |
| 0.157 | -0.014 | 0.124 | 0.209 | 0.373 | 0.113 |
| 1.000 | 0.162 | 0.229 | 0.089 | 0.115 | 0.229 |
| 0.162 | 1.000 | 0.271 | 0.137 | -0.030 | 0.358 |
| 0.229 | 0.271 | 1.000 | 0.394 | 0.196 | 0.296 |
| 0.089 | 0.137 | 0.394 | 1.000 | 0.348 | 0.442 |
| 0.115 | -0.030 | 0.196 | 0.348 | 1.000 | 0.300 |
| 0.229 | 0.358 | 0.296 | 0.442 | 0.300 | 1.000 |

| Q53 | Q58 | Q63 | Q68 | Q73 | Q75 | Q76 |
|---|---|---|---|---|---|---|
| 0.265 | -0.035 | 0.474 | 0.126 | 0.013 | 0.043 | 0.116 |
| 0.135 | 0.179 | 0.164 | -0.020 | -0.022 | 0.306 | 0.023 |
| 0.254 | -0.160 | 0.243 | 0.070 | -0.122 | 0.087 | 0.314 |
| 0.193 | 0.039 | 0.337 | 0.214 | 0.246 | 0.427 | -0.084 |
| 0.024 | 0.011 | 0.034 | -0.107 | 0.211 | 0.308 | -0.090 |
| 0.261 | -0.018 | 0.310 | 0.004 | 0.152 | 0.204 | 0.095 |
| 0.047 | -0.076 | 0.057 | 0.023 | 0.089 | 0.195 | 0.084 |
| 0.104 | 0.168 | 0.360 | 0.137 | 0.104 | 0.365 | -0.012 |
| 0.144 | -0.098 | 0.248 | 0.264 | -0.075 | 0.009 | -0.045 |
| 0.237 | 0.064 | 0.438 | 0.115 | 0.192 | 0.240 | -0.189 |
| 0.137 | 0.232 | 0.128 | 0.126 | 0.160 | 0.311 | -0.292 |
| 1.000 | 0.186 | 0.357 | 0.053 | -0.005 | 0.043 | 0.159 |
| 0.186 | 1.000 | 0.101 | 0.094 | 0.066 | 0.136 | -0.128 |
| 0.357 | 0.101 | 1.000 | 0.278 | 0.070 | 0.017 | -0.025 |
| 0.053 | 0.094 | 0.278 | 1.000 | 0.037 | 0.023 | 0.059 |
| -0.005 | 0.066 | 0.070 | 0.037 | 1.000 | 0.071 | -0.204 |
| 0.043 | 0.136 | 0.017 | 0.023 | 0.071 | 1.000 | -0.060 |
| 0.159 | -0.128 | -0.025 | 0.059 | -0.204 | -0.060 | 1.000 |

| Q64 | Q69 |
|---|---|
| 0.346 | 0.289 |
| 0.220 | 0.051 |
| 0.436 | 0.240 |
| 0.270 | 0.165 |
| 0.181 | 0.005 |
| 0.376 | 0.084 |
| 0.199 | 0.306 |
| 0.566 | 0.128 |
| 0.177 | 0.386 |
| 0.374 | 0.280 |
| 0.271 | 0.100 |
| 1.000 | 0.149 |
| 0.149 | 1.000 |

**Table 5-2 Results of the independent t-tests for grade 8 (2016) in the pre-SOM**

| SOM field | Sample | Mean | Standard deviation | Sig (2-tailed) | Effect size |
|---|---|---|---|---|---|
| **Study attitude** | SETH | 42,34 | 9,78 | 0,18 | 0,27 |
| | Non-SETH | 40,21 | 8,90 | | |
| **Mathematics anxiety** | SETH | 43,78 | 9,09 | 0,14 | 0,31 |
| | Non-SETH | 41,43 | 9,43 | | |
| **Study habits** | SETH | 50,14 | 11,68 | 0,16 | 0,28 |
| | Non-SETH | 47,49 | 10,77 | | |
| **Problem-solving behaviour** | SETH | 43,91 | 10,44 | 0,40 | 0,18 |
| | Non-SETH | 42,44 | 10,22 | | |
| **Study milieu** | SETH | 43,14 | 6,93 | 0,10 | 0,34 |
| | Non-SETH | 41,02 | 7,72 | | |

**Table 5-3 Results of the independent t-tests for grade 8 (2016) in the post-SOM**

| SOM field | Cohort | Mean | Standard deviation | Sig (2-tailed) | Effect size |
|---|---|---|---|---|---|
| **Study attitude** | SETH | 42,25 | 8,02 | 0,54 | 0,14 |
| | Non-SETH | 41,38 | 7,98 | | |
| **Mathematics anxiety** | SETH | 45,87 | 8,43 | 0,12 | 0,33 |
| | Non-SETH | 43,42 | 9,19 | | |
| **Study habits** | SETH | 48,98 | 11,40 | 0,81 | 0,05 |
| | Non-SETH | 48,51 | 10,92 | | |
| **Problem-solving behaviour** | SETH | 46,65 | 11,27 | 0,09 | 0,34 |
| | Non-SETH | 43,55 | 9,79 | | |
| **Study milieu** | SETH | 45,75 | 5,28 | 0,03 | 0,45 |
| | Non-SETH | 42,26 | 6,94 | | |

**Table 5-4 Results of the independent t-tests for grade 9 (2016) in the pre-SOM**

| SOM field | Cohort | Mean | Standard deviation | Sig (2-tailed) | Effect size |
|---|---|---|---|---|---|
| **Study attitude** | SETH | 43,82 | 6,72 | 0,01 | 0,57 |
| | Non-SETH | 40,14 | 8,11 | | |
| **Mathematics anxiety** | SETH | 44,54 | 7,34 | 0,37 | 0,20 |
| | Non-SETH | 43,17 | 8,70 | | |
| **Study habits** | SETH | 52,71 | 8,88 | 0,00 | 0,77 |
| | Non-SETH | 46,43 | 10,14 | | |
| **Problem-solving behaviour** | SETH | 47,05 | 9,11 | 0,01 | 0,60 |
| | Non-SETH | 42,65 | 8,44 | | |
| **Study milieu** | SETH | 45,10 | 4,91 | 0,15 | 0,30 |
| | Non-SETH | 43,45 | 6,79 | | |

**Table 5-5 Results of the independent t-tests for grade 9 (2016) in the post-SOM**

| SOM field | Cohort | Mean | Standard deviation | Sig (2-tailed) | Effect size |
|---|---|---|---|---|---|
| **Study attitude** | SETH | 44,59 | 7,59 | 0,00 | 0,71 |
| | Non-SETH | 39,82 | 8,45 | | |
| **Mathematics anxiety** | SETH | 47,58 | 5,45 | 0,22 | 0,26 |
| | Non-SETH | 45,86 | 8,40 | | |
| **Study habits** | SETH | 53,39 | 9,38 | 0,01 | 0,58 |
| | Non-SETH | 48,04 | 11,46 | | |
| **Problem-solving behaviour** | SETH | 48,65 | 8,29 | 0,00 | 0,69 |
| | Non-SETH | 43,78 | 8,82 | | |
| **Study milieu** | SETH | 46,75 | 4,65 | 0,10 | 0,35 |
| | Non-SETH | 44,82 | 7,03 | | |

**Table 5-6 Results of the independent t-tests for grade 8 (2017) in the pre-SOM**

| SOM field | Cohort | Mean | Standard deviation | Sig (2-tailed) | Effect size |
|---|---|---|---|---|---|
| **Study attitude** | SETH | 44,94 | 9,46 | 0,17 | 0,26 |
| | Non-SETH | 42,99 | 7,73 | | |
| **Mathematics anxiety** | SETH | 42,93 | 10,03 | 0,72 | 0,07 |
| | Non-SETH | 43,49 | 8,85 | | |
| **Study habits** | SETH | 53,43 | 11,13 | 0,09 | 0,34 |
| | Non-SETH | 50,43 | 9,91 | | |
| **Problem-solving behaviour** | SETH | 48,90 | 9,03 | 0,01 | 0,53 |
| | Non-SETH | 44,77 | 9,72 | | |
| **Study milieu** | SETH | 43,55 | 8,09 | 0,50 | 0,13 |
| | Non-SETH | 42,72 | 6,93 | | |

**Table 5-7 Results of the independent t-tests for grade 8 (2017) in the post-SOM**

| SOM field | Cohort | Mean | Standard deviation | Sig (2-tailed) | Effect size |
|---|---|---|---|---|---|
| **Study attitude** | SETH | 42,62 | 8,62 | 0,18 | 0,29 |
| | Non-SETH | 40,34 | 9,83 | | |
| **Mathematics anxiety** | SETH | 44,69 | 9,35 | 0,56 | 0,13 |
| | Non-SETH | 43,74 | 8,80 | | |
| **Study habits** | SETH | 51,89 | 8,42 | 0,07 | 0,37 |
| | Non-SETH | 48,41 | 11,86 | | |
| **Problem-solving behaviour** | SETH | 47,96 | 7,46 | 0,02 | 0,48 |
| | Non-SETH | 43,89 | 10,58 | | |
| **Study milieu** | SETH | 43,48 | 9,17 | 0,76 | 0,06 |
| | Non-SETH | 43,02 | 7,63 | | |

**Table 5-8 Results of the paired t-test for grade 8 (2016)**

| SETH | SOM | Mean | Standard deviation | Sig (2-tailed) | Effect size |
|---|---|---|---|---|---|
| **Study attitude** | Pre<br>Post | 41,87<br>42,25 | 9,73<br>8,02 | 0,69 | 0,05 |
| **Mathematics anxiety** | Pre<br>Post | 43,55<br>45,87 | 9,06<br>8,43 | 0,02 | 0,32 |
| **Study habits** | Pre<br>Post | 49,55<br>48,98 | 11,86<br>11,40 | 0,65 | 0,06 |
| **Problem-solving behaviour** | Pre<br>Post | 43,80<br>46,65 | 10,20<br>11,27 | 0,01 | 0,32 |
| **Study milieu** | Pre<br>Post | 43,18<br>45,75 | 6,61<br>5,28 | 0,00 | 0,49 |
| **Non-SETH** | **SOM** | **Mean** | **Standard deviation** | **Sig (2-tailed)** | **Effect size** |
| **Study attitude** | Pre<br>Post | 40,04<br>41,38 | 8,98<br>7,98 | 0,11 | 0,19 |
| **Mathematics anxiety** | Pre<br>Post | 41,23<br>43,42 | 9,49<br>9,19 | 0,01 | 0,29 |
| **Study habits** | Pre<br>Post | 47,35<br>48,51 | 10,91<br>10,92 | 0,26 | 0,13 |
| **Problem-solving behaviour** | Pre<br>Post | 42,21<br>43,55 | 10,12<br>9,79 | 0,15 | 0,17 |
| **Study milieu** | Pre<br>Post | 40,94<br>43,26 | 7,81<br>6,94 | 0,00 | 0,37 |

**Table 5-9 Results of the paired t-test for grade 9 (2016)**

| SETH | SOM | Mean | Standard deviation | Sig (2-tailed) | Effect size |
|---|---|---|---|---|---|
| **Study attitude** | Pre<br>Post | 43,82<br>44,59 | 6,72<br>7,59 | 0,46 | 0,13 |
| **Mathematics anxiety** | Pre<br>Post | 44,54<br>47,58 | 7,34<br>5,45 | 0,00 | 0,52 |
| **Study habits** | Pre<br>Post | 52,71<br>53,39 | 8,88<br>9,38 | 0,63 | 0,09 |
| **Problem-solving behaviour** | Pre<br>Post | 47,05<br>48,65 | 9,11<br>8,29 | 0,32 | 0,22 |
| **Study milieu** | Pre<br>Post | 45,10<br>46,75 | 4,91<br>4,65 | 0,03 | 0,42 |
| **Non-SETH** | **SOM** | **Mean** | **Standard deviation** | **Sig (2-tailed)** | **Effect size** |
| **Study attitude** | Pre<br>Post | 40,14<br>39,82 | 7,94<br>8,45 | 0,60 | 0,05 |
| **Mathematics anxiety** | Pre<br>Post | 43,15<br>48,86 | 8,76<br>8,40 | 0,00 | 0,39 |
| **Study habits** | Pre<br>Post | 46,66<br>48,04 | 9,54<br>11,46 | 0,07 | 0,15 |
| **Problem-solving behaviour** | Pre<br>Post | 42,64<br>43,78 | 8,01<br>8,82 | 0,07 | 0,16 |
| **Study milieu** | Pre<br>Post | 43,44<br>44,82 | 6,88<br>7,03 | 0,02 | 0,24 |

**Table 5-10 Results of the paired t-test for grade 8 (2017)**

| SETH | SOM | Mean | Standard deviation | Sig (2-tailed) | Effect size |
|---|---|---|---|---|---|
| **Study attitude** | Pre<br>Post | 45,45<br>42,62 | 7,84<br>8,62 | 0,01 | 0,41 |
| **Mathematics anxiety** | Pre<br>Post | 43,57<br>44,69 | 9,34<br>9,35 | 0,25 | 0,15 |
| **Study habits** | Pre<br>Post | 54,38<br>51,89 | 7,95<br>8,42 | 0,01 | 0,37 |
| **Problem-solving behaviour** | Pre<br>Post | 49,30<br>47,96 | 8,07<br>7,46 | 0,10 | 0,21 |
| **Study milieu** | Pre<br>Post | 44,33<br>43,48 | 6,49<br>9,17 | 0,30 | 0,11 |
| **Non-SETH** | **SOM** | **Mean** | **Standard deviation** | **Sig (2-tailed)** | **Effect size** |
| **Study attitude** | Pre<br>Post | 42,96<br>40,34 | 7,51<br>9,83 | 0,03 | 0,33 |
| **Mathematics anxiety** | Pre<br>Post | 43,18<br>43,74 | 9,03<br>8,80 | 0,49 | 0,08 |
| **Study habits** | Pre<br>Post | 50,34<br>48,41 | 10,40<br>11,86 | 0,10 | 0,20 |
| **Problem-solving behaviour** | Pre<br>Post | 44,46<br>43,89 | 9,57<br>10,58 | 0,59 | 0,07 |
| **Study milieu** | Pre<br>Post | 42,23<br>43,02 | 7,31<br>7,63 | 0,22 | 0,13 |

**Table 5-11 Results of the paired t-test for the grade 8 (2016) pre-and delayed-post SOM**

| SETH | SOM | Mean | Standard deviation | Sig (2-tailed) | Effect size |
|---|---|---|---|---|---|
| **Study attitude** | Pre<br>Post (D) | 42,17<br>42,83 | 9,93<br>8,50 | 0,54 | 0,08 |
| **Mathematics anxiety** | Pre<br>Post (D) | 44,03<br>44,60 | 8,37<br>8,20 | 0,61 | 0,09 |
| **Study habits** | Pre<br>Post (D) | 50,23<br>49,54 | 11,58<br>12,17 | 0,57 | 0,07 |
| **Problem-solving behaviour** | Pre<br>Post (D) | 44,00<br>45,66 | 10,62<br>10,94 | 0,21 | 0,19 |
| **Study milieu** | Pre<br>Post (D) | 43,66<br>46,09 | 5,92<br>5,45 | 0,01 | 0,51 |
| **Non-SETH** | **SOM** | **Mean** | **Standard deviation** | **Sig (2-tailed)** | **Effect size** |
| **Study attitude** | Pre<br>Post (D) | 40,20<br>42,23 | 8,75<br>7,66 | 0,03 | 0,29 |
| **Mathematics anxiety** | Pre<br>Post (D) | 41,15<br>45,02 | 9,70<br>7,71 | 0,00 | 0,50 |
| **Study habits** | Pre<br>Post (D) | 46,92<br>49,65 | 10,50<br>10,81 | 0,01 | 0,31 |
| **Problem-solving behaviour** | Pre<br>Post (D) | 42,42<br>46,34 | 10,24<br>9,93 | 0,00 | 0,48 |
| **Study milieu** | Pre<br>Post (D) | 40,90<br>44,75 | 8,01<br>6,63 | 0,00 | 0,60 |

**Table 5-12 Results of the paired t-test for the grade 9 (2016) pre-and delayed post-SOM**

| SETH | SOM | Mean | Standard deviation | Sig (2-tailed) | Effect size |
|---|---|---|---|---|---|
| **Study attitude** | Pre<br>Post (D) | 43,82<br>43,74 | 6,72<br>7,90 | 0,94 | 0,01 |
| **Mathematics anxiety** | Pre<br>Post (D) | 44,54<br>48,15 | 7,34<br>6,11 | 0,00 | 0,62 |
| **Study habits** | Pre<br>Post (D) | 52,71<br>52,59 | 8,88<br>10,41 | 0,94 | 0,01 |
| **Problem-solving behaviour** | Pre<br>Post (D) | 47,05<br>47,97 | 9,11<br>9,34 | 0,60 | 0,12 |
| **Study milieu** | Pre<br>Post (D) | 45,09<br>45,15 | 4,91<br>5,90 | 0,96 | 0,01 |
| **Non-SETH** | **SOM** | **Mean** | **Standard deviation** | **Sig (2-tailed)** | **Effect size** |
| **Study attitude** | Pre<br>Post (D) | 40,34<br>39,22 | 7,15<br>7,62 | 0,17 | 0,19 |
| **Mathematics anxiety** | Pre<br>Post (D) | 43,58<br>45,33 | 8,18<br>8,40 | 0,02 | 0,26 |
| **Study habits** | Pre<br>Post (D) | 46,42<br>47,49 | 9,33<br>11,30 | 0,26 | 0,12 |
| **Problem-solving behaviour** | Pre<br>Post (D) | 42,46<br>41,49 | 7,88<br>8,78 | 0,27 | 0,14 |
| **Study milieu** | Pre<br>Post (D) | 43,46<br>42,93 | 6,98<br>7,48 | 0,39 | 0,09 |

# Wiskunde Toets Graad 8/
# Mathematics Test Grade 8

**Naam/Name …… Gr. 8……**

**Instruksies / *Instructions*:**

- Nommer die antwoorde korrek volgens die numeringstelsel wat in die toets gebruik word. *Number the answers correctly according to the numbering system used in this test.*
- **Alle** berekeninge moet duidelik aangetoon word. ***All*** *calculations must be clearly shown.*
- Alle finale antwoorde moet tot **twee** desimale plekke afgerond word, tensy anders vermeld. *All final answers must be rounded off to* ***two*** *decimal places, unless stated otherwise.*
- Skryf **netjies** en leesbaar, vul alles in op die vraestel. *Write* ***neatly*** *and legibly, complete everything on the question paper.*
- 'n Sakrekenaar mag gebruik word. *A calculator may be used.*
- Jy mag die formules gebruik. *You may use the formulas.*

| | | |
|---|---|---|
| **Oppervlakte van 'n sirkel** | $A = \pi r^2$ | ***Area of a circle*** |
| **Omtrek van 'n sirkel** | $P = 2\pi r$ | ***Circumference of a circle*** |
| **Volume van 'n reghoekige prisma** | $V = l \times b \times h$ | **Volume of a rectangular prism (cuboid)** |
| **Volume van 'n regte silinder** | $V = \pi r^2 h$ | **Volume of a right cylinder** |

**Vraag 1**

Mnr. Visagie lê 548 kilometer af in 5 uur oppad na sy bestemming. Wat is sy gemiddelde snelheid in kilometer per uur?

**Question 1**

Mr. Visagie travels 548 kilometers in 5 hours to his destination. What is his average velocity in kilometer per hour?

**Vraag 2**

Bepaal die waarde van $y$ in die volgende vergelyking:

$$3y + 19 = -65 + 7y$$

**Question 2**

Determine the value of $y$ in the following expression:

$$3y + 19 = -65 + 7y$$

**Vraag 3**

'n Seun eet 100 koekies in vyf dae. Hy eet elke dag 6 koekies meer as die vorige dag. Hoeveel koekies het hy op die eerste dag geëet?

**Question 3**

A boy eats 100 cookies in five days. Each day he eats 6 cookies more than the previous day. How many cookies did he eat on the very first day?

**Vraag 4**

Theresa het 'n gemiddeld van 56% vir haar eerste sewe eksamenvraestelle. Watter persentasie behoort sy in haar agtste vraestel te kry sodat haar gemiddeld vir die agt vakke 60% sal wees?

**Question 4**

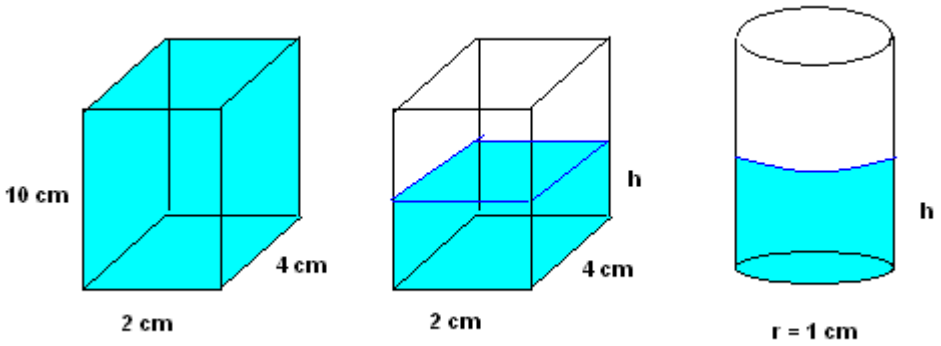
Theresa has an average of 56% for her first seven exam papers. What percentage should she get in her eighth paper to ensure she will have an average of 60% for her eight subjects?

**Vraag 5**

Die reghoekige prisma aan die linkerkant was aanvanklik vol water. Water is toe daaruit gegooi in die reghoekige prisma en silinder aan die regterkant sodat die hoogtes van die water in beide houers (die reghoekige silinder en die reghoekige prisma) gelyk is. Bereken die hoogte h van die water in beide houers. (Rond jou antwoord af tot die naaste tiende van 'n cm).

**Question 5**

The cuboid on the left was initially filled with water. Water is then emptied from it into the cuboid on the right and the rectangular cylinder on the right in such a way that the height h in both containers (the rectangular cylinder and the cuboid) are equal. Calculate the height h of the water in these two containers to the right. (Round your answer to the nearest tenth of a cm)



**Vraag 6**

Mev. Scheepers beplan om ‘n swembad in haar tuin te laat bou. Die tuin is in die vorm van ‘n reghoek met lengte 100m en breedte 50m. Sy wil graag ‘n vierkantige swembad hê. Bereken die lengte van een sy van die swembad as die oorblywende deel van die tuin (sonder die swembad) gelyk is aan die helfte van die oorspronklike reghoekige tuin.

**Question 6**

Mrs. Scheepers plans to build a swimming pool in her garden. The garden is in the form of a rectangle with length 100m and width 50m. She wants to build a square pool. Calculate the length of one side of the pool if the remaining part of the garden (without the swimming pool) equals one half of the original rectangular garden.

**Vraag 7**

Die volgende inligting van drie sirkels word aan jou gegee:

A is die grootste sirkel, B is die middelste grootte sirkel en C is die kleinste sirkel. Sirkel A het ‘n deursnee van 20cm. Die kleiner sirkels word so geteken dat die radius van sirkel A die deursnee van sirkel B is en die radius van sirkel B die deursnee van sirkel C is. Bereken die oppervlakte van sirkel C.

**Question 7**

The following information about three circles are given to you:

A is the largest circle; B is the middle-sized circle and C is the smallest circle. Circle A has a diameter of 20cm. The smaller circles are drawn in such a way that the radius of circle A is the diameter of circle B and the radius of circle B is the diameter of circle C. Calculate the area of the circle C.

**Vraag 8**

Sarel oorweeg dit om vir hom ‘n baadjie te koop waarvan die normale prys R400 is, maar daar is ‘n afslag van 20%. Daar word verkoopbelasting van 14% in Suid-Afrika bygevoeg. Die assistent voeg eers die verkoopbelasting by die prys van die baadjie en trek dan die 20% afslag af. Sarel protesteer omdat hy wil hê dat die assistent eers die 20% afslag moet aftrek en daarna die 14% belasting moet byvoeg. Maak dit enige verskil op die uiteindelike prys van die baadjie? Toon al jou bewerkings.

**Question 8**

Sarel considers buying himself a jacket. The original selling price of the jacket is R400, but there is a sale and the jacket is sold at 20% discount. In South Africa, the sales tax is 14%. The shop assistant first adds the tax to the price and then subtracts the 20% discount. Sarel is unhappy about this and insists that the assistant first subtract the 20% discount and then add the 14% tax. Does it make any difference to the price he must pay? Show all your calculations.

**Vraag 9**

'n Reghoekige stuk veld is bespreek vir 'n popkonsert. Die gedeelte waar die aanhangers moet staan, is 100m by 50m. Al die kaartjies vir die konsert was heeltemal uitverkoop en die veld was vol aanhangers wat tydens die konsert gestaan het.

Kies die beste skatting van die totale aantal mense wat die konsert bygewoon het:

A. 2 000
B. 5 000
C. 20 000
D. 50 000
E. 100 000

Toon ook jou redenering en bewerkings.

**Question 9**

A rectangular piece of field was booked for a pop concert. The area where the fans had to stand, was 100m by 50m. All the tickets were sold out and the field was filled with fans who were standing during the concert.

Choose the best estimation of the total number of people who attended the concert:

A. 2 000
B. 5 000
C. 20 000
D. 50 000
E. 100 000

Show your reasoning and all your calculations

# Wiskunde Toets Graad 9
# Mathematics Test Grade 9

**Naam/Name** ..... **Graad/Grade** .....

**Instruksies / *Instructions*:**

- Nommer die antwoorde korrek volgens die numeringstelsel wat in die toets gebruik word.
  *Number the answers correctly according to the numbering system used in this test.*
- **Alle** berekeninge moet duidelik aangetoon word.
  ***All*** *calculations must be clearly shown.*
- Alle finale antwoorde moet tot **twee** desimale plekke afgerond word, tensy anders vermeld.
  *All final answers must be rounded off to **two** decimal places, unless stated otherwise.*
- Skryf **netjies** en leesbaar, beantwoord al die vrae.
  *Write **neatly** and legibly, answer all the questions..*
- 'n Sakrekenaar mag wel gebruik word.
  *A Calculator may be used.*
- Jy mag van die volgende formules gebruik maak:
  *You may use the following formulas:*

| | | |
|---|---|---|
| **Oppervlakte van 'n sirkel** | $A = \pi r^2$ | ***Area of a circle*** |
| **Omtrek van 'n sirkel** | $P = 2\pi r$ | ***Circumference of a circle*** |
| **Volume van 'n reghoekige prisma** | $V = l \times b \times h$ | **Volume of a rectangular prism (cuboid)** |
| **Volume van 'n regte silinder** | $V = \pi r^2 h$ | **Volume of a right cylinder** |

**Vraag 1**

As die formule om die waarde van $y$ in die onderstaande tabel te bepaal $y = \frac{1}{2}x + 1$ is, voltooi die tabel.

**Question 1**

If the formula to solve for $y$ in the table below is given as $y = \frac{1}{2}x + 1$, complete the table given.

| $x$ | a | 1 | 2 | d | 10 | f |
|---|---|---|---|---|---|---|
| $y$ | 1 | b | c | 3 | e | 26 |

**Vraag 2**

Brandon kan 2 km in 24 minute stap. Hoe ver sal hy in een uur kan stap (in meter) teen dieselfde tempo?

**Question 2**

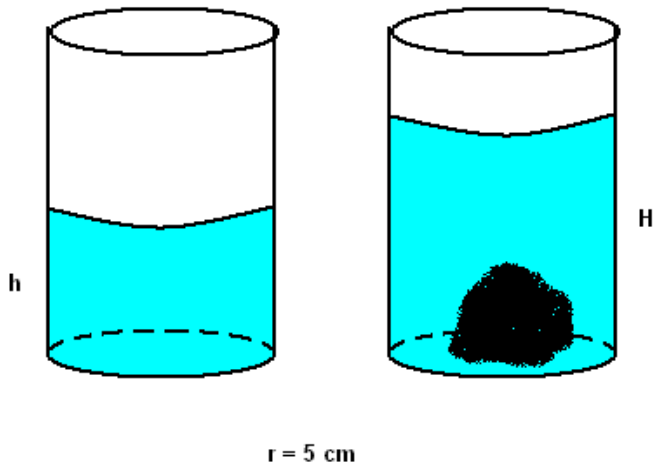
Brandon is able to walk 2km in 24 minutes. How far will he be able to walk in one hour (in meters) at the same pace?

**Vraag 3**

Die hoogte **h** van water in ‘n silindriese houer met radius **r = 5 cm** is gelyk aan **10cm**. Peter moet die volume van ‘n klip met ‘n onreëlmatige vorm meet en besluit om die klip binne-in die houer met water te sit. Die hoogte van die water binne die houer styg tot **H = 13,2cm**. Bereken die volume van die klip in kubieke sentimeter.

**Question 3**

The height **h** of water in a cylindrical container with radius **r = 5cm** is equal to **10cm**. Peter has to measure the volume of an irregularly shaped rock. He decides to place the rock inside the container filled with water. The height of the water inside the container rises to **H = 13,2cm.** Calculate the volume of the rock in cubic centimeter.



**Vraag 4**

Panarotti's bedien twee ronde Hawaiian pizzas van dieselfde dikte in verskillende groottes (dus verskillende oppervlaktes). Die kleiner pizza het 'n deursnee van 30cm and kos R 72,90. Die groter pizza het 'n deursnee van 40cm en kos R 92,90. Watter een van die twee pizzas is beter waarde vir geld? Wys jou redenering.
[Wenk: R per oppervlakte]

**Question 4**

Panarotti's serve two round Hawaiian pizzas with the same thickness but different sizes (thus different areas). The smaller pizza has a diameter of 30cm and costs R 72,90. The larger pizza has a diameter of 40cm and costs R 92,90. Which of the two pizzas is better value for money? Show your reasoning. [Hint: R per area]

**Vraag 5**

Mnr. Venter het die toetspunte van sy 25 graad 9 leerders aangeteken. Hy het hierdie toetspunte gebruik en 'n gemiddeld van 72% gekry. Sandra se punt van 86 is verkeerdelik nagesien as 36. Wat is die korrekte gemiddeld vir die toets nou?

**Question 5**

Mr. Venter wrote down the test marks of his 25 grade 9 learners. He used these marks to calculate an average of 72%. Sandra's mark of 86 has been incorrectly marked as 36. What is the correct average of the test mark now?

**Vraag 6**

'n Seeleeu moet asemhaal selfs wanneer dit slaap. Martin het vir een uur lank 'n seeleeu dopgehou. Aan die begin van sy waarneming, het die seeleeu na die bodem van die see geduik en begin slaap. Na 8 minute het dit stadig na die oppervlakte gedryf om asem te haal. Na 3 minute was dit weer terug op die seebodem en die hele proses is herhaal op 'n soortgelyke manier.

Na een uur was die seeleeu:

A. Op die seebodem
B. Besig om bo asem te haal
C. Oppad boontoe
D. Oppad ondertoe

Gee die korrekte antwoord (A-D), maar toon ook jou redenering

**Question 6**

A sea lion has to breathe even while it sleeps. Martin watched one for a whole hour. At the beginning of his observation the sea lion dived to the bottom of the ocean and slept. After 8 minutes it started to float slowly to the surface to breathe. After 3 minutes it was back on the bottom of the ocean and the process is repeated in a similar manner the whole time.

After an hour the sea lion was:

A. On the bottom of the ocean
B. Busy taking a breath at the top
C. On its way up
D. On its way down

Report the correct answer (A-D) and also show your reasoning.

**Vraag 7**

Pomp A kan 'n tenk in 5 ure volmaak met water. Pomp B kan dieselfde tenk vul in 8 ure. Hoe lank sal dit neem as die twee pompe saamwerk om die tenk vol te maak? (Rond jou antwoord af tot die naaste minuut).

**Question 7**

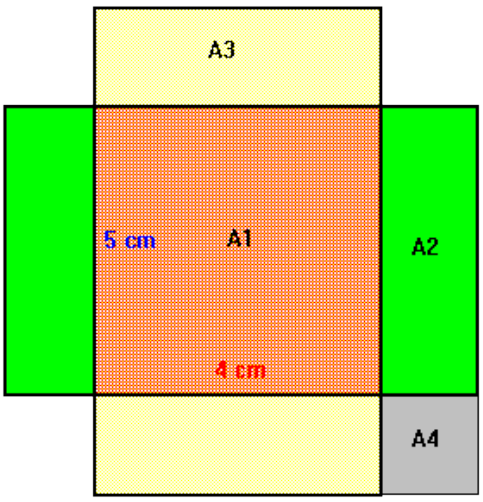
Pump A can fill a tank with water in 5 hours. Pump B can fill the same tank in 8 hours. How long will it take to fill up the tank if both pumps are used simultaneously? (Round your answer to the nearest minute).

**Vraag 8**

Vier klein vierkantige stukkies hout is op die vier hoeke van ‘n reghoekige stuk hout uitgesny. Die hout is daarna gebruik om ‘n boks te maak. Die volume van die boks is $60cm^3$ en die lengte is 5cm en die breedte 4cm. Bereken die oorspronklike oppervlakte van die stuk hout (voor enige stukke uitgesny is).

**Question 8**

Four small square pieces of wood are cut out of the four corners of a rectangular piece of wood. The wood is then used to make a box. The volume of the box is $60cm^3$. The length is 5cm and the breadth 4cm. Calculate the original area of the piece of wood (before anything was cut out).



L 22(1)

**Vraag 1**

As die formule om die waarde van $y$ in die onderstaande tabel te bepaal $y = \frac{1}{2}x + 1$ is, voltooi die tabel.

**Question 1**

If the formula to solve for $y$ in the table below is given as $y = \frac{1}{2}x + 1$, complete the table given.

| $x$ | a | 1 | 2 | d | 10 | f |
|---|---|---|---|---|---|---|
| $y$ | 1 | b | c | 3 | e | 26 |

a) $1 = \frac{1}{2}x + 1 = 0$ ✓

b) $y = \frac{1}{2}(1) + 1 = 1.5$ ✓

c) = 2. ✓

D) $x = 4$ ✓

e) = 6 ✓

f) $x = 50$ ✓

**Vraag 2**

Brandon kan 2 km in 24 minute stap. Hoe ver sal hy in een uur kan stap (in meter) teen dieselfde tempo?

**Question 2**

Brandon is able to walk 2km in 24 minutes. How far will he be able to walk in one hour (in meters) at the same pace?

12 min = 1km

24 min = 2km

36 min = 3km

h 48 min = 4km

60 min = 5km

in 60 min sal hy 5km kan stap

↓

1h

S1(1)

## Vraag 1

As die formule om die waarde van $y$ in die onderstaande tabel te bepaal $y = \frac{1}{2}x + 1$ is, voltooi die tabel.

## Question 1

If the formula to solve for $y$ in the table below is given as $y = \frac{1}{2}x + 1$, complete the table given.

| $x$ | a | 1 | 2 | d | 10 | f |
|---|---|---|---|---|---|---|
| $y$ | 1 | b | c | 3 | e | 26 |

$a = (1) - 1) \div \frac{1}{2}$ ✓
$a = 0 \div \frac{1}{2}$
$a = 0$

$b = \frac{1}{2}(1) + 1$ ✓
$= 1\frac{1}{2}$

$c = \frac{1}{2}(2) + 1$ ✓
$c = (1) + 1$
$c = 2$ ✓

$d + (3) - 1) \div \frac{1}{2}$
$d = (2) \div \frac{1}{2}$
$d = 4$ ✓

C

$e = \frac{1}{2}(10) + 1$ ✓
$= (5) + 1$
$e = 6$

$f = (26 - 1) \div \frac{1}{2}$ ✓
$f = (25) \div \frac{1}{2}$
$f = 50$

## Vraag 2

Brandon kan 2 km in 24 minute stap. Hoe ver sal hy in een uur kan stap (in meter) teen dieselfde tempo?

## Question 2

Brandon is able to walk 2km in 24 minutes. How far will he be able to walk in one hour (in meters) at the same pace?

2 km : 24 min
= 1 km : 12 min
=> 12 x 5 = 60 m = 1 h
=> $\frac{5}{1}$ x 1 km = 12 min. x $\frac{5}{1}$
=> 5 000 m : 60 min → He will be able to walk 5 000 m in an hour.

C

L 8 (2)

**Vraag 1**

As die formule om die waarde van $y$ in die onderstaande tabel te bepaal $y = \frac{1}{2}x + 1$ is, voltooi die tabel.

**Question 1**

If the formula to solve for $y$ in the table below is given as $y = \frac{1}{2}x + 1$, complete the table given.

| $x$ | a | 1 | 2 | d | 10 | f |
|---|---|---|---|---|---|---|
| $y$ | 1 | b | c | 3 | e | 26 |

$a = 1 = \frac{1}{2}a + 1$

X

**Vraag 2**

Brandon kan 2 km in 24 minute stap. Hoe ver sal hy in een uur kan stap (in meter) teen dieselfde tempo?

**Question 2**

Brandon is able to walk 2km in 24 minutes. How far will he be able to walk in one hour (in meters) at the same pace?

X ± 4250 m

S 31(2)

**Vraag 1**

As die formule om die waarde van $y$ in die onderstaande tabel te bepaal $y = \frac{1}{2}x + 1$ is, voltooi die tabel.

**Question 1**

If the formula to solve for $y$ in the table below is given as $y = \frac{1}{2}x + 1$, complete the table given.

| | | | | | | |
|---|---|---|---|---|---|---|
| | 0 | | | 4 | | 50 |
| $x$ | a | 1 | 2 | d | 10 | f |
| $y$ | 1 | b | c | 3 | e | 26 |
| | | $1\frac{1}{2}$ | 2 | | 6 | |

e
$y = \frac{1}{2}x + 1$
$y = \frac{1}{2}10 + 1$
$y = 5 + 1$
$y = 6$

f
$y = \frac{1}{2}x + 1$
$26 = \frac{1}{2}x + 1$
$25 = \frac{1}{2}x \times \frac{2}{1}$
$50 = x$

b
$y = \frac{1}{2}x + 1$
$y = \frac{1}{2}1 + 1$
$y = \frac{1}{2} + 1$
$y = 1\frac{1}{2}$

a
$y = \frac{1}{2}x + 1$
$1 = \frac{1}{2}x + 1$
$\frac{2}{1} \times 0 = \frac{1}{2}x \times \frac{2}{1}$
$0 = x$

c
$y = \frac{1}{2}x + 1$
$y = \frac{1}{2}2 + 1$
$y = 1 + 1$
$y = 2$

d
$y = \frac{1}{2}x + 1$
$3 = \frac{1}{2}x + 1$
$2 = \frac{1}{2}x \times \frac{2}{1}$
$4 = x$

C

**Vraag 2**

Brandon kan 2 km in 24 minute stap. Hoe ver sal hy in een uur kan stap (in meter) teen dieselfde tempo?

**Question 2**

Brandon is able to walk 2km in 24 minutes. How far will he be able to walk in one hour (in meters) at the same pace?

~~24 min = 2 km~~
~~12 min = 1 km~~
~~720~~
$\frac{2\text{ km}}{24\text{ min}}$
$5 \times \frac{1\text{ km}}{5 \times 12\text{ min}}$
$\frac{5\text{km}}{60\text{ min}}$
$= 5\text{ km}$ ✓

h

in meter?

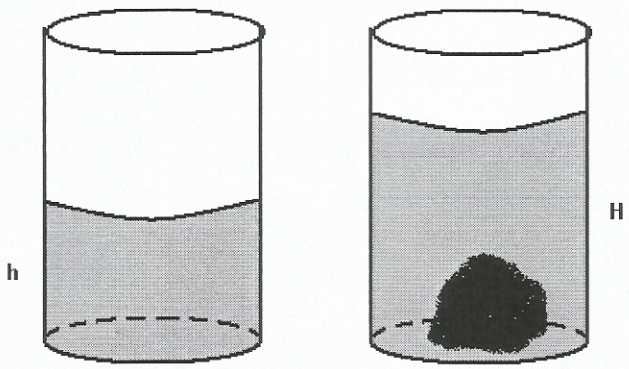
L 34 (3)

**Vraag 3**

Die hoogte **h** van water in 'n silindriese houer met radius **r = 5 cm** is gelyk aan **10cm**. Peter moet die volume van 'n klip met 'n onreëlmatige vorm meet en besluit om die klip binne-in die houer met water te sit. Die hoogte van die water binne die houer styg tot **H = 13,2cm**. Bereken die volume van die klip in kubieke sentimeter.

**Question 3**

The height **h** of water in a cylindrical container with radius **r = 5cm** is equal to **10cm**. Peter has to measure the volume of an irregularly shaped rock. He decides to place the rock inside the container filled with water. The height of the water inside the container rises to **H = 13,2cm.** Calculate the volume of the rock in cubic centimeter.




C

sonder klip

$\pi r^2 h$ ~~SOH~~

$\pi (5)^2 (10)$

$\pi (25)(10)$

$78,54 \text{ cm} \times 10$ ✓

$785,4 \text{ cm}^3$

met klip

$\pi r^2 h$

$\pi (5)^2 \times (13,2)$

$\pi (25)(13,2)$

$78,54 \times 13,2$ ✓

$1036,7 \text{ cm}^3$

klip = $251,33 \text{ cm}^3$ ✓

S 36(3)

**Vraag 3**

Die hoogte **h** van water in 'n silindriese houer met radius **r = 5 cm** is gelyk aan **10cm**. Peter moet die volume van 'n klip met 'n onreëlmatige vorm meet en besluit om die klip binne-in die houer met water te sit. Die hoogte van die water binne die houer styg tot **H = 13,2cm**. Bereken die volume van die klip in kubieke sentimeter.

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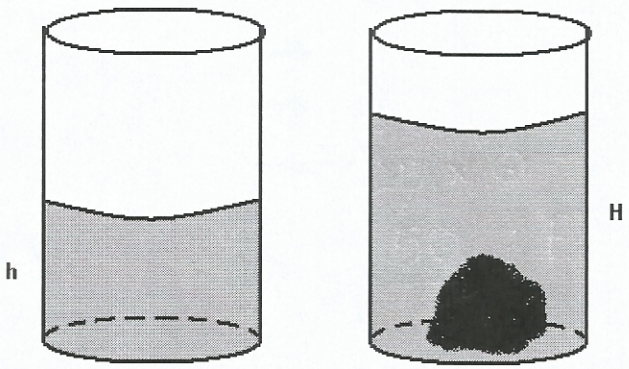



3,2

L57(4)

**Vraag 4**

Panarotti's bedien twee ronde Hawaiian pizzas van dieselfde dikte in verskillende groottes (dus verskillende oppervlaktes). Die kleiner pizza het 'n deursnee van 30cm and kos R 72,90. Die groter pizza het 'n deursnee van 40cm en kos R 92,90. Watter een van die twee pizzas is beter waarde vir geld? Wys jou redenering.
[Wenk: R per oppervlakte]

**Question 4**

Panarotti's serve two round Hawaiian pizzas with the same thickness but different sizes (thus different areas). The smaller pizza has a diameter of 30cm and costs R 72,90. The larger pizza has a diameter of 40cm and costs R 92,90. Which of the two pizzas is better value for money? Show your reasoning. [Hint: R per area]

$\pi r^2$
$\pi 30^2 \pi 15^2$
$900\pi \; 225\pi$
$2827,43 \; 706,86$

$\pi r^2$
$\pi 20$

$\pi r^2$
$\pi(20^2)$
$400\pi$
$1256,64$

The smaller one is the better ~~of~~ value of Money X

**Vraag 5**

Mnr. Venter het die toetspunte van sy 25 graad 9 leerders aangeteken. Hy het hierdie toetspunte gebruik en 'n gemiddeld van 72% gekry. Sandra se punt van 86 is verkeerdelik nagesien as 36. Wat is die korrekte gemiddeld vir die toets nou?

**Question 5**

Mr. Venter wrote down the test marks of his 25 grade 9 learners. He used these marks to calculate an average of 72%. Sandra's mark of 86 has been incorrectly marked as 36. What is the correct average of the test mark now?

$\frac{9}{25} \times 100 = 4$

$\frac{2}{25} \times 100 = 8$

$\frac{3}{25} \times 100 = 12$

$\frac{4}{25} \times 100 = 16$

$\frac{6}{25} \times 100 = 20$

$\frac{7}{25} \times 100 = 28$

$\frac{8}{25} \times 100 = 32$

$\frac{9}{25} \times 100 = 36$

X

It is 32

Klein pizza = 9,70 cm²/R. of R0,10/cm²

Groot pizza = 13,53 cm²/R. R0,07/cm².

**Vraag 4**

Panarotti's bedien twee ronde Hawaiian pizzas van dieselfde dikte in verskillende groottes (dus verskillende oppervlaktes). Die kleiner pizza het 'n deursnee van 30cm and kos R 72,90. Die groter pizza het 'n deursnee van 40cm en kos R 92,90. Watter een van die twee pizzas is beter waarde vir geld? Wys jou redenering.
[Wenk: R per oppervlakte]

**Question 4**

Panarotti's serve two round Hawaiian pizzas with the same thickness but different sizes (thus different areas). The smaller pizza has a diameter of 30cm and costs R 72,90. The larger pizza has a diameter of 40cm and costs R 92,90. Which of the two pizzas is better value for money? Show your reasoning. [Hint: R per area]

Kleiner Pizza

Oppv. $= \pi r^2$
$= \pi(30 \div 2)^2$
$= \pi(15)^2$
$= 225\pi$
$= 706,8583471\ cm^2$

Groter pizza

Oppv. $= \pi r^2$
$= \pi(40 \div 2)^2$
$= \pi(20)^2$
$= 400\pi$
$= 1256,637061\ cm^2$

Klein pizza: $\frac{706,8583471\ cm^2}{R72,90}$

$= R9,696273623\ /cm^2$
$\approx R9,70/cm^2$

Groter pizza: $\frac{1256,637061\ cm^2}{R\ 92,90}$

$= R13,52677138\ /cm^2$
$\approx R13,53/cm^2$

∴ Die groter pizza is beter waarde vir geld.

**Vraag 5**

Mnr. Venter het die toetspunte van sy 25 graad 9 leerders aangeteken. Hy het hierdie toetspunte gebruik en 'n gemiddeld van 72% gekry. Sandra se punt van 86 is verkeerdelik nagesien as 36. Wat is die korrekte gemiddeld vir die toets nou?

**Question 5**

Mr. Venter wrote down the test marks of his 25 grade 9 learners. He used these marks to calculate an average of 72%. Sandra's mark of 86 has been incorrectly marked as 36. What is the correct average of the test mark now?

9 x 25 = 225 · 25 x 72 = 1800

· 1800 + (86 - 36)
= 1800 + 50
= 1850

· 1850 ÷ 25
= 74% klasgemiddeld

(Sandra se gemiddeld vir haar toet is 86%.)

C

S(17) 4

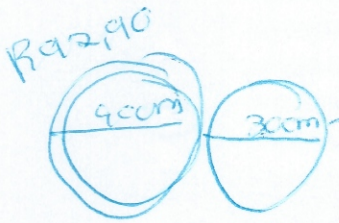
S4(5)

**Vraag 4**

Panarotti's bedien twee ronde Hawaiian pizzas van dieselfde dikte in verskillende groottes (dus verskillende oppervlaktes). Die kleiner pizza het 'n deursnee van 30cm and kos R 72,90. Die groter pizza het 'n deursnee van 40cm en kos R 92,90. Watter een van die twee pizzas is beter waarde vir geld? Wys jou redenering.
[Wenk: R per oppervlakte]

**Question 4**

Panarotti's serve two round Hawaiian pizzas with the same thickness but different sizes (thus different areas). The smaller pizza has a diameter of 30cm and costs R 72,90. The larger pizza has a diameter of 40cm and costs R 92,90. Which of the two pizzas is better value for money? Show your reasoning. [Hint: R per area]




R72,90 $\pi \times 92{,}90^2$

$A = \pi r^2$ $\pi \times 72{,}90^2$

27113,23 16619,71

294,71 X = 231,85

Die R92,90 sal 'n beter opsie wees

**Vraag 5**

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**Question 5**

Mr. Venter wrote down the test marks of his 25 grade 9 learners. He used these marks to calculate an average of 72%. Sandra's mark of 86 has been incorrectly marked as 36. What is the correct average of the test mark now?

72%

X

25

L 38(5)

**Vraag 4**

Panarotti's bedien twee ronde Hawaiian pizzas van dieselfde dikte in verskillende groottes (dus verskillende oppervlaktes). Die kleiner pizza het 'n deursnee van 30cm and kos R 72,90. Die groter pizza het 'n deursnee van 40cm en kos R 92,90. Watter een van die twee pizzas is beter waarde vir geld? Wys jou redenering.
[Wenk: R per oppervlakte]

**Question 4**

Panarotti's serve two round Hawaiian pizzas with the same thickness but different sizes (thus different areas). The smaller pizza has a diameter of 30cm and costs R 72,90. The larger pizza has a diameter of 40cm and costs R 92,90. Which of the two pizzas is better value for money? Show your reasoning. [Hint: R per area]

$A = \pi r^2$
$= \pi (30cm)^2$
$= 2827,433388$
$= 2827,43\ cm^2$ X

$A = \pi r^2$
$= \pi (40cm)^2$
$= 5026,548246$
$= 5026,55\ cm^2$

1.) R72,90 : $2827,43 cm^2$
2.) R92,90 : $5026,55\ cm^2$

1.) $2827,43\ cm^2 \div R72,90$
$= 38,79\ cm^2/R$
(Opsie 2 is beter meer pizza vir minder geld.)
2.) $5026,55 cm^2 \div R92,90$
$= 54,12\ cm^2/R$

**Vraag 5**

Mnr. Venter het die toetspunte van sy 25 graad 9 leerders aangeteken. Hy het hierdie toetspunte gebruik en 'n gemiddeld van 72% gekry. Sandra se punt van 86 is verkeerdelik nagesien as 36. Wat is die korrekte gemiddeld vir die toets nou?

**Question 5**

Mr. Venter wrote down the test marks of his 25 grade 9 learners. He used these marks to calculate an average of 72%. Sandra's mark of 86 has been incorrectly marked as 36. What is the correct average of the test mark now?

(25 = 72%)

$x \div 25 = 72\%$
$x = 1800$

$1800 + 50(86 - 36)$
$= 1800 + 50$
$= 1850$ C

$1850 \div 25$
$= 74\%$

L29(6)

**Vraag 6**

'n Seeleeu moet asemhaal selfs wanneer dit slaap. Martin het vir een uur lank 'n seeleeu dopgehou. Aan die begin van sy waarneming, het die seeleeu na die bodem van die see geduik en begin slaap. Na 8 minute het dit stadig na die oppervlakte gedryf om asem te haal. Na 3 minute was dit weer terug op die seebodem en die hele proses is herhaal op 'n soortgelyke manier.

Na een uur was die seeleeu:

A. Op die seebodem
B. Besig om bo asem te haal
C. Oppad boontoe
D. Oppad ondertoe

Gee die korrekte antwoord (A-D), maar toon ook jou redenering

**Question 6**

A sea lion has to breathe even while it sleeps. Martin watched one for a whole hour. At the beginning of his observation the sea lion dived to the bottom of the ocean and slept. After 8 minutes it started to float slowly to the surface to breathe. After 3 minutes it was back on the bottom of the ocean and the process is repeated in a similar manner the whole time.

After an hour the sea lion was:

A. On the bottom of the ocean
B. Busy taking a breath at the top
C. On its way up
D. On its way down

Report the correct answer (A-D) and also show your reasoning.

C 5 + 6 min

A →

**Vraag 7**

Pomp A kan 'n tenk in 5 ure volmaak met water. Pomp B kan dieselfde tenk vul in 8 ure. Hoe lank sal dit neem as die twee pompe saamwerk om die tenk vol te maak? (Rond jou antwoord af tot die naaste minuut).

**Question 7**

Pump A can fill a tank with water in 5 hours. Pump B can fill the same tank in 8 hours. How long will it take to fill up the tank if both pumps are used simultaneously? (Round your answer to the nearest minute).

~~moet~~ 05 (5) moet

X A : 5
B : 8

3 uure en 6 minute

40

5 + 8
5 + 5 = 13 40 ÷ 13

S 39(6)

**Vraag 6**

'n Seeleeu moet asemhaal selfs wanneer dit slaap. Martin het vir een uur lank 'n seeleeu dopgehou. Aan die begin van sy waarneming, het die seeleeu na die bodem van die see geduik en begin slaap. Na 8 minute het dit stadig na die oppervlakte gedryf om asem te haal. Na 3 minute was dit weer terug op die seebodem en die hele proses is herhaal op 'n soortgelyke manier.

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A. Op die seebodem
B. Besig om bo asem te haal
C. Oppad boontoe
D. Oppad ondertoe

Gee die korrekte antwoord (A-D), maar toon ook jou redenering

8 : 3
∴ 8 + 3 = 11
∴ $\frac{60}{11}$ =
∴ 8 × 5,4545... = 43,64
∴ 3 × 5,4545... = 16,36

∴ A

C

**Question 6**

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A. On the bottom of the ocean
B. Busy taking a breath at the top
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D. On its way down

Report the correct answer (A-D) and also show your reasoning.

**Vraag 7**

Pomp A kan 'n tenk in 5 ure volmaak met water. Pomp B kan dieselfde tenk vul in 8 ure. Hoe lank sal dit neem as die twee pompe saamwerk om die tenk vol te maak? (Rond jou antwoord af tot die naaste minuut).

$\frac{11}{5} + \frac{11}{8} = 2,2 + 1,375$

$= 3,575$ ure

X

**Question 7**

Pump A can fill a tank with water in 5 hours. Pump B can fill the same tank in 8 hours. How long will it take to fill up the tank if both pumps are used simultaneously? (Round your answer to the nearest minute).

L17(7)

**Vraag 6**

'n Seeleeu moet asemhaal selfs wanneer dit slaap. Martin het vir een uur lank 'n seeleeu dopgehou. Aan die begin van sy waarneming, het die seeleeu na die bodem van die see geduik en begin slaap. Na 8 minute het dit stadig na die oppervlakte gedryf om asem te haal. Na 3 minute was dit weer terug op die seebodem en die hele proses is herhaal op 'n soortgelyke manier.

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A. Op die seebodem
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D. Oppad ondertoe

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After an hour the sea lion was:

A. On the bottom of the ocean
B. Busy taking a breath at the top
C. On its way up
D. On its way down

Report the correct answer (A-D) and also show your reasoning.

0 10 20 31 40 50 60 13

A B A B A B A B A B 1

~~A~~ C · op die 55 min. was hy terug op die bodem, 8 min sou verloop tot hy weer bo is wat hom dan sou kry om asem te haal op die 13de min.

C

**Vraag 7**

Pomp A kan 'n tenk in 5 ure volmaak met water. Pomp B kan dieselfde tenk vul in 8 ure. Hoe lank sal dit neem as die twee pompe saamwerk om die tenk vol te maak? (Rond jou antwoord af tot die naaste minuut).

**Question 7**

Pump A can fill a tank with water in 5 hours. Pump B can fill the same tank in 8 hours. How long will it take to fill up the tank if both pumps are used simultaneously? (Round your answer to the nearest minute).

~~5 : X~~ $5 \times 8 = 40$ $5 + 8 = 13$

$\frac{40}{13} = 3{,}08$ ure.

13

∴ 3 ure en, 4 minute en 48 sekondes

∴ 3 ure en 5 min. (afgerond.)

C

S22(7)

**Vraag 6**

'n Seeleeu moet asemhaal selfs wanneer dit slaap. Martin het vir een uur lank 'n seeleeu dopgehou. Aan die begin van sy waarneming, het die seeleeu na die bodem van die see geduik en begin slaap. Na 8 minute het dit stadig na die oppervlakte gedryf om asem te haal. Na 3 minute was dit weer terug op die seebodem en die hele proses is herhaal op 'n soortgelyke manier.

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After an hour the sea lion was:

A. On the bottom of the ocean
B. Busy taking a breath at the top
C. On its way up
D. On its way down

Report the correct answer (A-D) and also show your reasoning.

C

Hy bly vir 8 minute op die bodem en dan vat dit 3 min om asem te haal en weer op die bodem te gaan lê, ∴ 11 min /"siklus". Na 5 "siklusse" ~~is~~ (55ste min) is hy weer op die ~~groud~~ bodem besig om ~~asem te haal~~ te slaap (vir 8 minute). So na 5 min (dan is dit 'n ~~uur~~) is hy nog op die seebodem. ~~besig om te slaap~~ besig om te slaap.

**Vraag 7**

Pomp A kan 'n tenk in 5 ure volmaak met water. Pomp B kan dieselfde tenk vul in 8 ure. Hoe lank sal dit neem as die twee pompe saamwerk om die tenk vol te maak? (Rond jou antwoord af tot die naaste minuut).

$\frac{5h}{1\text{ tenk}} + \frac{8h}{1\text{ tenk}} = \frac{13h}{2\text{ tenks}}$

∴ 6,5 h vir 1 tenk

≈ 390 min

h

**Question 7**

Pump A can fill a tank with water in 5 hours. Pump B can fill the same tank in 8 hours. How long will it take to fill up the tank if both pumps are used simultaneously? (Round your answer to the nearest minute).

(Sê nou maar die tenk is 40ℓ)

Pomp A: 5h vir 40ℓ
∴ 1h vir 8ℓ

Pomp B: 8h vir 40ℓ
∴ 1h vir 5ℓ

13ℓ / h
≈×3,1 ≈×3,1
40ℓ / 3,1 h

∴ 186 min om die tenk vol te maak.

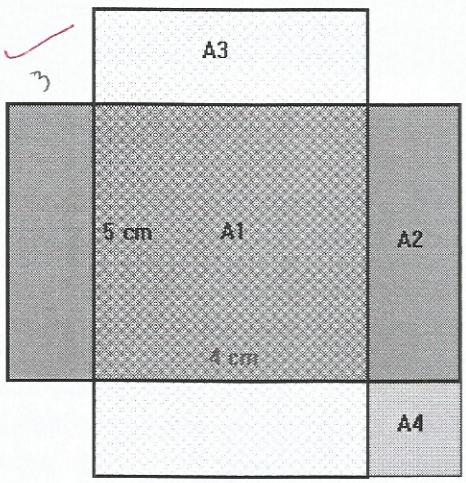
S7 (8) 3

**Vraag 8**

Vier klein vierkantige stukkies hout is op die vier hoeke van 'n reghoekige stuk hout uitgesny. Die hout is daarna gebruik om 'n boks te maak. Die volume van die boks is $60cm^3$ en die lengte is 5cm en die breedte 4cm. Bereken die oorspronklike oppervlakte van die stuk hout (voor enige stukke uitgesny is).

**Question 8**

Four small square pieces of wood are cut out of the four corners of a rectangular piece of wood. The wood is then used to make a box. The volume of the box is $60cm^3$. The length is 5cm and the breadth 4cm. Calculate the original area of the piece of wood (before anything was cut out).




✓ 3

$5 \times 4 = 20cm^2$ ✓

$10 \times 11 = 110cm^2$

C

Oorspronklike oppervlakte is $110cm^2$ ✓

/ 59 (8)

**Vraag 8**

Vier klein vierkantige stukkies hout is op die vier hoeke van 'n reghoekige stuk hout uitgesny. Die hout is daarna gebruik om 'n boks te maak. Die volume van die boks is $60cm^3$ en die lengte is 5cm en die breedte 4cm. Bereken die oorspronklike oppervlakte van die stuk hout (voor enige stukke uitgesny is).

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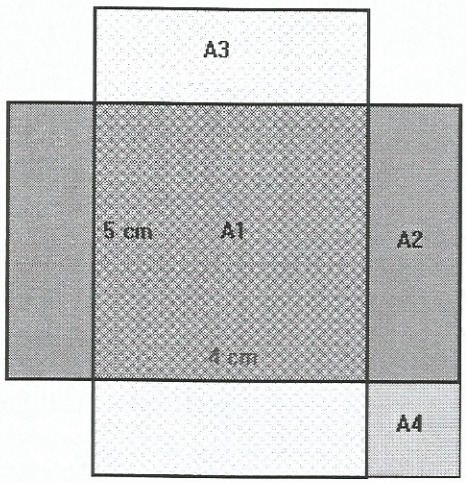



$h = V \div l \div b$

$= 60 \div 5$

$= 12 \div 4$

$\therefore h = 3cm$ ✓

$A_4 = l \times b$

$= 3 \times 3$

$= 9cm^2$

$A_1 = l \times b$

$= 5 \times 4$

$= 20cm^2$

$A_2 = l \times b$

$= 5 \times 3$

$= 15cm^2$

$A_3 = l \times b$

$= 3 \times 4$

$= 12cm^2$

$A\ box = A' + A_2(2) + A_3(2) + A_4(4)$

$= 20 + (15 \times 2) + (12 \times 2) + (9 \times 4)$

$= 20 + 30 + 24 + 36$

$= 74cm^2 + 36$

$= 110cm^2$

✓

The original area of the wood was $110cm^2$ before anything was cut.

8S41 (1)

**Vraag 1**

Mnr. Visagie lê 548 kilometer af in 5 uur oppad na sy bestemming. Wat is sy gemiddelde snelheid in kilometer per uur?

$S = \frac{A}{T}$

$S = 548 \div 5$

$= 109{,}6$ km/h

**Question 1**

Mr. Visagie travels 548 kilometers in 5 hours to his destination. What is his average velocity in kilometer per hour?

**Vraag 2**

Bepaal die waarde van $y$ in die volgende vergelyking:

$$3y + 19 = -65 + 7y$$

**Question 2**

Determine the value of $y$ in the following expression:

$$3y + 19 = -65 + 7y$$

8L86 (1)

**Vraag 1**

Mnr. Visagie lê 548 kilometer af in 5 uur oppad na sy bestemming. Wat is sy gemiddelde snelheid in kilometer per uur?

**Question 1**

Mr. Visagie travels 548 kilometers in 5 hours to his destination. What is his average velocity in kilometer per hour?

548 ×5

5 | 548 r 3

109

−5 ↓↓

48

45

3

~~His average velocity~~ 109.3

his average velocity is 109.3 km/h

**Vraag 2**

Bepaal die waarde van $y$ in die volgende vergelykking:

$$3y + 19 = -65 + 7y$$

**Question 2**

Determine the value of $y$ in the following expression:

$$3y + 19 = -65 + 7y$$

58

3y + 19 = 58

−65 + 7 = −58

**Vraag 1**

Mnr. Visagie lê 548 kilometer af in 5 uur oppad na sy bestemming. Wat is sy gemiddelde snelheid in kilometer per uur?

C

**Question 1**

Mr. Visagie travels 548 kilometers (d) in 5 hours (t) to his destination. What is his average velocity (speed) in kilometer per hour?

Speed = distance ÷ time
= 548 km ÷ 5 hours
= 548 ÷ ~~300 mins~~ 5 h
= ~~1,87~~ 109,6

Her average speed was ~~R109,60/h~~. 109,6 km/h.

8S79 (2)

**Vraag 2**

Bepaal die waarde van $y$ in die volgende vergelyking:

$$3y + 19 = -65 + 7y$$

X

$3y + 19 = -65 + 7y$
$\therefore y =$
$\therefore 3 \times 21 + 19 = -65 + 7 \times 9$
$\therefore$ the value of y is both 21 and 9.

**Question 2**

Determine the value of $y$ in the following expression:

$3y + 19 = -65 + 7y$

$3y + 19 = -65 + 7y$.
$\therefore y = 13$.

$3 \times 13 + 19$
$= -39$

7
21

**Vraag 1**

Mnr. Visagie lê 548 kilometer af in 5 uur oppad na sy bestemming. Wat is sy gemiddelde snelheid in kilometer per uur?

km
548 ÷ 5h = 109,60 km/h

Mnr. Visagie ry 109,60 km/h.

C

8 L 9 2 (2)

**Question 1**

Mr. Visagie travels 548 kilometers in 5 hours to his destination. What is his average velocity in kilometer per hour?

**Vraag 2**

Bepaal die waarde van $y$ in die volgende vergelyking:

79,75

82

$$3y + 19 = -65 + 7y$$

$3y - 7y + 19 = -65 + 7y - 7y$

$-4y + 19 - 19 = -65 - 19$ ✓

$\frac{-4y}{-4} = \frac{-84}{-4}$ ✓

$y = ~~20,25~~ \ 21$ ✓

**Question 2**

Determine the value of $y$ in the following expression:

$$3y + 19 = -65 + 7y$$

**Vraag 3**

'n Seun eet 100 koekies in vyf dae. Hy eet elke dag 6 koekies meer as die vorige dag. Hoeveel koekies het hy op die eerste dag geëet?

**Question 3**

A boy eats 100 cookies in five days. Each day he eats 6 cookies more than the previous day. How many cookies did he eat on the very first day?

$x + (x+6) + (x+12) + (x+18) + (x+24) = 100$

$5x + 60 = 100$

$5x = 40$

$x = 8.$

**Vraag 4**

Theresa het 'n gemiddeld van 56% vir haar eerste sewe eksamenvraestelle. Watter persentasie behoort sy in haar agtste vraestel te kry sodat haar gemiddeld vir die agt vakke 60% sal wees?

**Question 4**

Theresa has an average of 56% for her first seven exam papers. What percentage should she get in her eighth paper to ensure she will have an average of 60% for her eight subjects?

8S67 (3)

~~60 480 : 60 = 8~~

$8 \times 60 = 480$ sy moet in totaal van 480 % hê

C $7 \times 56 = 392.$

$480 - 392 = 88$

Sy moet 88 % behaal ...

**Vraag 3**

'n Seun eet 100 koekies in vyf dae. Hy eet elke dag 6 koekies meer as die vorige dag. Hoeveel koekies het hy op die eerste dag geëet?

**Question 3**

A boy eats 100 cookies in five days. Each day he eats 6 cookies more than the previous day. How many cookies did he eat on the very first day?

6 x 4 = 24

100 - 24 = 76

X

Hy het 76 koekies op die eerste dag geëet.

**Vraag 4**

Theresa het 'n gemiddeld van 56% vir haar eerste sewe eksamenvraestelle. Watter persentasie behoort sy in haar agtste vraestel te kry sodat haar gemiddeld vir die agt vakke 60% sal wees?

**Question 4**

Theresa has an average of 56% for her first seven exam papers. What percentage should she get in her eighth paper to ensure she will have an average of 60% for her eight subjects?

X

66%

→

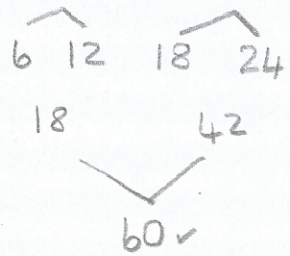
8 L 104

(3)

# 8S79 (4)

**Vraag 3**

'n Seun eet 100 koekies in vyf dae. Hy eet elke dag 6 koekies meer as die vorige dag. Hoeveel koekies het hy op die eerste dag geëet?




C

22
46
32
100

42
+ 18
60

**Question 3**

A boy eats 100 cookies in five days. Each day he eats 6 cookies more than the previous day. How many cookies did he eat on the very first day?

$x + (x+6) + (x+12) + (x+18) + (x+24)$

$= 100$

$\therefore 5x + 60 - 60 = 100 - 60$

$\therefore \frac{5x}{5} = \frac{40}{5}$

$\therefore x = 8.$

$(8) + (8+6) + (8+12) + (8+18) + (8+24)$

$= 8 + 14 + 20 + 26 + 32$

$= 100.$

**Vraag 4**

Theresa het 'n gemiddeld van 56% vir haar eerste sewe eksamenvraestelle. Watter persentasie behoort sy in haar agtste vraestel te kry sodat haar gemiddeld vir die agt vakke 60% sal wees?

X

**Question 4**

Theresa has an average of 56% for her first seven exam papers. What percentage should she get in her eighth paper to ensure she will have an average of 60% for her eight subjects?

$\frac{7}{18} \times \frac{56}{100}$

$= \frac{49}{100} = 49\%$

$\frac{49}{1248} \times \frac{60}{100}$

$=$

60
56
·4

4
x 8
32

X

She has to get 32%.

8L101 (4)

**Vraag 3**

'n Seun eet 100 koekies in vyf dae. Hy eet elke dag 6 koekies meer as die vorige dag. Hoeveel koekies het hy op die eerste dag geëet?

**Question 3**

A boy eats 100 cookies in five days. Each day he eats 6 cookies more than the previous day. How many cookies did he eat on the very first day?

100 koekies. 5 dae

$x + 6 + x + 12 + x + 18 + x + 24 + x + 30 = 100$

$5x + 90 = 100$

$\frac{5x}{5} = \frac{10}{5}$

$x = 2$

Hy het 2 koekies op die eerste dag geëet.

**Vraag 4**

Theresa het 'n gemiddeld van 56% vir haar eerste sewe eksamenvraestelle. Watter persentasie behoort sy in haar agtste vraestel te kry sodat haar gemiddeld vir die agt vakke 60% sal wees? (%)

**Question 4**

Theresa has an average of 56% for her first seven exam papers. What percentage should she get in her eighth paper to ensure she will have an average of 60% for her eight subjects?

$\frac{A+B+C+D+E+F+G}{7} = 56\%$ ✓

$= \frac{56+56+56+56+56+56+56+x}{8} = 60\%$

$= \frac{392+x}{8} = 60\% \left(\frac{480}{8} = 60\%\right)$ ✓

60 × 8 = 480

480 − 392

$392 + x = 480$

$x = 88\%$

Theresa moet 88% hê vir die 8ste vraestel

8 S62
(4)

**Vraag 3**

'n Seun eet 100 koekies in vyf dae. Hy eet elke dag 6 koekies meer as die vorige dag. Hoeveel koekies het hy op die eerste dag geëet?

**Question 3**

A boy eats 100 cookies in five days. Each day he eats 6 cookies more than the previous day. How many cookies did he eat on the very first day?

$(x+24)+(x)+(x+6)+(x+12)+(x+18)=100$

$5x+60=100$

$5x=100-60$

$x=\frac{40}{5}$

$x=8$

∴ The boy ate 8 cookies on the first day.

$8+14+20+26+32=100$

**Vraag 4**

Theresa het 'n gemiddeld van 56% vir haar eerste sewe eksamenvraestelle. Watter persentasie behoort sy in haar agtste vraestel te kry sodat haar gemiddeld vir die agt vakke 60% sal wees?

**Question 4**

$\frac{392}{7}$

Theresa has an average of 56% for her first seven exam papers. What percentage should she get in her eighth paper to ensure she will have an average of 60% for her eight subjects? $\frac{480}{8}$

$\frac{392+x}{7+1}=60$

$\frac{392+x}{8}=60$ ✓

$392+x=60\times 8$

$392+x=480$

$x=480-392$

$x=88$ ✓

∴ She'll need 88% of her 8th test to get 60% for her average ✓

**Vraag 3**

'n Seun eet 100 koekies in vyf dae. Hy eet elke dag 6 koekies meer as die vorige dag. Hoeveel koekies het hy op die eerste dag geëet?

**Question 3**

A boy eats 100 cookies in five days. Each day he eats 6 cookies more than the previous day. How many cookies did he eat on the very first day?

$x, x+6, x+12, x+18, x+24 = 100$

h

$6x + 60 = 100$

$6x = 40$

$x = 6.67$

1

8 L 114

(4)

**Vraag 4**

Theresa het 'n gemiddeld van 56% vir haar eerste sewe eksamenvraestelle. Watter persentasie behoort sy in haar agtste vraestel te kry sodat haar gemiddeld vir die agt vakke 60% sal wees?

**Question 4**

Theresa has an average of 56% for her first seven exam papers. What percentage should she get in her eighth paper to ensure she will have an average of 60% for her eight subjects?

800 - 392 = 408

= 40.8% + 20%

= 60%

Sy kort dus nog net 20%.

X

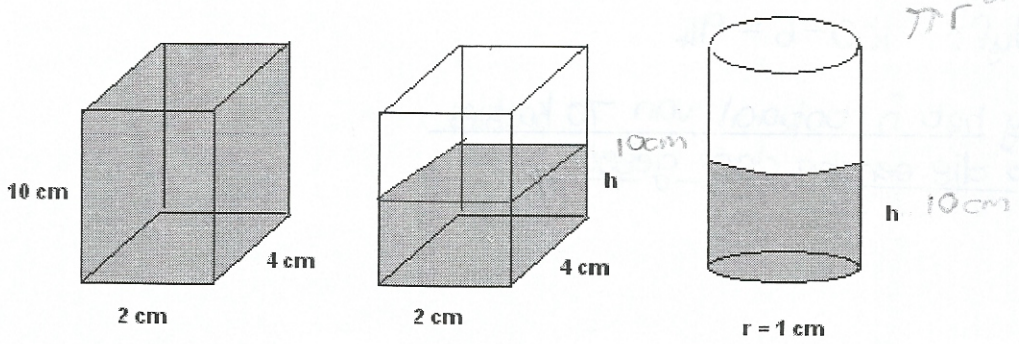
L 30 (5)

**Vraag 5**

Die reghoekige prisma aan die linkerkant was aanvanklik vol water. Water is toe daaruit gegooi in die reghoekige prisma en silinder aan die regterkant sodat die hoogtes van die water in beide houers (die reghoekige silinder en die reghoekige prisma) gelyk is. Bereken die hoogte h van die water in beide houers. (Rond jou antwoord af tot die naaste tiende van 'n cm).

**Question 5**

The cuboid on the left was initially filled with water. Water is then emptied from it into the cuboid on the right and the rectangular cylinder on the right in such a way that the height h in both containers (the rectangular cylinder and the cuboid) are equal. Calculate the height h of the water in these two containers to the right. (Round your answer to the nearest tenth of a cm)




$\pi r^2$ = oppv.

10cm

h 10cm

Reghoekig - $(2 \times 4 \times 10) \div 2 = 80cm^3 \div 2 = 40cm^3$

Silinder - $(\pi r^2) \times 10 = 31,42 \div 2 = 15,71cm^3$ X

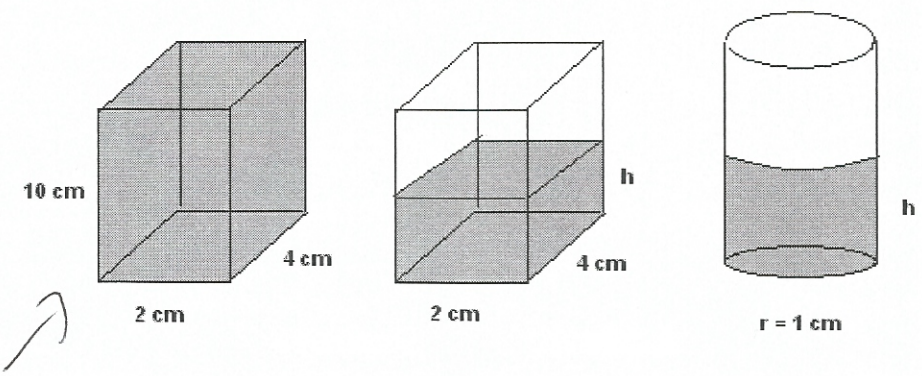
S1(5)

**Vraag 5**

Die reghoekige prisma aan die linkerkant was aanvanklik vol water. Water is toe daaruit gegooi in die reghoekige prisma en silinder aan die regterkant sodat die hoogtes van die water in beide houers (die reghoekige silinder en die reghoekige prisma) gelyk is. Bereken die hoogte h van die water in beide houers. (Rond jou antwoord af tot die naaste tiende van 'n cm).

**Question 5**

The cuboid on the left was initially filled with water. Water is then emptied from it into the cuboid on the right and the rectangular cylinder on the right in such a way that the height h in both containers (the rectangular cylinder and the cuboid) are equal. Calculate the height h of the water in these two containers to the right. (Round your answer to the nearest tenth of a cm)




Volume = $10 \times 2 \times 4$

$= 80\ cm^3$ ✓

$\frac{1}{2}\ 80\ cm^3 = 40\ cm^3$

$2\ cm \times 4 \times x = 40\ cm^3$

$8\ cm \times \frac{1}{8}\ x = 40\ cm^3 \times \frac{1}{8}$

$x = 5\ cm \therefore h = 5\ cm$ (cuboid)

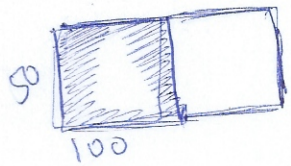
X

$3,14 \times (1)^2 \times \frac{x}{8} = 40\ cm^3$

$3,14 \times 1 \times x = 40\ cm^3$

$\frac{3,14}{3,14}\ x = \frac{40\ cm^3}{3,14}$

$x = 12,74\ cm \therefore h = 12,74\ cm$




**Vraag 6**

Mev. Scheepers beplan om 'n swembad in haar tuin te laat bou. Die tuin is in die vorm van 'n reghoek met lengte 100m en breedte 50m. Sy wil graag 'n vierkantige swembad hê. Bereken die lengte van een sy van die swembad as die oorblywende deel van die tuin (sonder die swembad) gelyk is aan die helfte van die oorspronklike reghoekige tuin.

**Question 6**

Mrs. Scheepers plans to build a swimming pool in her garden. The garden is in the form of a rectangle with length 100m and width 50m. She wants to build a square pool. Calculate the length of one side of the pool if the remaining part of the garden (without the swimming pool) equals one half of the original rectangular garden.

# QUESTION 8

$\frac{14}{100} \times \frac{400}{1}$ 456

$= 56$ - Vat

$\frac{20}{100} \times \frac{456}{1}$

$= \frac{456}{5}$

$= 91{,}20$ - discount

R456,00
- R 91,20
364,80 → new price

$\frac{20}{100} \times \frac{400}{1}$

$= R80$ → discount.

R400,00
- R 80,00
R320,00

$\frac{14}{100} \times \frac{320}{1}$

$= \frac{224}{5}$

$= 44{,}80$ → Vat.

R320,00
+ 44,80
R364,80 → new price

No, it doesn't make a difference to the price he must pay.

3

Area = $l \times l$

Area = $100m \times 50m$

$= 5000m^2$ - garden.

Area = $50m \times 25m$

$= 1250m^2$

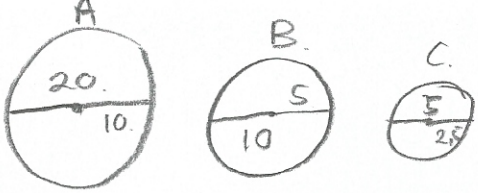
Area = $l^2$

Area = $50m \times 50m$

$= 2500m^2$

The length of one side of the pool is 50m ∴ the area of the pool is $2500m^2$ which is half of the original rectangular garden.

3




S17 (7)

**Vraag 7**

Die volgende inligting van drie sirkels word aan jou gegee:

A is die grootste sirkel, B is die middelste grootte sirkel en C is die kleinste sirkel. Sirkel A het 'n deursnee van 20cm. Die kleiner sirkels word so geteken dat die radius van sirkel A die deursnee van sirkel B is en die radius van sirkel B die deursnee van sirkel C is. Bereken die oppervlakte van sirkel C.

**Question 7**

The following information about three circles are given to you:

A is the largest circle; B is the middle-sized circle and C is the smallest circle. Circle A has a diameter of 20cm. The smaller circles are drawn in such a way that the radius of circle A is the diameter of circle B and the radius of circle B is the diameter of circle C. Calculate the area of the circle C.

A : radius = 10 cm (20 ÷ 2).
: Deursnee = 20 cm.

B : radius = (10 ÷ 2) = 5 cm
: Deursnee = 10 cm.

C : radius (5 ÷ 2) = 2,5 cm.
: Deursnee = 5 cm.

Oppervlakte = $\pi r^2$.
Oppervlakte van sirkel C = $\pi (2,5)^2$.
Oppervlakte van sirkel C = $\pi (6,25)$ ✓
Oppervlakte van sirkel C = 19,63 $cm^2$.

C
3

∴ Die oppervlakte van sirkel C = 19,63 $cm^2$.
(want die ~~deursn~~ radius van sirkel C = die (2 × die) deursnee ; en die deursnee van sirkel C = die radius van B en die radius van B = die deursnee ÷ 2 en die deursnee van B = Die radius van A en die radius van A = Die deursnee van A ÷ 2.) ✓

# S11 (8)

**Vraag 8**

Sarel oorweeg dit om vir hom 'n baadjie te koop waarvan die normale prys R400 is, maar daar is 'n afslag van 20%. Daar word verkoopbelasting van 14% in Suid-Afrika bygevoeg. Die assistent voeg eers die verkoopbelasting by die prys van die baadjie en trek dan die 20% afslag af. Sarel protesteer omdat hy wil hê dat die assistent eers die 20% afslag moet aftrek en daarna die 14% belasting moet byvoeg. Maak dit enige verskil op die uiteindelike prys van die baadjie? Toon al jou bewerkings.

**Question 8**

Sarel considers buying himself a jacket. The original selling price of the jacket is R400, but there is a sale and the jacket is sold at 20% discount. In South Africa, the sales tax is 14%. The shop assistant first adds the tax to the price and then subtracts the 20% discount. Sarel is unhappy about this and insists that the assistant first subtract the 20% discount and then add the 14% tax. Does it make any difference to the price he must pay? Show all your calculations.

Sarel:

$((\frac{400}{1} \times \frac{20}{100}) + 400) +$

$(400 - (\frac{400}{1} \times \frac{20}{100})) + 14\%$

$= (400 - 80) + 14\%$

$= 320 + (\frac{320}{1} \times \frac{14}{100})$

$= 320 + 44,8$

$= 320,0$
$\quad 44,8$
$\overline{364,80}$ ✓

Assestent:

$(((\frac{400}{1} \times \frac{14}{100}) + 400) - 20\%$

$= (56 + 400) - 20\%$

$= \frac{456}{1} \times \frac{20}{100}$

$= 465 - 91,2$

$= 416,10$
$- 91,2$
$\overline{R\ 373,80}$ ✗

S37(8)

**Vraag 8**

Sarel oorweeg dit om vir hom 'n baadjie te koop waarvan die normale prys R400 is, maar daar is 'n afslag van 20%. Daar word verkoopbelasting van 14% in Suid-Afrika bygevoeg. Die assistent voeg eers die verkoopbelasting by die prys van die baadjie en trek dan die 20% afslag af. Sarel protesteer omdat hy wil hê dat die assistent eers die 20% afslag moet aftrek en daarna die 14% belasting moet byvoeg. Maak dit enige verskil op die uiteindelike prys van die baadjie? Toon al jou bewerkings.

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Eers afslag dan belasting

R400 - (400 ÷ 100 × 20)

= R400 - 80 = R320 ✓

R320 + (320 ÷ 100 × 14)

= R320 + (3,2 × 14)

= R320 + 44,80

= R364,80

Eers belasting dan afslag.

R400 + (400 ÷ 100 × 14)

= R400 + 56 = R456 ✓

R456 - (R456 ÷ 100 × 20)

= R456 - (4,56 × 20)

= R456 - 91,2

= R364,80 ✓

Nee, beide waardes is eenders.

L29(8)

**Vraag 8**

Sarel oorweeg dit om vir hom 'n baadjie te koop waarvan die normale prys R400 is, maar daar is 'n afslag van 20%. Daar word verkoopbelasting van 14% in Suid-Afrika bygevoeg. Die assistent voeg eers die verkoopbelasting by die prys van die baadjie en trek dan die 20% afslag af. Sarel protesteer omdat hy wil hê dat die assistent eers die 20% afslag moet aftrek en daarna die 14% belasting moet byvoeg. Maak dit enige verskil op die uiteindelike prys van die baadjie? Toon al jou bewerkings.

**Question 8**

Sarel considers buying himself a jacket. The original selling price of the jacket is R400, but there is a sale and the jacket is sold at 20% discount. In South Africa, the sales tax is 14%. The shop assistant first adds the tax to the price and then subtracts the 20% discount. Sarel is unhappy about this and insists that the assistant first subtract the 20% discount and then add the 14% tax. Does it make any difference to the price he must pay? Show all your calculations.

56 X 20 ÷ 100 = 11.20 afslag

400 X 14 ÷ 100 = ~~2857~~

400 x 20 ÷ 100 = 80 X 14 ÷ 100 = R1.20 afslag.

Nee geen verskil X

L4(8)

**Vraag 8**

Sarel oorweeg dit om vir hom 'n baadjie te koop waarvan die normale prys R400 is, maar daar is 'n afslag van 20%. Daar word verkoopbelasting van 14% in Suid-Afrika bygevoeg. Die assistent voeg eers die verkoopbelasting by die prys van die baadjie en trek dan die 20% afslag af. Sarel protesteer omdat hy wil hê dat die assistent eers die 20% afslag moet aftrek en daarna die 14% belasting moet byvoeg. Maak dit enige verskil op die uiteindelike prys van die baadjie? Toon al jou bewerkings.

**Question 8**

Sarel considers buying himself a jacket. The original selling price of the jacket is R400, but there is a sale and the jacket is sold at 20% discount. In South Africa, the sales tax is 14%. The shop assistant first adds the tax to the price and then subtracts the 20% discount. Sarel is unhappy about this and insists that the assistant first subtract the 20% discount and then add the 14% tax. Does it make any difference to the price he must pay? Show all your calculations.

R400 ÷ 100 = R4

R4 × 14
= R56 ✓

R400 + R56
= R454

5

R4 × 20
= R80

R456 − R80

≠ R 80
R 376

R374,00

2

R400 − R80
= R320 ✓

R320 + R56
= R376

geen verskil

L30 (9)

Vraag 7: C 20 000 want

een mens is ongeveer $\frac{1}{4}$ van $m^3$ dik. en $100 \times 50 = 5000$

$5000 \times 4 = 20\,000$ (5)

3

Vraag 8:

Silinder ~~Area/Oppv. = 6,28 cm~~ ~~Omtrek = 3,14 cm~~

$3,14 \times 6,28 = 19,71$

$3,14 \times 6,28 = 19,72$ cm

$+ 6,28$ cm

$+ 18,84$ cm

$50,24$ cm

Silinder = 31,41 cm ✓

0

Reghoekige prisma = 80,00 cm ✓

Ekstra tyd vir vraag 9.

Vraag 9:

A = Radius: 10 cm

Deursnee: 20 cm

1

B = Deursnee: 10 cm

Radius: 5 cm

5

C = Deursnee: 5 cm

Radius: 2,5 cm

C se oppv. is dus 15,71 ✓

# S2(1)

**Vraag 1**

As die formule om die waarde van $y$ in die onderstaande tabel te bepaal $y = \frac{1}{2}x + 1$ is, voltooi die tabel.

**Question 1**

If the formula to solve for $y$ in the table below is given as $y = \frac{1}{2}x + 1$, complete the table given.

| $x$ | a | 1 | 2 | d | 10 | f |
|---|---|---|---|---|---|---|
| $y$ | 1 | b | c | 3 | e | 26 |

(a) $= \frac{1}{2}(a) + 1$

$2 \times 0 = \frac{1}{2}(a) \times 2$

$0 = a$ ✓

(b) $= \frac{1}{2}(1) + 1$

$b = \frac{1}{2} + 1$

$b = 1{,}5$ ✓

(c) $= \frac{1}{2}(2) + 1$

$c = 1 + 1$

$c = 2$ ✓

(3) $= \frac{1}{2}(d) + 1$

$3 = \frac{1}{2}d + 1$

$2 \times 2 = \frac{1}{2}d \times 2$

$4 = d$ ✓

(e) $= \frac{1}{2}(10) + 1$

$(e) = 5 + 1$

$e = 6$ ✓

$y = \frac{1}{2}x + 1$ ✓

$(26) = \frac{1}{2}(f) + 1$

$2 \times 25 = \frac{1}{2}f \times 2$

$50 = f$

**Vraag 2**

Brandon kan 2 km in 24 minute stap. Hoe ver sal hy in een uur kan stap (in meter) teen dieselfde tempo?

**Question 2**

Brandon is able to walk 2km in 24 minutes. How far will he be able to walk in one hour (in meters) at the same pace?

2 km / 24 minute

2000 m / 24 minutes

$\frac{2000}{24} = \frac{250}{3}$ m / 1 minute

$83\frac{1}{3}$ m / 1 minute $\times 60$

5000 m / 60 minutes

5000 m / hour

C

∴ Brandon will be able to walk 5000 meters in an hour if he continues at the same pace

L34(1)

**Vraag 1**

As die formule om die waarde van $y$ in die onderstaande tabel te bepaal $y = \frac{1}{2}x + 1$ is, voltooi die tabel.

**Question 1**

If the formula to solve for $y$ in the table below is given as $y = \frac{1}{2}x + 1$, complete the table given.

| $x$ | a | 1 | 2 | d | 10 | f |
|---|---|---|---|---|---|---|
| $y$ | 1 | b | c | 3 | e | 26 |

a=1
b=1,5 ✓
c=2 ✓
d= –
e=6 ✓
f= –

1.

**Vraag 2**

Brandon kan 2 km in 24 minute stap. Hoe ver sal hy in een uur kan stap (in meter) teen dieselfde tempo?

**Question 2**

Brandon is able to walk 2km in 24 minutes. How far will he be able to walk in one hour (in meters) at the same pace?

60 min ÷ 24 min
= 2,5 x 2
= 5 km wat hy in 'n uur kan stap
= 5000 m ✓

3

L9(2)

**Vraag 1**

As die formule om die waarde van $y$ in die onderstaande tabel te bepaal $y = \frac{1}{2}x + 1$ is, voltooi die tabel.

**Question 1**

If the formula to solve for $y$ in the table below is given as $y = \frac{1}{2}x + 1$, complete the table given.

| $x$ | a | 1 | 2 | d | 10 | f |
|---|---|---|---|---|---|---|
| $y$ | 1 | b | c | 3 | e | 26 |

a = 0 ; f

$y = \frac{1}{2}x + 1$

$y = \frac{1}{2}x + 1$

$y = \frac{1}{2}x + 1$

$y = \frac{1}{2}(2) + 1$

$y = 2$ ✓

2

1,5 ; 2

$y = \frac{1}{2}x + 1$

$1 = \frac{1}{2}x + 1$ −1

$0 = \frac{1}{2}x$

$0 = x$ ✓

$y = \frac{1}{2}x + 1$

$3 = \frac{1}{2}x + 1$ −1

$2 = \frac{1}{2}x$ ×2

$1 = x$ X

$y = \frac{1}{2}x + 1$

$y = \frac{1}{2}(1) + 1$

$y = 1,5$ ✓

$y = \frac{1}{2}x + 1$

$y = \frac{1}{2}(10) + 1$

$y = 6$ ✓

$y = \frac{1}{2}x + 1$

$26 = \frac{1}{2}(x) + 1$ −1 ×2

$25 = 37,5$

X

**Vraag 2**

Brandon kan 2 km in 24 minute stap. Hoe ver sal hy in een uur kan stap (in meter) teen dieselfde tempo?

**Question 2**

Brandon is able to walk 2km in 24 minutes. How far will he be able to walk in one hour (in meters) at the same pace?

2km in 24 min. Afstand?

A S T

$A = S \times T$

$A = 2km \times 24min$

$A = 48km$

∴ Hy kan 48 km in een uur stap.

X

O

L8 (2)

**Vraag 1**

As die formule om die waarde van $y$ in die onderstaande tabel te bepaal $y = \frac{1}{2}x + 1$ is, voltooi die tabel.

**Question 1**

If the formula to solve for $y$ in the table below is given as $y = \frac{1}{2}x + 1$, complete the table given.

| $x$ | a | 1 | 2 | d | 10 | f |
|---|---|---|---|---|---|---|
| $y$ | 1 | b | c | 3 | e | 26 |

a) 0
b) 1,5
c) 2
d) 4
e) 6
f) 50

$y = \frac{1}{2}x + 1$

$0 = \frac{1}{2}x$

$\frac{1}{2}$

0.

**Vraag 2**

Brandon kan 2 km in 24 minute stap. Hoe ver sal hy in een uur kan stap (in meter) teen dieselfde tempo?

**Question 2**

Brandon is able to walk 2km in 24 minutes. How far will he be able to walk in one hour (in meters) at the same pace?

24
48
72
96
110
134
158
182
206
240
2400

853 m/s

853 x 60

853
x 60
0

24
x53
792
1200
1272

S 26(2)

**Vraag 1**

As die formule om die waarde van $y$ in die onderstaande tabel te bepaal $y = \frac{1}{2}x + 1$ is, voltooi die tabel.

**Question 1**

If the formula to solve for $y$ in the table below is given as $y = \frac{1}{2}x + 1$, complete the table given.

| $x$ | a | 1 | 2 | d | 10 | f |
|---|---|---|---|---|---|---|
| $y$ | 1 | b | c | 3 | e | 26 |

C

$d = 1\frac{1}{2}$ 0

$b = 1\frac{1}{2}$

✓ $c = 2$

$d = 4$

$e = 6$

$f = 50$

**Vraag 2**

Brandon kan 2 km in 24 minute stap. Hoe ver sal hy in een uur kan stap (in meter) teen dieselfde tempo?

**Question 2**

Brandon is able to walk 2km in 24 minutes. How far will he be able to walk in one hour (in meters) at the same pace?

C

$\frac{2\text{ km}}{2} / \frac{24\text{ min}}{2}$

$= 1\text{ km} / 12\text{ min}$

$12\text{ min} \times 5 = 60\text{ min} = 1\text{ uur}$

$1\text{ km} \times 5 = 5\text{ km} = 5000\text{ meter}$

∴ Hy sal ✓ 5 000 meter stap in een uur

S17(2)

**Vraag 1**

As die formule om die waarde van $y$ in die onderstaande tabel te bepaal $y = \frac{1}{2}x + 1$ is, voltooi die tabel.

**Question 1**

If the formula to solve for $y$ in the table below is given as $y = \frac{1}{2}x + 1$, complete the table given.

| $x$ | a | 1 | 2 | d | 10 | f |
|---|---|---|---|---|---|---|
| $y$ | 1 | b | c | 3 | e | 26 |

a = 0

C

(b ≠ $y = \frac{1}{2}(1) + 1$

b = 1,5 / $1\frac{1}{2}$ ✓

(c) $y = \frac{1}{2}(2) + 1$

c = 2

(d) $y = \frac{1}{2}(x) + 1$

d = 4.

(e) $y = \frac{1}{2}(10) + 1$

e = 6.

(f ≠ $26 = \frac{1}{2}(x)$

26 − 1 = 25 x 2

= 50.

a = 0

b = 1,5

c = 2

d = 4

e = 6

f = 50

**Vraag 2**

Brandon kan 2 km in 24 minute stap. Hoe ver sal hy in een uur kan stap (in meter) teen dieselfde tempo?

**Question 2**

Brandon is able to walk 2km in 24 minutes. How far will he be able to walk in one hour (in meters) at the same pace?

$S = \frac{A}{T}$

Spoed = $\frac{2\text{ km}}{24\text{ m}}$

kilo meter per minuut = 0,083

60 km ÷ 24 m = 2,5

h

2,5 x 2 = 5 km.

Brandon sal 5 km in 'n uur stap as hy teen 'n konstante spoed loop.

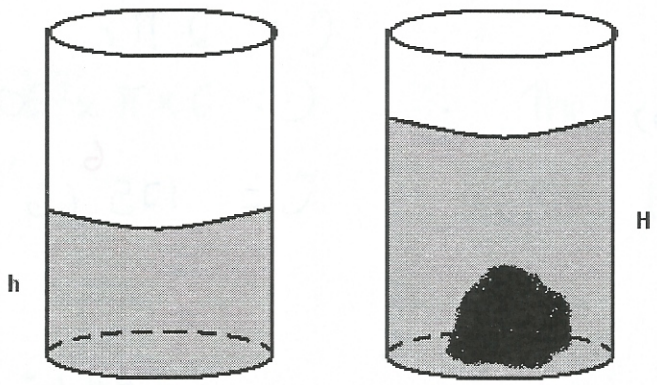
L66(3)

**Vraag 3**

Die hoogte **h** van water in 'n silindriese houer met radius **r = 5 cm** is gelyk aan **10cm**. Peter moet die volume van 'n klip met 'n onreëlmatige vorm meet en besluit om die klip binne-in die houer met water te sit. Die hoogte van die water binne die houer styg tot **H = 13,2cm**. Bereken die volume van die klip in kubieke sentimeter.

**Question 3**

The height **h** of water in a cylindrical container with radius **r = 5cm** is equal to **10cm**. Peter has to measure the volume of an irregularly shaped rock. He decides to place the rock inside the container filled with water. The height of the water inside the container rises to **H = 13,2cm.** Calculate the volume of the rock in cubic centimeter.




13,2cm − 10cm
= 3,2cm

$A = \pi r^2$

$A = \pi \times 5^2$

$A = 78,53$

X ∴ 78,53 − 3,2

= 75,33

∴ The volume of the rock is 75,33

L 59 (3)

**Vraag 3**

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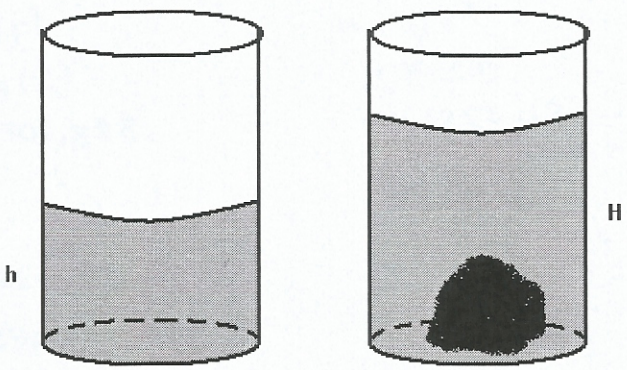


3

$V_1 = \pi r^2 h$

$= \pi(5)^2(10)$ ✓

$= 785,398\ldots cm^3$

$V_2 = \pi r^2 h$

$= \pi(5)^2(13,2)$

✓ $= 1036,725\ldots cm^2$

$V_2 - V_1$ = Rock Volume

$1036,725 - 785,398 = 251,33 cm^3$ ✓

S3(3)

**Vraag 3**

Die hoogte **h** van water in 'n silindriese houer met radius **r = 5 cm** is gelyk aan **10cm**. Peter moet die volume van 'n klip met 'n onreëlmatige vorm meet en besluit om die klip binne-in die houer met water te sit. Die hoogte van die water binne die houer styg tot **H = 13,2cm**. Bereken die volume van die klip in kubieke sentimeter.

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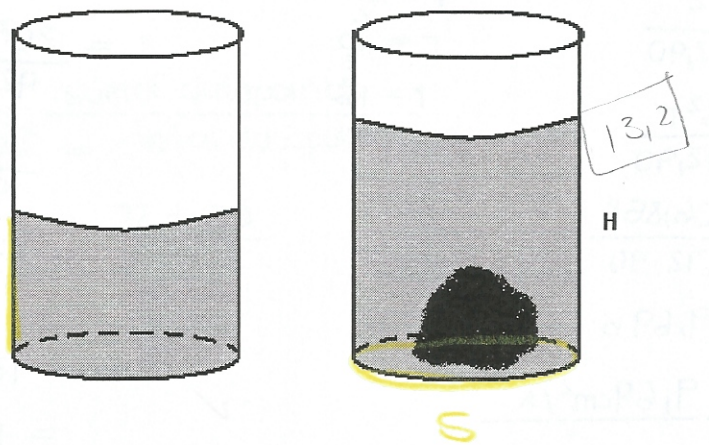


V = Area of base x h

$C_1 = \pi r^2 \times h$
$= \pi(5)^2 \times h$
$= \pi(25) \times 10$
$= 78,53981634 \times 10$
$= 785,3981634\ cm^3$
$= 785,40\ cm^3$ (Rounded off)

C

$C_2 = \pi r^2 \times h$
$= \pi(5)^2 \times h$
$= \pi(25) \times 13,2$
$= 78,53981634 \times 13,2$
$= 1036,725576$
$= 1036,73\ cm^3$

$1036,73 - 785,40$
$= 251,327$
$= 251,33\ cm^3$

The volume of the rock is $251,33\ cm^3$

S 11 (3)

**Vraag 3**

Die hoogte **h** van water in 'n silindriese houer met radius **r = 5 cm** is gelyk aan **10cm**. Peter moet die volume van 'n klip met 'n onreëlmatige vorm meet en besluit om die klip binne-in die houer met water te sit. Die hoogte van die water binne die houer styg tot **H = 13,2cm**. Bereken die volume van die klip in kubieke sentimeter.

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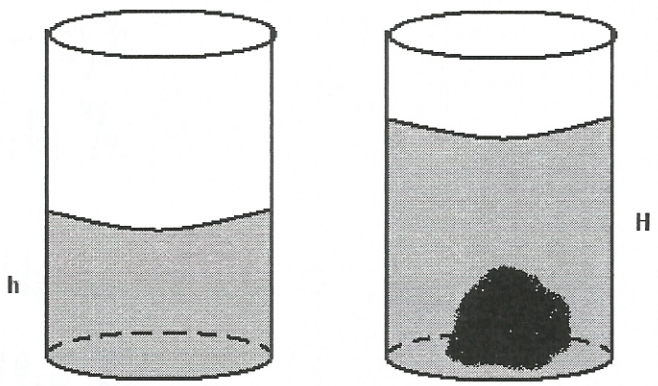


X

$V = \pi r^2 h$

$= \pi (5\,cm)^2 (13{,}2\,cm)$

$= 1036{,}725576\,cm^3$

$\approx 1036{,}76\,cm^3$ ✓

$\therefore 1036{,}76\,cm^3 - 13{,}2\,cm$

$= 1023{,}56\,cm^3$ X

L 58 (4)

**Vraag 4**

Panarotti's bedien twee ronde Hawaiian pizzas van dieselfde dikte in verskillende groottes (dus verskillende oppervlaktes). Die kleiner pizza het 'n deursnee van 30cm and kos R 72,90. Die groter pizza het 'n deursnee van 40cm en kos R 92,90. Watter een van die twee pizzas is beter waarde vir geld? Wys jou redenering.
[Wenk: R per oppervlakte]

**Question 4**

Panarotti's serve two round Hawaiian pizzas with the same thickness but different sizes (thus different areas). The smaller pizza has a diameter of 30cm and costs R 72,90. The larger pizza has a diameter of 40cm and costs R 92,90. Which of the two pizzas is better value for money? Show your reasoning. [Hint: R per area]

72 : 30

```
   - 2,43
30|72,90
 - 60 |
   129
  -120
    90
```

The large pizze is a better deal.

```
   - 2,37
40|92,90
 - 80 |
   129
  -120
    90
  - 80
    10
```

S4(4)

**Vraag 4**

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small pizza. /

$A = \pi r^2$

$A = \pi (15)^2$

✓ $A = \frac{706.853471}{72.90}$

$1R = 9,67 cm^2$

big pizza /

$A = \pi r^2$

$D = \pi (20)^2$

✓ $A = \frac{1256,637061}{92.90}$

2

$1R = 13.52 cm^2$

the big pizza is better value for my money.

why?

S6(s)

**Vraag 5**

Mnr. Venter het die toetspunte van sy 25 graad 9 leerders aangeteken. Hy het hierdie toetspunte gebruik en 'n gemiddeld van 72% gekry. Sandra se punt van 86 is verkeerdelik nagesien as 36. Wat is die korrekte gemiddeld vir die toets nou?

**Question 5**

Mr. Venter wrote down the test marks of his 25 grade 9 learners. He used these marks to calculate an average of 72%. Sandra's mark of 86 has been incorrectly marked as 36. What is the correct average of the test mark now?

$72 \times 25$
$= 1800 - 36$
$= 1764 + 86$
$= 1850 \div 25$
$= 74\%$

3

∴ Die korrekte gemiddeld is 74%

L62(5)

**Vraag 5**

Mnr. Venter het die toetspunte van sy 25 graad 9 leerders aangeteken. Hy het hierdie toetspunte gebruik en 'n gemiddeld van 72% gekry. Sandra se punt van 86 is verkeerdelik nagesien as 36. Wat is die korrekte gemiddeld vir die toets nou?

**Question 5**

Mr. Venter wrote down the test marks of his 25 grade 9 learners. He used these marks to calculate an average of 72%. Sandra's mark of 86 has been incorrectly marked as 36. What is the correct average of the test mark now?

- Class average 72 % ( 25 learners)
- Sandras mark incorrect by 50 marks.

$\therefore \frac{72\%}{25 \text{ learners}} = 2,88 \times 50\%$

$= 3,28 - 2,88 = 0,5$

$= \frac{72}{50} \times \frac{72}{25} = 4,1472$

$= 72\% + 4,15\%$

$= 76,15\%$ or $76\%$

X

thus the correct average of the ~~test~~ mark now is 76 %

S 22 (6)

**Vraag 6**

'n Seeleeu moet asemhaal selfs wanneer dit slaap. Martin het vir een uur lank 'n seeleeu dopgehou. Aan die begin van sy waarneming, het die seeleeu na die bodem van die see geduik en begin slaap. Na 8 minute het dit stadig na die oppervlakte gedryf om asem te haal. Na 3 minute was dit weer terug op die seebodem en die hele proses is herhaal op 'n soortgelyke manier.

Na een uur was die seeleeu:

A. Op die seebodem
B. Besig om bo asem te haal
C. Oppad boontoe
D. Oppad ondertoe

Gee die korrekte antwoord (A-D), maar toon ook jou redenering

↓ = 8 min
↑ = 3 min
→ = 8 min ÷ 1,5 min
→ = 6,5 min
↑ = 3 min ÷ 2
↑ = 1½ min
↓ = 3 min ÷ 2
↓ = 1½ min

afwisseling
↳ opvat
↓
op ↑
af ↓
slaap

**Question 6**

A sea lion has to breathe even while it sleeps. Martin watched one for a whole hour. At the beginning of his observation the sea lion dived to the bottom of the ocean and slept. After 8 minutes it started to float slowly to the surface to breathe. After 3 minutes it was back on the bottom of the ocean and the process is repeated in a similar manner the whole time.

After an hour the sea lion was:

A. On the bottom of the ocean
B. Busy taking a breath at the top
C. On its way up
D. On its way down

Report the correct answer (A-D) and also show your reasoning.

↓ + → + ↑ + ↓ = 60
1,5 + 6,5 + 1,5 + 1,5 = 60
11 = 60
60 × 5 = 55
11 × 5 = 55 min
60 min − 55 min
= 5 min

6,5 − 5 = 1,5 min oor van slaap

antwoord is A, die seeleeu is op die seebodem

L 8 (6)

**Vraag 6**

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B. Besig om bo asem te haal
C. Oppad boontoe
D. Oppad ondertoe

Gee die korrekte antwoord (A-D), maar toon ook jou redenering

C

① 8 min at 3 min op

~~11 min~~

② 16 min 6 min
③ 24 min 12 min
④ 32 min 18 min
⑤ 40 min 24 min
⑥ 48 min 30 min
⑦ 56 min 36 min
⑧ 64 min 42 in

5, 4, 5, 4, 5, 4, 5, 4, 5, 5 teer op

**Question 6**

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A. On the bottom of the ocean
B. Busy taking a breath at the top
C. On its way up
D. On its way down

Report the correct answer (A-D) and also show your reasoning.

✓A. want hy is onder die water want dit is in die middel van sy slaap

S19(7)

**Vraag 7**

Pomp A kan 'n tenk in 5 ure volmaak met water. Pomp B kan dieselfde tenk vul in 8 ure. Hoe lank sal dit neem as die twee pompe saamwerk om die tenk vol te maak? (Rond jou antwoord af tot die naaste minuut).

**Question 7**

Pump A can fill a tank with water in 5 hours. Pump B can fill the same tank in 8 hours. How long will it take to fill up the tank if both pumps are used simultaneously? (Round your answer to the nearest minute).

Direct Proportion

Lets say the tank ~~is can hold~~ has a capacity of 40 litres

Pump A = 40 l / 5 hours
= 8 l / h

Pump B = 40 l / (8 h)
= 5 l / h

So pump A + pump B can fill (8 + 5) l in an hour (60 min)

13

C

~~40 ÷ 13~~
= ~~3~~ hours
= 3 hours

*

time = ~~40 ÷ 13~~ / ~~60~~ $\frac{40}{1} \div \frac{13}{1}$
= 3,08 hours x 60
= ~~3 hours~~ ~~184 min~~ 184,8 min
= 185 minutes

✓

It will take 185 minutes to fill up the tank if both pumps are used
↓
3h 5 min

S25(7)

**Vraag 7**

Pomp A kan 'n tenk in 5 ure volmaak met water. Pomp B kan dieselfde tenk vul in 8 ure. Hoe lank sal dit neem as die twee pompe saamwerk om die tenk vol te maak? (Rond jou antwoord af tot die naaste minuut).

**Question 7**

Pump A can fill a tank with water in 5 hours. Pump B can fill the same tank in 8 hours. How long will it take to fill up the tank if both pumps are used simultaneously? (Round your answer to the nearest minute).

Pump A = 5 hour

Pump B = 8 hours

$\frac{5}{8} = 0,65$

$\frac{8}{5} = 1,6$

~~0,65~~ $0,65 + 1,6 = 2,25$ hours.

L 43(7)

**Vraag 7**

Pomp A kan 'n tenk in 5 ure volmaak met water. Pomp B kan dieselfde tenk vul in 8 ure. Hoe lank sal dit neem as die twee pompe saamwerk om die tenk vol te maak? (Rond jou antwoord af tot die naaste minuut).

**Question 7**

Pump A can fill a tank with water in 5 hours. Pump B can fill the same tank in 8 hours. How long will it take to fill up the tank if both pumps are used simultaneously? (Round your answer to the nearest minute).

3.08

8 ÷ 5 = 0,625 + 1

= 1,625.

1 ÷ 1.625 = 0,62

0,62 x 5 / 0,62 x 0,625 x 8

C

= 3.08 ure = 3 ure en 5 minute

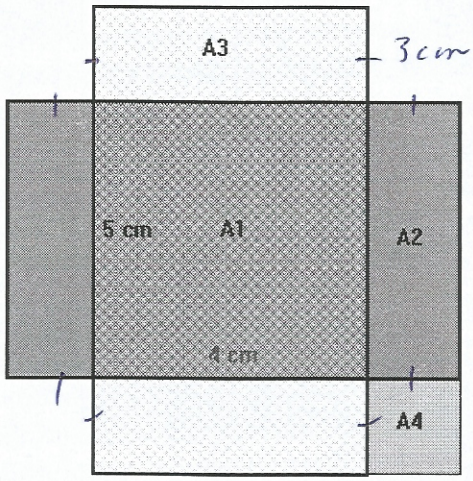
L 56 (8)

**Vraag 8**

Vier klein vierkantige stukkies hout is op die vier hoeke van 'n reghoekige stuk hout uitgesny. Die hout is daarna gebruik om 'n boks te maak. Die volume van die boks is $60cm^3$ en die lengte is 5cm en die breedte 4cm. Bereken die oorspronklike oppervlakte van die stuk hout (voor enige stukke uitgesny is).

**Question 8**

Four small square pieces of wood are cut out of the four corners of a rectangular piece of wood. The wood is then used to make a box. The volume of the box is $60cm^3$. The length is 5cm and the breadth 4cm. Calculate the original area of the piece of wood (before anything was cut out).




$60 cm^3 / 20 cm^2$

$= 3 cm$ ✓

$4cm \times 5cm$

$= 20 cm^2$

3

$\therefore$ Vierkantige stukkies

$= (3cm)^2 \times 4$

$= 9cm^2 \times 6$

$= 36 cm^2$

$5 cm + 6 cm$

$= 11 cm$

$4 cm + 6 cm$

$= 10 cm$

$\therefore$ Oorspr. Oppv.

$= 11 cm \times 10 cm$

$= 110 cm^2$ ✓

8

S 27(8)

**Vraag 8**

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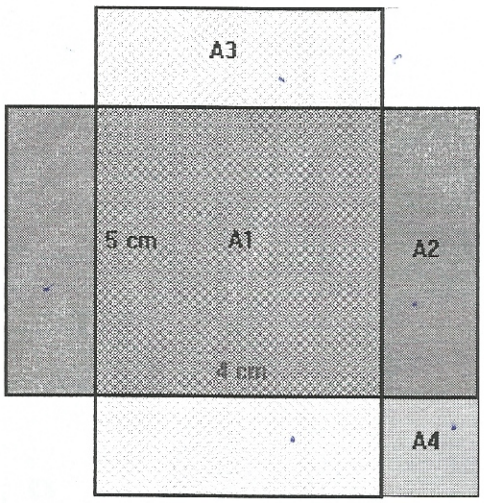


Hoogte = 3cm ✓

C

$V = l \times b \times h$

~~$60 = 5 \times 4 \times h$~~

~~$60 = 20 \times h$~~

~~$\frac{60}{20} = \frac{20h}{20}$~~

~~$3 = h$~~

Opp. van hout is $= 110cm^2$ voor enige stukke uitgesny is. ✓

Opp. $= l \times b$
$= 5 \times 4$
$A_1 = 20\ cm^2$

Opp. $= l \times b$
$= 3 \times 4$
$A_3 = 12\ cm^2 \times 2 = 24cm^2$

Opp. $= l \times b$
$= 5 \times 3$
$A_2 = 15cm^2 \times 2 = 30\ cm^2$

Opp. $l \times b$
$= 3 \times 3$
$A_4 = 9cm^2 \times 4 = 36cm^2$

$20cm^2 + 24cm^2 + 30cm^2 + 36cm^2 = 110\ cm^2$

S10(8)

**Vraag 8**

Vier klein vierkantige stukkies hout is op die vier hoeke van 'n reghoekige stuk hout uitgesny. Die hout is daarna gebruik om 'n boks te maak. Die volume van die boks is $60cm^3$ en die lengte is 5cm en die breedte 4cm. Bereken die oorspronklike oppervlakte van die stuk hout (voor enige stukke uitgesny is).

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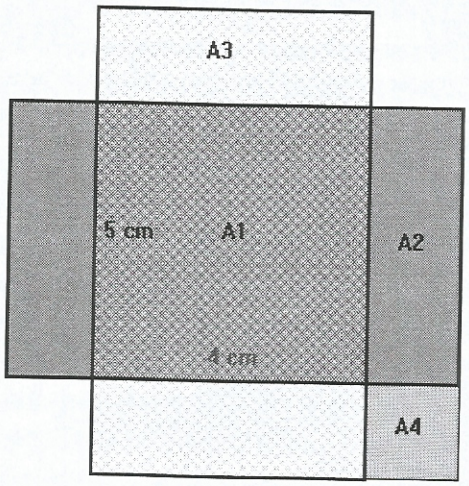


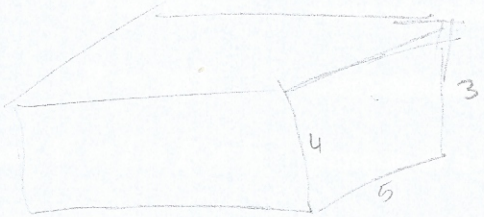

$V = b \times l \times h$

$V = 4cm \times 5cm \times h$

$60cm^3 = 20cm^2 \times h$

$h = \frac{60cm^3}{20cm^2}$

$h = 3cm$




$3cm \times 4 = 12cm$

$(3cm)^3 = 27cm^2 \times 4$

$= 108cm^3$

X

$60cm^3 + 108cm^3 = 168cm^2$

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Hoërskool Ferdinand Postma | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| GD | OOSTHUIZEN | KODE | | | | | | | |
| | | | | | | | | | |
| Surname | First Names | | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | | | | | | | | | |
| BESTER | EBERT CORNELIUS (EBERT) | L3 | 1 | 1 | 0 | 0 | 0 | 0 | 1 |
| | | | 2 | 0 | 0 | 0 | 3 | 1 | 1 |
| | | | | | | | | | |
| | | | | | | | | | |
| BRONKHORS | STEPHAN ALFRED (STEPHAN) | S5 | 3 | 3 | 3 | 1 | 1 | 1 | 0 |
| | | | 3 | 3 | 1 | 3 | 0 | 1 | 1 |
| | | | | | | | | | |
| | | | | | | | | | |
| CASSIM | MOHAMMED SUHAIL (MOHAMM | L45 | | | | | | | |
| | | | 3 | 3 | 0 | 0 | 1 | 2 | 3 |
| | | | | | | | | | |
| | | | | | | | | | |
| CROUS | CARLA (CARLA) | L23 | 3 | 2 | 0 | 0 | 1 | 1 | 1 |
| | | | 3 | 3 | 0 | 0 | 2 | 1 | 1 |
| | | | | | | | | | |
| | | | | | | | | | |
| DE MEYER | CARLO WIAN (CARLO) | L24 | 3 | 0 | 3 | 0 | 1 | 3 | 1 |
| | | | 3 | 1 | 1 | 0 | 1 | 1 | 1 |
| | | | | | | | | | |
| | | | | | | | | | |
| ESTERHUYS | SIMONE (SIMONE) | L5 | 3 | 3 | 1 | 0 | 0 | 1 | 1 |
| | | | 2 | 3 | 2 | 0 | 0 | 1 | 0 |
| | | | | | | | | | |
| | | | | | | | | | |
| FOUCH | JANU (JANU) | L29 | 3 | 1 | 3 | 0 | 1 | 3 | 1 |
| | | | 3 | 3 | 0 | 0 | 0 | 0 | 3 |
| | | | | | | | | | |
| | | | | | | | | | |
| GAABUE | LEBONE TSHIRELETSO (LEBON | L47 | 3 | 1 | 0 | 3 | 0 | 1 | 1 |
| | | | 0 | 0 | 1 | 3 | 0 | 0 | 1 |
| | | | | | | | | | |
| | | | | | | | | | |
| HENDRIKS | JANE (JANE) | S14 | 3 | 3 | 1 | 0 | 1 | 2 | 1 |
| | | | 3 | 3 | 3 | 0 | 0 | 3 | 1 |
| | | | | | | | | | |
| | | | | | | | | | |
| HOFMEYER | TRISTAN ROBERT (TRISTAN) | S16 | 2 | 3 | 3 | 0 | 0 | 2 | 1 |
| | | | 3 | 1 | 3 | 0 | 0 | 1 | 0 |
| | | | | | | | | | |
| | | | | | | | | | |
| KOOIJ | KARIN (KARIN) | S17 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| | | | 3 | 3 | 3 | 3 | 1 | 2 | 3 |
| | | | | | | | | | |
| | | | | | | | | | |
| KRUGER | JAROD CHRISTIAN (JAROD) | S18 | 3 | 3 | 3 | 3 | 2 | 2 | 1 |
| | | | 3 | 3 | 3 | 3 | 2 | 2 | 1 |
| | | | | | | | | | |
| | | | | | | | | | |
| LEBITSA | TLOTLISO (TLOTLISO) | S19 | 3 | 3 | 3 | 0 | 1 | 3 | 1 |
| | | | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| | | | | | | | | | |

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| MOFFAT | MATHABO ANGELINAH (MATHA | S23 | 3 | 1 | 3 | 0 | 1 | 3 | 3 |
| | | | 1 | 3 | 3 | 0 | 3 | 3 | 1 |
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| MPHAHLELE | AMOGELANG OLIVER JUNIOR ( | S24 | 3 | 3 | 3 | 3 | 3 | 1 | 1 |
| | | | 3 | 3 | 3 | 3 | 3 | 2 | 3 |
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| MQONI | KEALEBOGA ONALENNA (ONAL | L57 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| | | | 3 | 2 | 0 | 0 | 0 | 0 | 1 |
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| MULLER | CORNELIUS WILLEM (NEELS) | L11 | 3 | 1 | 3 | 0 | 1 | 3 | 1 |
| | | | 3 | 3 | 0 | 3 | 0 | 3 | 1 |
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| OLIPHANT | ALEXANDER DAVID (ALEXANDE | L59 | 2 | 0 | 3 | 0 | 0 | 1 | 3 |
| | | | 2 | 3 | 0 | 0 | 1 | 1 | 3 |
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| PIENAAR | ZANDRIA (ZANDRIA) | S30 | | | | | | | |
| | | | 3 | 3 | 3 | 0 | 3 | 3 | 1 |
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| RICHARDSON | VIHAN (VIHAN) | L14 | 3 | 2 | 0 | 1 | 1 | 1 | 1 |
| | | | 3 | 0 | 0 | 1 | 0 | 1 | 1 |
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| ROSS | CONNOR LISLE (CONNOR) | L63 | 3 | 0 | 3 | 3 | 3 | 1 | 3 |
| | | | 1 | 0 | 0 | 0 | 2 | 2 | 3 |
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| SCHULTZ | AYRTON (AYRTON) | L36 | 3 | 0 | 0 | 0 | 1 | 0 | 1 |
| | | | 1 | 0 | 0 | 0 | 0 | 1 | 1 |
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| SEPENG | ORENEILWE SHADEY (SHADEY | L64 | 2 | 1 | 0 | 1 | 0 | 1 | 1 |
| | | | 3 | 1 | 0 | 0 | 0 | 1 | 1 |
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| STAVAST | LOURENS PETRUS FOURIE (FO | L15 | 3 | 1 | 0 | 0 | 0 | 1 | 1 |
| | | | 3 | 3 | 3 | 0 | 2 | 2 | 1 |
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| TEMBE | PALESA GABRINA (PALESA) | S36 | 0 | 2 | 0 | 3 | 0 | 1 | 1 |
| | | | 3 | 0 | 1 | 3 | 2 | 2 | 1 |
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| | | | | | | | | | |
| VAN COPPEN | COBUS (COBUS) | L40 | 0 | 0 | 3 | 0 | 0 | 2 | 3 |
| | | | 3 | 3 | 0 | 0 | 1 | 1 | 0 |
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| VAN DER ME | MICHAELA (MICHAELA) | L18 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 1 | 1 | 1 | 0 | 0 | 2 | 1 |
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| VAN DYK | MARKUS JOHANNES (MJ) | L127 | | | | | | | |

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| VAN NIEKERK | SUNE (SUNE) | S38 | | | | | | | |
| | | | 2 | 3 | 3 | 0 | 1 | 1 | 1 |
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| VAN ZYL | ZANICA (ZANICA) | L43 | 3 | 3 | 0 | 0 | 2 | 0 | 1 |
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| BESTER | EBERT CORNELIUS (EBERT) | L3 | 3 | 0 | 3 | 1 |
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| BRONKHORST | STEPHAN ALFRED (STEPHAN) | S5 | 3 | 1 | 3 | 2 |
| | | | | | | |
| CASSIM | MOHAMMED SUHAIL (MOHAMMED) | L45 | 1 | 0 | 0 | 2 |
| | | | | | | |
| CROUS | CARLA (CARLA) | L23 | 3 | 0 | 1 | 0 |
| | | | | | | |
| DE MEYER | CARLO WIAN (CARLO) | L24 | 3 | 1 | 1 | 0 |
| | | | | | | |
| ESTERHUYSE | SIMONE (SIMONE) | L5 | 1 | 0 | 0 | 0 |
| | | | | | | |
| FOUCH | JANU (JANU) | L29 | 1 | 3 | 3 | 0 |
| | | | | | | |
| GAABUE | LEBONE TSHIRELETSO (LEBONE) | L47 | 3 | 0 | 0 | 0 |
| | | | | | | |
| HENDRIKS | JANE (JANE) | S14 | 3 | 3 | 0 | 0 |
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| HOFMEYER | TRISTAN ROBERT (TRISTAN) | S16 | 3 | 3 | 3 | 1 |
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| KOOIJ | KARIN (KARIN) | S17 | 3 | 3 | 3 | 3 |
| | | | | | | |
| KRUGER | JAROD CHRISTIAN (JAROD) | S18 | 3 | 3 | 3 | 2 |
| | | | | | | |
| LEBITSA | TLOTLISO (TLOTLISO) | S19 | 2 | 0 | 3 | 3 |
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| MOFFAT | MATHABO ANGELINAH (MATHABO) | S23 | 3 | 3 | 3 | 3 |
| | | | | | | |
| MPHAHLELE | AMOGELANG OLIVER JUNIOR (JUNIOR) | S24 | 2 | 3 | 3 | 3 |
| | | | | | | |
| MQONI | KEALEBOGA ONALENNA (ONALENNA) | L57 | 1 | 0 | 1 | 1 |
| | | | | | | |
| MULLER | CORNELIUS WILLEM (NEELS) | L11 | 3 | 3 | 0 | 0 |
| | | | | | | |
| OLIPHANT | ALEXANDER DAVID (ALEXANDER) | L59 | 1 | 2 | 2 | 2 |
| | | | | | | |
| PIENAAR | ZANDRIA (ZANDRIA) | S30 | 3 | 0 | 3 | 0 |
| | | | | | | |
| RICHARDSON | VIHAN (VIHAN) | L14 | 1 | 3 | 0 | 1 |
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| ROSS | CONNOR LISLE (CONNOR) | L63 | | | | |
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| SCHULTZ | AYRTON (AYRTON) | L36 | 2 | 0 | 3 | 2 |
| | | | | | | |
| SEPENG | ORENEILWE SHADEY (SHADEY) | L64 | 2 | 2 | 1 | 0 |
| | | | | | | |
| STAVAST | LOURENS PETRUS FOURIE (FOURIE) | L15 | 0 | 3 | 3 | 2 |
| | | | | | | |
| TEMBE | PALESA GABRINA (PALESA) | S36 | 3 | 3 | 0 | 0 |
| | | | | | | |
| VAN COPPENHAGEN | COBUS (COBUS) | L40 | 3 | 1 | 0 | 0 |
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|---|---|---|---|---|---|---|
| VAN DER MERWE | MICHAELA (MICHAELA) | L18 | 0 | 3 | 0 | 0 |
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| VAN DYK | MARKUS JOHANNES (MJ) | L127 | | | | |
| | | | | | | |
| VAN NIEKERK | SUNE (SUNE) | S38 | 3 | 1 | 0 | 0 |
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| VAN ZYL | ZANICA (ZANICA) | L43 | 3 | 3 | 3 | 0 |
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| Surname | First Names | | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** |
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| BADENHORST | RUBEN (RUBEN) | 8L102 | 3 | 0 | 3 | 0 | 0 | 0 | 0 | 0 |
| | | | 3 | 2 | 1 | 0 | 0 | 1 | 0 | 0 |
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| BOTHA | JOHN LOUIS (JOHN) | 8S69 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| | | | 2 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
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| BURGER | FERDIE (FERDIE) | 8L103 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
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| DE KOCK | COLENE (COLENE) | 8L104 | 3 | 3 | 0 | 0 | 0 | 0 | 3 | 3 |
| | | | 3 | 3 | 3 | 0 | 0 | 1 | 0 | 3 |
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| DERBYSHIRE | JANIQUE RIQUELLE (JANIQU | 8L105 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
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| FRONEMAN | HANKO CHARL (HANKO) | 8S70 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| | | | 2 | 3 | 3 | 0 | 0 | 1 | 0 | 0 |
| | | | | | | | | | | |
| GOPANE | REBONE DITIROTSAONE (D | 8S71 | 3 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| | | | 3 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| | | | | | | | | | | |
| ISHERWOOD | KYLE NICHOLAS (KYLE) | 8L106 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 3 | 0 | 2 | 0 | 0 | 0 | 0 | 3 |
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| JERLING | MORGAN JADE (MORGAN) | 8S72 | 3 | 0 | 0 | 0 | 1 | 3 | 3 | 3 |
| | | | 3 | 0 | 2 | 1 | 0 | 3 | 0 | 2 |
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| JONKER | MARTHINUS PHILLIPPUS (TI | 8L107 | 3 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| | | | 3 | 0 | 3 | 0 | 0 | 3 | 0 | 0 |
| | | | | | | | | | | |
| KATAMETSI | ROSE PABALLO (PABALLO) | 8S73 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
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| KLEINHANS | RUAN (RUAN) | 8S74 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| | | | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
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| LABUSCHAGNE | THOMAS IGNATHEUS (THON | 8L108 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | | | | | | |
| LOUW | JOSHUA (JOSHUA) | 8L109 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 3 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
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| MAHLATSI | MPHO REABETSWE (MPHO) | 8S75 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 0 |
| | | | 3 | 3 | 0 | 3 | 0 | 0 | 2 | 1 |
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| MATSEMELA | MATSIMELA RESEGO (RESE | 8S76 | 3 | 0 | 1 | 2 | 1 | 1 | 1 | 0 |
| | | | 3 | 0 | 1 | 3 | 0 | 1 | 0 | 0 |
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| MEYER | HERMANUS BERNARDUS (B | 8S77 | 1 | 0 | 2 | 3 | 0 | 0 | 0 | 2 |
| | | | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 3 |
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| MOLAPISI | QUEEN NOMTHANDAZO (QU | 8S78 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 2 | 0 | 0 | 3 | 0 | 1 | 1 | 0 |
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| MOTARA | YAASEEN AHMED (YAASEEI | 8L110 | 2 | 0 | 3 | 0 | 0 | 0 | 1 | 1 |
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| NOINYANE | THANDOLWETHU (THANDO) | 8S79 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 3 |
| | | | 3 | 1 | 3 | 0 | 0 | 1 | 3 | 2 |
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| PRETORIUS | DIAN (DIAN) | 8L111 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | | | | | | |
| ROUX | ENGELA MARIE (ENGELA) | 8L112 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| | | | | | | | | | | |
| SCHOLTZ | JAN DANIEL (DANIEL) | 8L113 | 3 | 0 | 0 | 0 | 0 | 3 | 0 | 0 |
| | | | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
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| SEOBI | TSHEHETSO KHOSI (TSHEH | 8S80 | 2 | 0 | 1 | 0 | 0 | 1 | 0 | 1 |
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| SNYMAN | JASON-LEE (JASON) | 8L114 | 3 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| | | | 2 | 2 | 1 | 1 | 1 | 1 | 0 | 2 |
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| SNYMAN | NICOLAAS MARCO (MARCO | 8L115 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 2 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
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| SPRINGTHORPE | JILLIAN LOUISE (JILLIAN) | 8S81 | 3 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| | | | 3 | 3 | 3 | 0 | 1 | 1 | 0 | 1 |
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| SWART | LENIEL (LENIEL) | 8L116 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
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| TYATYA | NOTHANDO BIKIWE (THAND | 8L117 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
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| VAN DER MERWE | WILLEM JACOBUS (WIAN) | 8L118 | 3 | 0 | 0 | 0 | 0 | 1 | 0 | 2 |
| | | | 3 | 0 | 2 | 0 | 0 | 0 | 0 | 2 |
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| WILMANS | JUA-NE (JUA-NE) | 8L119 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 3 | 0 | 3 | 0 | 0 | 0 | 0 | 0 |
| | | | | | | | | | | |
| YONA | NOMATHAMSANQA THAMI ( | 8L120 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | 3 | 2 | 0 | 0 | 0 | 2 | 0 | 2 |
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| Liam | Wolmaran | 1 | 1 | 0 | 2 | 0 | 3 | 0 |
| Mumina | Khair | 2 | 2 | 0 | 0 | 0 | 0 | 0 |
| Denovia | Zeekoei | 3 | 3 | 1 | 2 | 3 | 1 | 0 |
| Andre | Barnard | 2 | 3 | 1 | 1 | 0 | 0 | 0 |
| Jade | Selbego | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gomolema | Molete | 0 | 1 | 1 | 1 | 1 | 1 | 0 |
| Bernard | Stavast | 3 | 3 | 3 | 3 | 3 | 1 | 0 |
| Aston | Forbes | 1 | 3 | 0 | 0 | 0 | 0 | 0 |
| Aldun | Coetzee | 2 | 2 | 0 | 0 | 0 | 0 | 0 |
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| Naam | Van | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
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| Danel | Combrink | 3 | 0 | 0 | 1 | 0 | 3 | 0 |
| | | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
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# Question analysis: Test Gr 8

**Question 1:**

Mr. Visagie travels 548 kilometers in 5 hours to his destination. What is his average velocity in kilometer per hour?

| Knowledge level | Competency cluster & level |
|---|---|
| **Level 2: Routine procedure**<br>Learner must identify the correct formula, substitute the values in the formula, and determine the average velocity | **Reproduction cluster – Level 1/2** |

**Question 2:**

Determine the value of $y$ in the following expression:

$$3y + 19 = -65 + 7y$$

| Knowledge level | Competency cluster & level |
|---|---|
| **Level 2: Routine procedure**<br>Learner must know the algorithm to solve this linear equation | **Reproduction cluster – Level 1/2** |

**Question 3:**

A boy eats 100 cookies in five days. Each day he eats 6 cookies more than the previous day. How many cookies did he eat on the very first day?

| Knowledge level | Competency cluster & level |
|---|---|
| **Level 4: Problem-solving**<br>Learner must write a linear equation to model this situation and then solve the equation | **Reflection cluster – Level 5/6** |

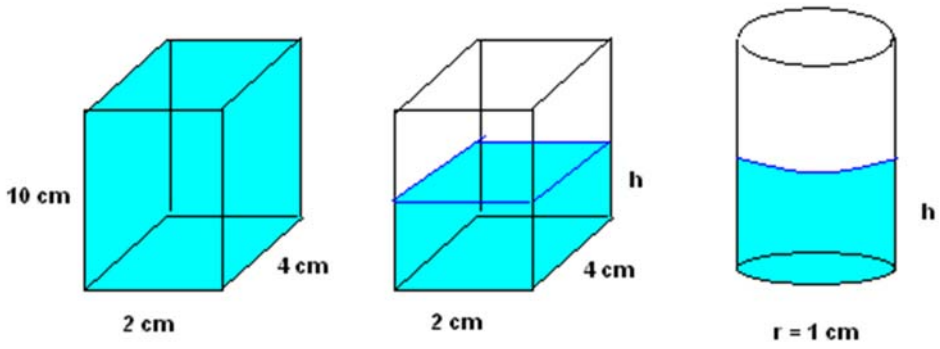
**Question 4:**

Theresa has an average of 56% for her first seven exam papers. What percentage should she get in her eighth paper to ensure she will have an average of 60% for her eight subjects?

| Knowledge level | Competency cluster & level |
|---|---|
| **Level 3: Complex procedure**<br>Learner must determine the total for eight papers and subtract the total for seven papers to determine the mark in paper eight | **Connections cluster – Level 3/4** |

**Question 5:**

The cuboid on the left was initially filled with water. Water is then emptied from it into the cuboid on the right and the rectangular cylinder on the right in such a way that the height h in both containers (the right cylinder and the cuboid) are equal. Calculate the height h of the water in these two containers to the right. (Round your answer to the nearest tenth of a cm)




| Cognitive level | Competence cluster & level |
|---|---|
| **Level 4: Problem-solving**<br>Learner must determine the volume of all three shapes, then model the total volume of the last two shapes in terms of the volume of the first shape, and then determine the height of the water in the two shapes by solving this linear equation | **Reflection cluster – Level 5/6** |

**Question 6:**

Mrs. Scheepers plans to build a swimming pool in her garden. The garden is in the form of a rectangle with length 100m and width 50m. She wants to build a square pool. Calculate the length of one side of the pool if the remaining part of the garden (without the swimming pool) equals one half of the original rectangular garden.

| Knowledge level | Competency cluster & level |
|---|---|
| **Level 3: Complex procedure**<br>Learner must determine the area of the garden, determine one half of this area and find the length of one side of the square | **Connections cluster – Level 3/4** |

**Question 7:**

The following information about three circles are given to you:

A is the largest circle; B is the middle-sized circle and C is the smallest circle. Circle A has a diameter of 20cm. The smaller circles are drawn in such a way that the radius of circle A is the diameter of circle B and the radius of circle B is the diameter of circle C. Calculate the area of the circle C.

| Knowledge level | Competency cluster & level |
|---|---|
| **Level 3: Complex procedure**<br>Learner must know that the diameter is twice the radius, draw the three circles with the correct radius, and then determine the area of the smallest circle | **Connections cluster – Level 3/4** |

**Question 8:**

Sarel considers buying himself a jacket. The original selling price of the jacket is R400, but there is a sale and the jacket is sold at 20% discount. In South Africa, the sales tax is 14%. The shop assistant first adds the tax to the price and then subtracts the 20% discount. Sarel is unhappy about this and insists that the assistant first subtract the 20% discount and then add the 14% tax. Does it make any difference to the price he must pay? Show all your calculations.

| Knowledge level | Competency cluster & level |
|---|---|
| **Level 3: Complex procedure** | **Connections cluster – Level 3/4** |

| | |
|---|---|
| Learner must be able to determine the price with sales tax, the discounted price and then the other way around. Learner must answer the question appropriately | |

**Question 9:**

A rectangular piece of field was booked for a pop concert. The area where the fans had to stand, was 100m by 50m. All the tickets were sold out and the field was filled with fans who were standing during the concert.

Choose the best estimation of the total number of people who attended the concert:

A. 2 000
B. 5 000
C. 20 000
D. 50 000
E. 100 000

Show your reasoning and all your calculations.

| Knowledge level | Competency cluster & level |
|---|---|
| **Level 4: Problem-solving**<br>Learner must estimate how many people can stand on one square meter, determine the area of the field and then determine the number of people on the field | **Reflection cluster – Level 5/6** |

# Test analysis Gr 9

**Question 1:**

If the formula to solve for $y$ in the table below is given as $y = \frac{1}{2}x + 1$ , complete the table given.

| $x$ | $a$ | 1 | 2 | $d$ | 10 | $f$ |
|---|---|---|---|---|---|---|
| $y$ | 1 | $b$ | $c$ | 3 | $e$ | 26 |

| Knowledge level | Competency cluster & level |
|---|---|
| **Level 2: Routine procedure**<br>Learner must determine the values for y when a value for x is given and the values for x when a value for y is given. Must know substitution and solving of a linear equation | **Reproduction cluster – Level 1/2** |

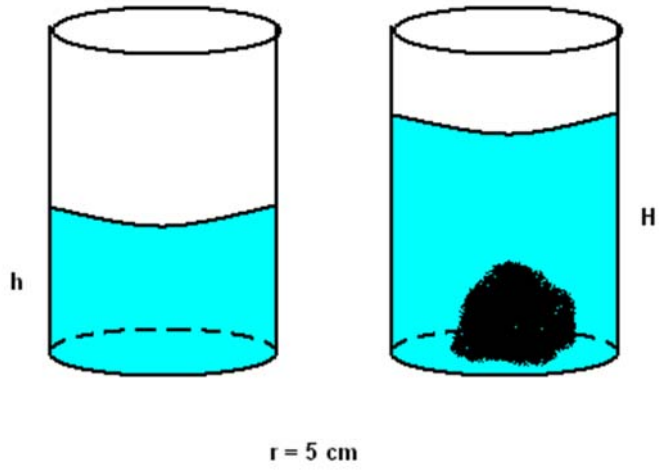
**Question 2:**

Brandon can walk 2 km in 24 minutes. How far will he be able to walk in one hour (in meters) at the same pace?

| Knowledge level | Competency cluster & level |
|---|---|
| **Level 2: Routine procedure**<br>Learner must convert km to m, determine the distance he can walk, and convert the answer to m/h | **Reproduction cluster – Level 1/2** |

**Question 3:**

The height **h** of water in a cylindrical container with radius **r = 5cm** is equal to **10cm**. Peter must measure the volume of an irregularly shaped rock. He decides to place the rock inside the container filled with water. The height of the water inside the container rises to **H = 13,2cm.** Calculate the volume of the rock in cubic centimeter.




| Knowledge level | Competency cluster & level |
|---|---|
| **Level 3: Complex procedure**<br>Learner must model this situation in terms of the volume of the cylinder without the rock and the volume with the rock. Determine the volume of the rock by subtracting the two volumes | **Connections cluster – Level 3/4** |

**Question 4:**

Panarotti's serve two round Hawaiian pizzas with the same thickness but different sizes (thus different areas). The smaller pizza has a diameter of 30cm and costs R 72,90. The larger pizza has a diameter of 40cm and costs R 92,90. Which of the two pizzas is better value for money? Show your reasoning. [Hint: R per area]

| Knowledge level | Competency cluster & level |
|---|---|
| **Level 3: Complex procedure**<br>Learner must determine the area of both pizzas, then determine the cost of each per square meter, explain which one is better value for money | **Connections cluster – Level 3/4** |

**Question 5:**

Mr. Venter wrote down the test marks of his 25 grade 9 learners. He used these marks to calculate an average of 72%. Sandra's mark of 86% has been incorrectly marked as 36%. What is the correct average of the test mark now?

| Knowledge level | Competency cluster & level |
|---|---|
| **Level 2: Complex procedure**<br>Learner must determine the total mark of the learners, subtract the wrong mark, add the correct mark and determine the new average | **Connections cluster – Level 3/4** |

**Question 6:**

A sea lion must breathe even while it sleeps. Martin watched one for a whole hour. At the beginning of his observation the sea lion dived to the bottom of the ocean and slept. After 8 minutes, it started to float slowly to the surface to breathe. After 3 minutes, it was back on the bottom of the ocean and the process is repeated in a similar manner the whole time.

After an hour, the sea lion was:

A. On the bottom of the ocean
B. Busy taking a breath at the top
C. On its way, up
D. On its way, down

Report the correct answer (A-D) and show your reasoning.

| Knowledge level | Competency cluster & level |
|---|---|
| **Level 2: Routine procedure**<br>Learner must in a logical way determine the position of the sea lion for the 8- and 3 min intervals during the 60 min of observation | **Reproduction cluster – Level 1/2** |

**Question 7:**

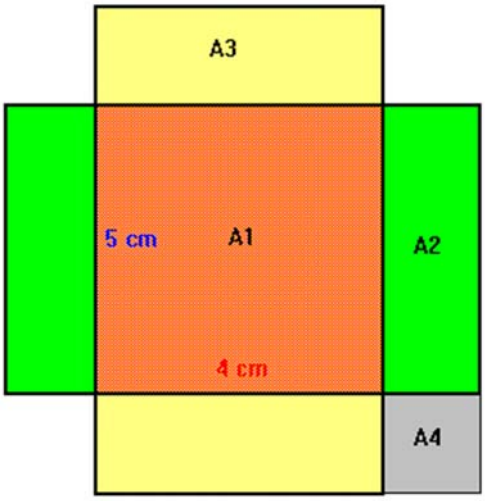
Pump A can fill a tank with water in 5 hours. Pump B can fill the same tank in 8 hours. How long will it take to fill up the tank if both pumps are used simultaneously? (Round your answer to the nearest minute).

| Knowledge level | Competency cluster & level |
|---|---|
| **Level 3: Problem-solving** | **Reflection cluster – Level 5/6** |

| | |
|---|---|
| Learner must model this situation in terms of the combined rates of the two pumps, determine this rate and answer to the nearest min | |

**Question 8:**

Four small square pieces of wood are cut out of the four corners of a rectangular piece of wood. The wood is then used to make a box. The volume of the box is $60cm^3$. The length is 5cm and the breadth 4cm. Calculate the original area of the piece of wood (before anything was cut out)




| Knowledge level | Competency cluster & level |
|---|---|
| **Level 4: Problem-solving**<br>Learner must determine the height of the box, realize that this is the length of the pieces cut out, find the length and breadth of the wood, and determine the area of the original piece of wood | **Reflection cluster – Level 5/6** |

```
NONPAR CORR
  /VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9
  /PRINT=SPEARMAN TWOTAIL NOSIG
  /MISSING=PAIRWISE.
```

# Nonparametric Correlations

**Notes**

| | | |
|---|---|---|
| Output Created | | 02-SEP-2017 10:37:40 |
| Comments | | |
| Input | Active Dataset | DataSet1 |
| | Filter | Test = 1 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 97 |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics for each pair of variables are based on all the cases with valid data for that pair. |
| Syntax | | NONPAR CORR /VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 /PRINT=SPEARMAN TWOTAIL NOSIG /MISSING=PAIRWISE. |
| Resources | Processor Time | 00:00:00.00 |
| | Elapsed Time | 00:00:00.00 |
| | Number of Cases Allowed | 262144 cases[a] |

a. Based on availability of workspace memory

**Correlations**

| | | | Q1 |
|---|---|---|---|
| Spearman's rho | Q1 | Correlation Coefficient | 1.000 |
| | | Sig. (2-tailed) | |
| | | N | 83 |
| | Q2 | Correlation Coefficient | .303** |
| | | Sig. (2-tailed) | 0.005 |
| | | N | 83 |
| | Q3 | Correlation Coefficient | 0.121 |
| | | Sig. (2-tailed) | 0.277 |
| | | N | 83 |

| | | | |
|---|---|---|---|
| | Q4 | Correlation Coefficient | 0.115 |
| | | Sig. (2-tailed) | 0.302 |
| | | N | 82 |
| | Q5 | Correlation Coefficient | .221* |
| | | Sig. (2-tailed) | 0.044 |
| | | N | 83 |
| | Q6 | Correlation Coefficient | .313** |
| | | Sig. (2-tailed) | 0.004 |
| | | N | 83 |
| | Q7 | Correlation Coefficient | -0.026 |
| | | Sig. (2-tailed) | 0.817 |
| | | N | 82 |
| | Q8 | Correlation Coefficient | 0.165 |
| | | Sig. (2-tailed) | 0.137 |
| | | N | 83 |
| | Q9 | Correlation Coefficient | 0.115 |
| | | Sig. (2-tailed) | 0.299 |
| | | N | 83 |

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

```
SORT CASES  BY SET.
SPLIT FILE LAYERED BY SET.
NONPAR CORR
  /VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9
  /PRINT=SPEARMAN TWOTAIL NOSIG
  /MISSING=PAIRWISE.
```

# Nonparametric Correlations

**Notes**

| | | |
|---|---|---|
| Output Created | | 02-SEP-2017 10:38:06 |
| Comments | | |
| Input | Active Dataset | DataSet1 |
| | Filter | Test = 1 (FILTER) |
| | Weight | <none> |
| | Split File | SET |
| | N of Rows in Working Data File | 97 |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |

| | | |
|---|---|---|
| | Cases Used | Statistics for each pair of variables are based on all the cases with valid data for that pair. |
| Syntax | | NONPAR CORR<br>/VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9<br>/PRINT=SPEARMAN TWOTAIL NOSIG<br>/MISSING=PAIRWISE. |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.02 |
| | Number of Cases Allowed | 262144 cases[a] |

a. Based on availability of workspace memory

**Correla**

| SET | | | |
|---|---|---|---|
| Spearman's rho | 1 | Q1 | Correlation Coefficient |
| | | | Sig. (2-tailed) |
| | | | N |
| | | Q2 | Correlation Coefficient |
| | | | Sig. (2-tailed) |
| | | | N |
| | | Q3 | Correlation Coefficient |
| | | | Sig. (2-tailed) |
| | | | N |
| | | Q4 | Correlation Coefficient |
| | | | Sig. (2-tailed) |
| | | | N |
| | | Q5 | Correlation Coefficient |
| | | | Sig. (2-tailed) |
| | | | N |
| | | Q6 | Correlation Coefficient |
| | | | Sig. (2-tailed) |
| | | | N |
| | | Q7 | Correlation Coefficient |
| | | | Sig. (2-tailed) |
| | | | N |
| | | Q8 | Correlation Coefficient |
| | | | Sig. (2-tailed) |
| | | | N |
| | | Q9 | Correlation Coefficient |
| | | | Sig. (2-tailed) |
| | | | N |
| | 2 | Q1 | Correlation Coefficient |

| | | |
|---|---|---|
| | | Sig. (2-tailed) |
| | | N |
| | Q2 | Correlation Coefficient |
| | | Sig. (2-tailed) |
| | | N |
| | Q3 | Correlation Coefficient |
| | | Sig. (2-tailed) |
| | | N |
| | Q4 | Correlation Coefficient |
| | | Sig. (2-tailed) |
| | | N |
| | Q5 | Correlation Coefficient |
| | | Sig. (2-tailed) |
| | | N |
| | Q6 | Correlation Coefficient |
| | | Sig. (2-tailed) |
| | | N |
| | Q7 | Correlation Coefficient |
| | | Sig. (2-tailed) |
| | | N |
| | Q8 | Correlation Coefficient |
| | | Sig. (2-tailed) |
| | | N |
| | Q9 | Correlation Coefficient |
| | | Sig. (2-tailed) |
| | | N |

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

s

| Q2 | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 |
|---|---|---|---|---|---|---|---|
| .303** | 0.121 | 0.115 | .221* | .313** | -0.026 | 0.165 | 0.115 |
| 0.005 | 0.277 | 0.302 | 0.044 | 0.004 | 0.817 | 0.137 | 0.299 |
| 83 | 83 | 82 | 83 | 83 | 82 | 83 | 83 |
| 1.000 | 0.126 | 0.194 | 0.208 | 0.190 | 0.060 | 0.158 | 0.116 |
| | 0.256 | 0.080 | 0.059 | 0.086 | 0.592 | 0.154 | 0.297 |
| 83 | 83 | 82 | 83 | 83 | 82 | 83 | 83 |
| 0.126 | 1.000 | 0.127 | .365** | .501** | .367** | -0.078 | 0.191 |
| 0.256 | | 0.255 | 0.001 | 0.000 | 0.001 | 0.481 | 0.084 |
| 83 | 83 | 82 | 83 | 83 | 82 | 83 | 83 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.194 | 0.127 | 1.000 | 0.071 | 0.047 | 0.116 | 0.014 | -0.125 |
| 0.080 | 0.255 | | 0.528 | 0.673 | 0.301 | 0.897 | 0.264 |
| 82 | 82 | 82 | 82 | 82 | 81 | 82 | 82 |
| 0.208 | .365** | 0.071 | 1.000 | .246* | 0.181 | 0.067 | 0.188 |
| 0.059 | 0.001 | 0.528 | | 0.025 | 0.103 | 0.545 | 0.089 |
| 83 | 83 | 82 | 83 | 83 | 82 | 83 | 83 |
| 0.190 | .501** | 0.047 | .246* | 1.000 | .265* | 0.035 | 0.157 |
| 0.086 | 0.000 | 0.673 | 0.025 | | 0.016 | 0.750 | 0.157 |
| 83 | 83 | 82 | 83 | 83 | 82 | 83 | 83 |
| 0.060 | .367** | 0.116 | 0.181 | .265* | 1.000 | 0.030 | .232* |
| 0.592 | 0.001 | 0.301 | 0.103 | 0.016 | | 0.788 | 0.036 |
| 82 | 82 | 81 | 82 | 82 | 82 | 82 | 82 |
| 0.158 | -0.078 | 0.014 | 0.067 | 0.035 | 0.030 | 1.000 | -0.007 |
| 0.154 | 0.481 | 0.897 | 0.545 | 0.750 | 0.788 | | 0.951 |
| 83 | 83 | 82 | 83 | 83 | 82 | 83 | 83 |
| 0.116 | 0.191 | -0.125 | 0.188 | 0.157 | .232* | -0.007 | 1.000 |
| 0.297 | 0.084 | 0.264 | 0.089 | 0.157 | 0.036 | 0.951 | |
| 83 | 83 | 82 | 83 | 83 | 82 | 83 | 83 |

**ations**

| Q1 | Q2 | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 |
|---|---|---|---|---|---|---|---|---|
| 1.000 | 0.375 | 0.231 | 0.094 | .416* | 0.201 | 0.050 | 0.343 | 0.066 |
| | 0.054 | 0.247 | 0.641 | 0.031 | 0.315 | 0.803 | 0.080 | 0.743 |
| 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 |
| 0.375 | 1.000 | 0.197 | 0.150 | .413* | 0.018 | 0.043 | 0.136 | 0.252 |
| 0.054 | | 0.325 | 0.456 | 0.032 | 0.930 | 0.833 | 0.499 | 0.205 |
| 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 |
| 0.231 | 0.197 | 1.000 | 0.185 | .440* | 0.234 | 0.272 | 0.148 | 0.200 |
| 0.247 | 0.325 | | 0.355 | 0.022 | 0.240 | 0.170 | 0.461 | 0.317 |
| 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 |
| 0.094 | 0.150 | 0.185 | 1.000 | 0.146 | 0.117 | 0.200 | 0.145 | -0.182 |
| 0.641 | 0.456 | 0.355 | | 0.466 | 0.562 | 0.317 | 0.470 | 0.363 |
| 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 |
| .416* | .413* | .440* | 0.146 | 1.000 | 0.174 | 0.363 | .444* | 0.068 |
| 0.031 | 0.032 | 0.022 | 0.466 | | 0.384 | 0.062 | 0.020 | 0.736 |
| 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 |
| 0.201 | 0.018 | 0.234 | 0.117 | 0.174 | 1.000 | .500** | .398* | 0.087 |
| 0.315 | 0.930 | 0.240 | 0.562 | 0.384 | | 0.008 | 0.040 | 0.667 |
| 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 |
| 0.050 | 0.043 | 0.272 | 0.200 | 0.363 | .500** | 1.000 | 0.363 | 0.189 |
| 0.803 | 0.833 | 0.170 | 0.317 | 0.062 | 0.008 | | 0.062 | 0.346 |
| 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 |
| 0.343 | 0.136 | 0.148 | 0.145 | .444* | .398* | 0.363 | 1.000 | -0.100 |
| 0.080 | 0.499 | 0.461 | 0.470 | 0.020 | 0.040 | 0.062 | | 0.620 |
| 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 |
| 0.066 | 0.252 | 0.200 | -0.182 | 0.068 | 0.087 | 0.189 | -0.100 | 1.000 |
| 0.743 | 0.205 | 0.317 | 0.363 | 0.736 | 0.667 | 0.346 | 0.620 | |
| 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 |
| 1.000 | .289* | 0.039 | 0.094 | 0.103 | .323* | -0.062 | 0.077 | 0.136 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 0.031 | 0.777 | 0.497 | 0.449 | 0.015 | 0.652 | 0.572 | 0.319 |
| 56 | 56 | 56 | 55 | 56 | 56 | 55 | 56 | 56 |
| .289* | 1.000 | -0.082 | -0.012 | 0.005 | 0.153 | 0.060 | 0.177 | 0.079 |
| 0.031 | | 0.549 | 0.932 | 0.971 | 0.259 | 0.665 | 0.191 | 0.564 |
| 56 | 56 | 56 | 55 | 56 | 56 | 55 | 56 | 56 |
| 0.039 | -0.082 | 1.000 | -0.074 | 0.233 | .573** | .438** | -0.244 | 0.162 |
| 0.777 | 0.549 | | 0.590 | 0.083 | 0.000 | 0.001 | 0.070 | 0.232 |
| 56 | 56 | 56 | 55 | 56 | 56 | 55 | 56 | 56 |
| 0.094 | -0.012 | -0.074 | 1.000 | -0.064 | -0.116 | 0.095 | -0.114 | -0.085 |
| 0.497 | 0.932 | 0.590 | | 0.642 | 0.398 | 0.493 | 0.405 | 0.535 |
| 55 | 55 | 55 | 55 | 55 | 55 | 54 | 55 | 55 |
| 0.103 | 0.005 | 0.233 | -0.064 | 1.000 | 0.211 | 0.088 | -0.150 | 0.240 |
| 0.449 | 0.971 | 0.083 | 0.642 | | 0.118 | 0.522 | 0.271 | 0.075 |
| 56 | 56 | 56 | 55 | 56 | 56 | 55 | 56 | 56 |
| .323* | 0.153 | .573** | -0.116 | 0.211 | 1.000 | 0.196 | -0.144 | 0.200 |
| 0.015 | 0.259 | 0.000 | 0.398 | 0.118 | | 0.151 | 0.290 | 0.139 |
| 56 | 56 | 56 | 55 | 56 | 56 | 55 | 56 | 56 |
| -0.062 | 0.060 | .438** | 0.095 | 0.088 | 0.196 | 1.000 | -0.151 | 0.252 |
| 0.652 | 0.665 | 0.001 | 0.493 | 0.522 | 0.151 | | 0.272 | 0.063 |
| 55 | 55 | 55 | 54 | 55 | 55 | 55 | 55 | 55 |
| 0.077 | 0.177 | -0.244 | -0.114 | -0.150 | -0.144 | -0.151 | 1.000 | 0.042 |
| 0.572 | 0.191 | 0.070 | 0.405 | 0.271 | 0.290 | 0.272 | | 0.756 |
| 56 | 56 | 56 | 55 | 56 | 56 | 55 | 56 | 56 |
| 0.136 | 0.079 | 0.162 | -0.085 | 0.240 | 0.200 | 0.252 | 0.042 | 1.000 |
| 0.319 | 0.564 | 0.232 | 0.535 | 0.075 | 0.139 | 0.063 | 0.756 | |
| 56 | 56 | 56 | 55 | 56 | 56 | 55 | 56 | 56 |

```
FACTOR
  /VARIABLES Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9
  /MISSING LISTWISE
  /ANALYSIS Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9
  /PRINT UNIVARIATE INITIAL CORRELATION DET KMO EXTRACTION ROTATION
  /FORMAT SORT BLANK(.316)
  /CRITERIA MINEIGEN(1) ITERATE(500)
  /EXTRACTION PAF
  /CRITERIA ITERATE(500) DELTA(0)
  /ROTATION OBLIMIN
  /METHOD=CORRELATION.
```

# Factor Analysis

**Notes**

| | | |
|---|---|---|
| Output Created | | 02-SEP-2017 10:40:53 |
| Comments | | |
| Input | Active Dataset | DataSet1 |
| | Filter | Test = 1 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 97 |
| Missing Value Handling | Definition of Missing | MISSING=EXCLUDE: User-defined missing values are treated as missing. |
| | Cases Used | LISTWISE: Statistics are based on cases with no missing values for any variable used. |

| | | |
|---|---|---|
| Syntax | | FACTOR<br>/VARIABLES Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9<br>/MISSING LISTWISE<br>/ANALYSIS Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9<br>/PRINT UNIVARIATE INITIAL CORRELATION DET KMO EXTRACTION ROTATION<br>/FORMAT SORT BLANK(.316)<br>/CRITERIA MINEIGEN(1) ITERATE(500)<br>/EXTRACTION PAF<br>/CRITERIA ITERATE(500) DELTA(0)<br>/ROTATION OBLIMIN<br>/METHOD=CORRELATION. |
| Resources | Processor Time | 00:00:00.06 |
| | Elapsed Time | 00:00:00.09 |
| | Maximum Memory Required | 11368 (11.102K) bytes |

## Descriptive Statistics

| | Mean | Std. Deviation | Analysis N |
|---|---|---|---|
| Q1 | 2.57 | 0.790 | 81 |
| Q2 | 1.70 | 1.289 | 81 |
| Q3 | 1.12 | 1.364 | 81 |
| Q4 | 0.49 | 1.002 | 81 |
| Q5 | 0.85 | 0.976 | 81 |
| Q6 | 1.32 | 0.998 | 81 |
| Q7 | 1.15 | 0.709 | 81 |
| Q8 | 0.26 | 0.468 | 81 |
| Q9 | 0.49 | 1.074 | 81 |

## Correlation

| | | Q1 | Q2 |
|---|---|---|---|
| Correlation | Q1 | 1.000 | 0.290 |
| | Q2 | 0.290 | 1.000 |
| | Q3 | 0.120 | 0.085 |
| | Q4 | 0.084 | 0.212 |
| | Q5 | 0.208 | 0.203 |
| | Q6 | 0.305 | 0.123 |
| | Q7 | -0.063 | 0.008 |
| | Q8 | 0.104 | 0.212 |
| | Q9 | 0.137 | 0.152 |

a. Determinant = .298

### KMO and Bartlett's Test

| | | |
|---|---|---|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | 0.652 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 92.264 |
| | df | 36 |
| | Sig. | 0.000 |

### Communalities

| | Initial | Extraction |
|---|---|---|
| Q1 | 0.206 | 0.470 |
| Q2 | 0.172 | 0.373 |
| Q3 | 0.373 | 0.598 |
| Q4 | 0.137 | 0.183 |
| Q5 | 0.245 | 0.320 |
| Q6 | 0.312 | 0.418 |
| Q7 | 0.250 | 0.414 |
| Q8 | 0.092 | 0.113 |
| Q9 | 0.109 | 0.076 |

Extraction Method: Principal Axis Factoring.

### Total Variance Explained

| | Initial Eigenvalues | | |
|---|---|---|---|
| Factor | Total | % of Variance | Cumulative % |
| 1 | 2.419 | 26.879 | 26.879 |
| 2 | 1.339 | 14.877 | 41.756 |
| 3 | 1.122 | 12.467 | 54.224 |
| 4 | 0.966 | 10.736 | 64.959 |
| 5 | 0.881 | 9.787 | 74.747 |
| 6 | 0.713 | 7.927 | 82.674 |
| 7 | 0.608 | 6.757 | 89.430 |
| 8 | 0.541 | 6.015 | 95.445 |
| 9 | 0.410 | 4.555 | 100.000 |

Extraction Method: Principal Axis Factoring.

a. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.

### Factor Matrix[a]

| | Factor | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| Q3 | 0.689 | -0.326 | |
| Q6 | 0.582 | | |

| | | | |
|---|---|---|---|
| Q5 | 0.538 | | |
| Q7 | 0.488 | -0.389 | |
| Q4 | | | |
| Q9 | | | |
| Q8 | | | |
| Q1 | 0.389 | 0.502 | |
| Q2 | 0.349 | 0.450 | |

Extraction Method: Principal Axis Factoring.

a. 3 factors extracted. 22 iterations required.

**Pattern Matrix[a]**

| | Factor | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| Q3 | 0.776 | | |
| Q6 | 0.645 | | |
| Q7 | 0.466 | -0.387 | |
| Q9 | | | |
| Q1 | | 0.561 | |
| Q2 | | | 0.575 |
| Q4 | | | 0.385 |
| Q5 | | | 0.358 |
| Q8 | | | 0.340 |

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.

a. Rotation converged in 18 iterations.

**Structure Matrix**

| | Factor | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| Q3 | 0.758 | | |
| Q6 | 0.619 | | |
| Q7 | 0.516 | -0.390 | |
| Q9 | | | |
| Q1 | | 0.577 | 0.363 |
| Q2 | | | 0.575 |
| Q5 | 0.463 | | 0.475 |
| Q4 | | | 0.388 |
| Q8 | | | 0.332 |

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.

## Factor Correlation Matrix

| Factor | 1 | 2 | 3 |
|---|---|---|---|
| 1 | 1.000 | -0.030 | 0.410 |
| 2 | -0.030 | 1.000 | 0.122 |
| 3 | 0.410 | 0.122 | 1.000 |

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.

**ı Matrix[a]**

| Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 |
|---|---|---|---|---|---|---|
| 0.120 | 0.084 | 0.208 | 0.305 | -0.063 | 0.104 | 0.137 |
| 0.085 | 0.212 | 0.203 | 0.123 | 0.008 | 0.212 | 0.152 |
| 1.000 | 0.193 | 0.371 | 0.467 | 0.407 | -0.012 | 0.154 |
| 0.193 | 1.000 | 0.216 | 0.115 | 0.195 | 0.097 | -0.090 |
| 0.371 | 0.216 | 1.000 | 0.191 | 0.285 | 0.167 | 0.190 |
| 0.467 | 0.115 | 0.191 | 1.000 | 0.268 | 0.141 | 0.142 |
| 0.407 | 0.195 | 0.285 | 0.268 | 1.000 | 0.071 | 0.165 |
| -0.012 | 0.097 | 0.167 | 0.141 | 0.071 | 1.000 | 0.040 |
| 0.154 | -0.090 | 0.190 | 0.142 | 0.165 | 0.040 | 1.000 |

| Extraction Sums of Squared Loadings | | | Rotation Sums of Squared Loadings[a] |
|---|---|---|---|
| Total | % of Variance | Cumulative % | Total |
| 1.824 | 20.263 | 20.263 | 1.687 |
| 0.755 | 8.393 | 28.656 | 0.645 |
| 0.386 | 4.288 | 32.944 | 1.149 |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

```
SPLIT FILE OFF.
USE ALL.
COMPUTE filter_$=(Test = 2).
VARIABLE LABELS filter_$ 'Test = 2 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
FREQUENCIES VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9
  /ORDER=ANALYSIS.
```

# Frequencies

**Notes**

| | | |
|---|---|---|
| Output Created | | 02-SEP-2017 10:33:05 |
| Comments | | |
| Input | Active Dataset | DataSet1 |
| | Filter | Test = 2 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 97 |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data. |
| Syntax | | FREQUENCIES VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 /ORDER=ANALYSIS. |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.02 |

**Stati**

| | | Q1 | Q2 |
|---|---|---|---|
| N | Valid | 92 | 92 |
| | Missing | 5 | 5 |

# Frequency Table

**Q1**

| | | Frequency | Percent |
|---|---|---|---|
| Valid | 0 | 3 | 3.1 |

| | | | |
|---|---|---|---|
| | 1 | 9 | 9.3 |
| | 2 | 9 | 9.3 |
| | 3 | 71 | 73.2 |
| | Total | 92 | 94.8 |
| Missing | System | 5 | 5.2 |
| Total | | 97 | 100.0 |

**Q2**

| | | Frequency | Percent |
|---|---|---|---|
| Valid | 0 | 17 | 17.5 |
| | 1 | 12 | 12.4 |
| | 2 | 6 | 6.2 |
| | 3 | 57 | 58.8 |
| | Total | 92 | 94.8 |
| Missing | System | 5 | 5.2 |
| Total | | 97 | 100.0 |

**Q3**

| | | Frequency | Percent |
|---|---|---|---|
| Valid | 0 | 36 | 37.1 |
| | 1 | 19 | 19.6 |
| | 2 | 5 | 5.2 |
| | 3 | 32 | 33.0 |
| | Total | 92 | 94.8 |
| Missing | System | 5 | 5.2 |
| Total | | 97 | 100.0 |

**Q4**

| | | Frequency | Percent |
|---|---|---|---|
| Valid | 0 | 57 | 58.8 |
| | 1 | 7 | 7.2 |
| | 3 | 28 | 28.9 |
| | Total | 92 | 94.8 |
| Missing | System | 5 | 5.2 |
| Total | | 97 | 100.0 |

**Q5**

| | | Frequency | Percent |
|---|---|---|---|
| Valid | 0 | 31 | 32.0 |
| | 1 | 25 | 25.8 |
| | 2 | 11 | 11.3 |

| | | | |
|---|---|---|---|
| | 3 | 25 | 25.8 |
| | Total | 92 | 94.8 |
| Missing | System | 5 | 5.2 |
| Total | | 97 | 100.0 |

**Q6**

| | | Frequency | Percent |
|---|---|---|---|
| Valid | 0 | 13 | 13.4 |
| | 1 | 36 | 37.1 |
| | 2 | 17 | 17.5 |
| | 3 | 26 | 26.8 |
| | Total | 92 | 94.8 |
| Missing | System | 5 | 5.2 |
| Total | | 97 | 100.0 |

**Q7**

| | | Frequency | Percent |
|---|---|---|---|
| Valid | 0 | 11 | 11.3 |
| | 1 | 70 | 72.2 |
| | 2 | 1 | 1.0 |
| | 3 | 10 | 10.3 |
| | Total | 92 | 94.8 |
| Missing | System | 5 | 5.2 |
| Total | | 97 | 100.0 |

**Q8**

| | | Frequency | Percent |
|---|---|---|---|
| Valid | 0 | 55 | 56.7 |
| | 1 | 28 | 28.9 |
| | 2 | 3 | 3.1 |
| | 3 | 6 | 6.2 |
| | Total | 92 | 94.8 |
| Missing | System | 5 | 5.2 |
| Total | | 97 | 100.0 |

**Q9**

| | | Frequency | Percent |
|---|---|---|---|
| Valid | 0 | 32 | 33.0 |
| | 1 | 13 | 13.4 |
| | 2 | 4 | 4.1 |
| | 3 | 43 | 44.3 |

| | | | |
|---|---|---|---|
| | Total | 92 | 94.8 |
| Missing | System | 5 | 5.2 |
| Total | | 97 | 100.0 |

```
SORT CASES  BY SET.
SPLIT FILE LAYERED BY SET.
FREQUENCIES VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9
  /ORDER=ANALYSIS.
```

## Frequencies

**Notes**

| | | |
|---|---|---|
| Output Created | | 02-SEP-2017 10:33:12 |
| Comments | | |
| Input | Active Dataset | DataSet1 |
| | Filter | Test = 2 (FILTER) |
| | Weight | <none> |
| | Split File | SET |
| | N of Rows in Working Data File | 97 |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data. |
| Syntax | | FREQUENCIES VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 /ORDER=ANALYSIS. |
| Resources | Processor Time | 00:00:00.00 |
| | Elapsed Time | 00:00:00.00 |

| SET | | | Q1 |
|---|---|---|---|
| 1 | N | Valid | 33 |
| | | Missing | 0 |
| 2 | N | Valid | 59 |
| | | Missing | 5 |

## Frequency Table

**Q1**

| SET | | | Frequency |
|---|---|---|---|
| 1 | Valid | 1 | 1 |

| | | | |
|---|---|---|---|
| | | 2 | 1 |
| | | 3 | 31 |
| | | Total | 33 |
| 2 | Valid | 0 | 3 |
| | | 1 | 8 |
| | | 2 | 8 |
| | | 3 | 40 |
| | | Total | 59 |
| | Missing | System | 5 |
| | Total | | 64 |

**Q2**

| SET | | | Frequency |
|---|---|---|---|
| 1 | Valid | 0 | 3 |
| | | 1 | 2 |
| | | 2 | 1 |
| | | 3 | 27 |
| | | Total | 33 |
| 2 | Valid | 0 | 14 |
| | | 1 | 10 |
| | | 2 | 5 |
| | | 3 | 30 |
| | | Total | 59 |
| | Missing | System | 5 |
| | Total | | 64 |

**Q3**

| SET | | | Frequency |
|---|---|---|---|
| 1 | Valid | 0 | 1 |
| | | 1 | 5 |
| | | 2 | 2 |
| | | 3 | 25 |
| | | Total | 33 |
| 2 | Valid | 0 | 35 |
| | | 1 | 14 |
| | | 2 | 3 |
| | | 3 | 7 |
| | | Total | 59 |
| | Missing | System | 5 |
| | Total | | 64 |

**Q4**

| SET | | | Frequency |
|---|---|---|---|
| 1 | Valid | 0 | 16 |
| | | 1 | 3 |
| | | 3 | 14 |
| | | Total | 33 |
| 2 | Valid | 0 | 41 |
| | | 1 | 4 |
| | | 3 | 14 |
| | | Total | 59 |
| | Missing | System | 5 |
| | Total | | 64 |

**Q5**

| SET | | | Frequency |
|---|---|---|---|
| 1 | Valid | 0 | 6 |
| | | 1 | 6 |
| | | 2 | 5 |
| | | 3 | 16 |
| | | Total | 33 |
| 2 | Valid | 0 | 25 |
| | | 1 | 19 |
| | | 2 | 6 |
| | | 3 | 9 |
| | | Total | 59 |
| | Missing | System | 5 |
| | Total | | 64 |

**Q6**

| SET | | | Frequency |
|---|---|---|---|
| 1 | Valid | 0 | 1 |
| | | 1 | 11 |
| | | 2 | 7 |
| | | 3 | 14 |
| | | Total | 33 |
| 2 | Valid | 0 | 12 |
| | | 1 | 25 |
| | | 2 | 10 |
| | | 3 | 12 |
| | | Total | 59 |
| | Missing | System | 5 |
| | Total | | 64 |

## Q7

| SET | | | Frequency |
|---|---|---|---|
| 1 | Valid | 0 | 3 |
| | | 1 | 24 |
| | | 2 | 1 |
| | | 3 | 5 |
| | | Total | 33 |
| 2 | Valid | 0 | 8 |
| | | 1 | 46 |
| | | 3 | 5 |
| | | Total | 59 |
| | Missing | System | 5 |
| | Total | | 64 |

## Q8

| SET | | | Frequency |
|---|---|---|---|
| 1 | Valid | 0 | 16 |
| | | 1 | 12 |
| | | 2 | 1 |
| | | 3 | 4 |
| | | Total | 33 |
| 2 | Valid | 0 | 39 |
| | | 1 | 16 |
| | | 2 | 2 |
| | | 3 | 2 |
| | | Total | 59 |
| | Missing | System | 5 |
| | Total | | 64 |

## Q9

| SET | | | Frequency |
|---|---|---|---|
| 1 | Valid | 0 | 7 |
| | | 1 | 5 |
| | | 2 | 1 |
| | | 3 | 20 |
| | | Total | 33 |
| 2 | Valid | 0 | 25 |
| | | 1 | 8 |
| | | 2 | 3 |
| | | 3 | 23 |
| | | Total | 59 |
| | Missing | System | 5 |

| | |
|---|---|
| Total | 64 |

**istics**

| Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 |
|---|---|---|---|---|---|---|
| 92 | 92 | 92 | 92 | 92 | 92 | 92 |
| 5 | 5 | 5 | 5 | 5 | 5 | 5 |

| Valid Percent | Cumulative Percent |
|---|---|
| 3.3 | 3.3 |

| | |
|---|---|
| 9.8 | 13.0 |
| 9.8 | 22.8 |
| 77.2 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 18.5 | 18.5 |
| 13.0 | 31.5 |
| 6.5 | 38.0 |
| 62.0 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 39.1 | 39.1 |
| 20.7 | 59.8 |
| 5.4 | 65.2 |
| 34.8 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 62.0 | 62.0 |
| 7.6 | 69.6 |
| 30.4 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 33.7 | 33.7 |
| 27.2 | 60.9 |
| 12.0 | 72.8 |

| | |
|---|---|
| 27.2 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 14.1 | 14.1 |
| 39.1 | 53.3 |
| 18.5 | 71.7 |
| 28.3 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 12.0 | 12.0 |
| 76.1 | 88.0 |
| 1.1 | 89.1 |
| 10.9 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 59.8 | 59.8 |
| 30.4 | 90.2 |
| 3.3 | 93.5 |
| 6.5 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 34.8 | 34.8 |
| 14.1 | 48.9 |
| 4.3 | 53.3 |
| 46.7 | 100.0 |

| | |
|---|---|
| 100.0 | |
| | |
| | |

**Statistics**

| Q2 | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 |
|---|---|---|---|---|---|---|---|
| 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 59 | 59 | 59 | 59 | 59 | 59 | 59 | 59 |
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |

| Percent | Valid Percent | Cumulative Percent |
|---|---|---|
| 3.0 | 3.0 | 3.0 |

| | | |
|---|---|---|
| 3.0 | 3.0 | 6.1 |
| 93.9 | 93.9 | 100.0 |
| 100.0 | 100.0 | |
| 4.7 | 5.1 | 5.1 |
| 12.5 | 13.6 | 18.6 |
| 12.5 | 13.6 | 32.2 |
| 62.5 | 67.8 | 100.0 |
| 92.2 | 100.0 | |
| 7.8 | | |
| 100.0 | | |

| Percent | Valid Percent | Cumulative Percent |
|---|---|---|
| 9.1 | 9.1 | 9.1 |
| 6.1 | 6.1 | 15.2 |
| 3.0 | 3.0 | 18.2 |
| 81.8 | 81.8 | 100.0 |
| 100.0 | 100.0 | |
| 21.9 | 23.7 | 23.7 |
| 15.6 | 16.9 | 40.7 |
| 7.8 | 8.5 | 49.2 |
| 46.9 | 50.8 | 100.0 |
| 92.2 | 100.0 | |
| 7.8 | | |
| 100.0 | | |

| Percent | Valid Percent | Cumulative Percent |
|---|---|---|
| 3.0 | 3.0 | 3.0 |
| 15.2 | 15.2 | 18.2 |
| 6.1 | 6.1 | 24.2 |
| 75.8 | 75.8 | 100.0 |
| 100.0 | 100.0 | |
| 54.7 | 59.3 | 59.3 |
| 21.9 | 23.7 | 83.1 |
| 4.7 | 5.1 | 88.1 |
| 10.9 | 11.9 | 100.0 |
| 92.2 | 100.0 | |
| 7.8 | | |
| 100.0 | | |

| Percent | Valid Percent | Cumulative Percent |
|---|---|---|
| 48.5 | 48.5 | 48.5 |
| 9.1 | 9.1 | 57.6 |
| 42.4 | 42.4 | 100.0 |
| 100.0 | 100.0 | |
| 64.1 | 69.5 | 69.5 |
| 6.3 | 6.8 | 76.3 |
| 21.9 | 23.7 | 100.0 |
| 92.2 | 100.0 | |
| 7.8 | | |
| 100.0 | | |

| Percent | Valid Percent | Cumulative Percent |
|---|---|---|
| 18.2 | 18.2 | 18.2 |
| 18.2 | 18.2 | 36.4 |
| 15.2 | 15.2 | 51.5 |
| 48.5 | 48.5 | 100.0 |
| 100.0 | 100.0 | |
| 39.1 | 42.4 | 42.4 |
| 29.7 | 32.2 | 74.6 |
| 9.4 | 10.2 | 84.7 |
| 14.1 | 15.3 | 100.0 |
| 92.2 | 100.0 | |
| 7.8 | | |
| 100.0 | | |

| Percent | Valid Percent | Cumulative Percent |
|---|---|---|
| 3.0 | 3.0 | 3.0 |
| 33.3 | 33.3 | 36.4 |
| 21.2 | 21.2 | 57.6 |
| 42.4 | 42.4 | 100.0 |
| 100.0 | 100.0 | |
| 18.8 | 20.3 | 20.3 |
| 39.1 | 42.4 | 62.7 |
| 15.6 | 16.9 | 79.7 |
| 18.8 | 20.3 | 100.0 |
| 92.2 | 100.0 | |
| 7.8 | | |
| 100.0 | | |

| Percent | Valid Percent | Cumulative Percent |
|---|---|---|
| 9.1 | 9.1 | 9.1 |
| 72.7 | 72.7 | 81.8 |
| 3.0 | 3.0 | 84.8 |
| 15.2 | 15.2 | 100.0 |
| 100.0 | 100.0 | |
| 12.5 | 13.6 | 13.6 |
| 71.9 | 78.0 | 91.5 |
| 7.8 | 8.5 | 100.0 |
| 92.2 | 100.0 | |
| 7.8 | | |
| 100.0 | | |

| Percent | Valid Percent | Cumulative Percent |
|---|---|---|
| 48.5 | 48.5 | 48.5 |
| 36.4 | 36.4 | 84.8 |
| 3.0 | 3.0 | 87.9 |
| 12.1 | 12.1 | 100.0 |
| 100.0 | 100.0 | |
| 60.9 | 66.1 | 66.1 |
| 25.0 | 27.1 | 93.2 |
| 3.1 | 3.4 | 96.6 |
| 3.1 | 3.4 | 100.0 |
| 92.2 | 100.0 | |
| 7.8 | | |
| 100.0 | | |

| Percent | Valid Percent | Cumulative Percent |
|---|---|---|
| 21.2 | 21.2 | 21.2 |
| 15.2 | 15.2 | 36.4 |
| 3.0 | 3.0 | 39.4 |
| 60.6 | 60.6 | 100.0 |
| 100.0 | 100.0 | |
| 39.1 | 42.4 | 42.4 |
| 12.5 | 13.6 | 55.9 |
| 4.7 | 5.1 | 61.0 |
| 35.9 | 39.0 | 100.0 |
| 92.2 | 100.0 | |
| 7.8 | | |

| | | |
|---|---|---|
| 100.0 | | |

```
GET DATA
  /TYPE=XLSX
  /FILE='C:\Users\20396236\Desktop\Jordaan_T\Toetspunt Data\Graad 8 2016
  /SHEET=name 'Gr8 2016 (Ind)'
  /CELLRANGE=FULL
  /READNAMES=ON
  /DATATYPEMIN PERCENTAGE=95.0
  /HIDDEN IGNORE=YES.
EXECUTE.
DATASET NAME DataSet1 WINDOW=FRONT.
USE ALL.
COMPUTE filter_$=(Test = 1).
VARIABLE LABELS filter_$ 'Test = 1 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
FREQUENCIES VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9
  /ORDER=ANALYSIS.
```

# Frequencies

**Notes**

| | | |
|---|---|---|
| Output Created | | 02-SEP-2017 10:31:09 |
| Comments | | |
| Input | Active Dataset | DataSet1 |
| | Filter | Test = 1 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 97 |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data. |
| Syntax | | FREQUENCIES VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 /ORDER=ANALYSIS. |
| Resources | Processor Time | 00:00:00.03 |
| | Elapsed Time | 00:00:00.05 |

[DataSet1]

**Stati**

| | | Q1 | Q2 |
|---|---|---|---|
| N | Valid | 83 | 83 |
| | Missing | 14 | 14 |

## Frequency Table

### Q1

| | | Frequency | Percent |
|---|---|---|---|
| Valid | 0 | 3 | 3.1 |
| | 1 | 6 | 6.2 |
| | 2 | 14 | 14.4 |
| | 3 | 60 | 61.9 |
| | Total | 83 | 85.6 |
| Missing | System | 14 | 14.4 |
| Total | | 97 | 100.0 |

### Q2

| | | Frequency | Percent |
|---|---|---|---|
| Valid | 0 | 23 | 23.7 |
| | 1 | 17 | 17.5 |
| | 2 | 7 | 7.2 |
| | 3 | 36 | 37.1 |
| | Total | 83 | 85.6 |
| Missing | System | 14 | 14.4 |
| Total | | 97 | 100.0 |

### Q3

| | | Frequency | Percent |
|---|---|---|---|
| Valid | 0 | 46 | 47.4 |
| | 1 | 9 | 9.3 |
| | 2 | 2 | 2.1 |
| | 3 | 26 | 26.8 |
| | Total | 83 | 85.6 |
| Missing | System | 14 | 14.4 |
| Total | | 97 | 100.0 |

### Q4

| | | Frequency | Percent |
|---|---|---|---|
| Valid | 0 | 62 | 63.9 |
| | 1 | 10 | 10.3 |
| | 3 | 10 | 10.3 |

| | | | |
|---|---|---|---|
| | Total | 82 | 84.5 |
| Missing | System | 15 | 15.5 |
| Total | | 97 | 100.0 |

**Q5**

| | | Frequency | Percent |
|---|---|---|---|
| Valid | 0 | 39 | 40.2 |
| | 1 | 27 | 27.8 |
| | 2 | 9 | 9.3 |
| | 3 | 8 | 8.2 |
| | Total | 83 | 85.6 |
| Missing | System | 14 | 14.4 |
| Total | | 97 | 100.0 |

**Q6**

| | | Frequency | Percent |
|---|---|---|---|
| Valid | 0 | 17 | 17.5 |
| | 1 | 39 | 40.2 |
| | 2 | 12 | 12.4 |
| | 3 | 15 | 15.5 |
| | Total | 83 | 85.6 |
| Missing | System | 14 | 14.4 |
| Total | | 97 | 100.0 |

**Q7**

| | | Frequency | Percent |
|---|---|---|---|
| Valid | 0 | 6 | 6.2 |
| | 1 | 67 | 69.1 |
| | 3 | 9 | 9.3 |
| | Total | 82 | 84.5 |
| Missing | System | 15 | 15.5 |
| Total | | 97 | 100.0 |

**Q8**

| | | Frequency | Percent |
|---|---|---|---|
| Valid | 0 | 61 | 62.9 |
| | 1 | 21 | 21.6 |
| | 2 | 1 | 1.0 |
| | Total | 83 | 85.6 |
| Missing | System | 14 | 14.4 |
| Total | | 97 | 100.0 |

**Q9**

| | | Frequency | Percent |
|---|---|---|---|
| Valid | 0 | 67 | 69.1 |
| | 1 | 4 | 4.1 |
| | 3 | 12 | 12.4 |
| | Total | 83 | 85.6 |
| Missing | System | 14 | 14.4 |
| Total | | 97 | 100.0 |

```
SORT CASES  BY SET.
SPLIT FILE LAYERED BY SET.
FREQUENCIES VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9
  /ORDER=ANALYSIS.
```

# Frequencies

**Notes**

| | | |
|---|---|---|
| Output Created | | 02-SEP-2017 10:31:23 |
| Comments | | |
| Input | Active Dataset | DataSet1 |
| | Filter | Test = 1 (FILTER) |
| | Weight | <none> |
| | Split File | SET |
| | N of Rows in Working Data File | 97 |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data. |
| Syntax | | FREQUENCIES VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 /ORDER=ANALYSIS. |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.05 |

| SET | | | Q1 |
|---|---|---|---|
| 1 | N | Valid | 27 |
| | | Missing | 6 |
| 2 | N | Valid | 56 |
| | | Missing | 8 |

# Frequency Table

**Q1**

| SET | | | Frequency |
|---|---|---|---|
| 1 | Valid | 0 | 1 |
| | | 2 | 5 |
| | | 3 | 21 |
| | | Total | 27 |
| | Missing | System | 6 |
| | Total | | 33 |
| 2 | Valid | 0 | 2 |
| | | 1 | 6 |
| | | 2 | 9 |
| | | 3 | 39 |
| | | Total | 56 |
| | Missing | System | 8 |
| | Total | | 64 |

**Q2**

| SET | | | Frequency |
|---|---|---|---|
| 1 | Valid | 0 | 3 |
| | | 1 | 2 |
| | | 2 | 1 |
| | | 3 | 21 |
| | | Total | 27 |
| | Missing | System | 6 |
| | Total | | 33 |
| 2 | Valid | 0 | 20 |
| | | 1 | 15 |
| | | 2 | 6 |
| | | 3 | 15 |
| | | Total | 56 |
| | Missing | System | 8 |
| | Total | | 64 |

**Q3**

| SET | | | Frequency |
|---|---|---|---|
| 1 | Valid | 0 | 9 |
| | | 1 | 3 |
| | | 2 | 1 |
| | | 3 | 14 |

| | | | |
|---|---|---|---|
| | | Total | 27 |
| | Missing | System | 6 |
| | Total | | 33 |
| 2 | Valid | 0 | 37 |
| | | 1 | 6 |
| | | 2 | 1 |
| | | 3 | 12 |
| | | Total | 56 |
| | Missing | System | 8 |
| | Total | | 64 |

**Q4**

| SET | | | Frequency |
|---|---|---|---|
| 1 | Valid | 0 | 15 |
| | | 1 | 5 |
| | | 3 | 7 |
| | | Total | 27 |
| | Missing | System | 6 |
| | Total | | 33 |
| 2 | Valid | 0 | 47 |
| | | 1 | 5 |
| | | 3 | 3 |
| | | Total | 55 |
| | Missing | System | 9 |
| | Total | | 64 |

**Q5**

| SET | | | Frequency |
|---|---|---|---|
| 1 | Valid | 0 | 9 |
| | | 1 | 10 |
| | | 2 | 3 |
| | | 3 | 5 |
| | | Total | 27 |
| | Missing | System | 6 |
| | Total | | 33 |
| 2 | Valid | 0 | 30 |
| | | 1 | 17 |
| | | 2 | 6 |
| | | 3 | 3 |
| | | Total | 56 |
| | Missing | System | 8 |
| | Total | | 64 |

## Q6

| SET | | | Frequency |
|---|---|---|---|
| 1 | Valid | 0 | 1 |
| | | 1 | 14 |
| | | 2 | 5 |
| | | 3 | 7 |
| | | Total | 27 |
| | Missing | System | 6 |
| | Total | | 33 |
| 2 | Valid | 0 | 16 |
| | | 1 | 25 |
| | | 2 | 7 |
| | | 3 | 8 |
| | | Total | 56 |
| | Missing | System | 8 |
| | Total | | 64 |

## Q7

| SET | | | Frequency |
|---|---|---|---|
| 1 | Valid | 0 | 2 |
| | | 1 | 22 |
| | | 3 | 3 |
| | | Total | 27 |
| | Missing | System | 6 |
| | Total | | 33 |
| 2 | Valid | 0 | 4 |
| | | 1 | 45 |
| | | 3 | 6 |
| | | Total | 55 |
| | Missing | System | 9 |
| | Total | | 64 |

## Q8

| SET | | | Frequency |
|---|---|---|---|
| 1 | Valid | 0 | 19 |
| | | 1 | 7 |
| | | 2 | 1 |
| | | Total | 27 |
| | Missing | System | 6 |
| | Total | | 33 |
| 2 | Valid | 0 | 42 |
| | | 1 | 14 |

| | | | |
|---|---|---|---|
| | | Total | 56 |
| | Missing | System | 8 |
| | Total | | 64 |

**Q9**

| SET | | | Frequency |
|---|---|---|---|
| 1 | Valid | 0 | 22 |
| | | 1 | 1 |
| | | 3 | 4 |
| | | Total | 27 |
| | Missing | System | 6 |
| | Total | | 33 |
| 2 | Valid | 0 | 45 |
| | | 1 | 3 |
| | | 3 | 8 |
| | | Total | 56 |
| | Missing | System | 8 |
| | Total | | 64 |

```
; Eerste twee toetse.xlsx'
```

**istics**

| Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 |
|---|---|---|---|---|---|---|
| 83 | 82 | 83 | 83 | 82 | 83 | 83 |
| 14 | 15 | 14 | 14 | 15 | 14 | 14 |

| Valid Percent | Cumulative Percent |
|---|---|
| 3.6 | 3.6 |
| 7.2 | 10.8 |
| 16.9 | 27.7 |
| 72.3 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 27.7 | 27.7 |
| 20.5 | 48.2 |
| 8.4 | 56.6 |
| 43.4 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 55.4 | 55.4 |
| 10.8 | 66.3 |
| 2.4 | 68.7 |
| 31.3 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 75.6 | 75.6 |
| 12.2 | 87.8 |
| 12.2 | 100.0 |

| | |
|---|---|
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 47.0 | 47.0 |
| 32.5 | 79.5 |
| 10.8 | 90.4 |
| 9.6 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 20.5 | 20.5 |
| 47.0 | 67.5 |
| 14.5 | 81.9 |
| 18.1 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 7.3 | 7.3 |
| 81.7 | 89.0 |
| 11.0 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 73.5 | 73.5 |
| 25.3 | 98.8 |
| 1.2 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 80.7 | 80.7 |
| 4.8 | 85.5 |
| 14.5 | 100.0 |
| 100.0 | |
| | |
| | |

**Statistics**

| Q2 | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 |
|---|---|---|---|---|---|---|---|
| 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 |
| 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| 56 | 56 | 55 | 56 | 56 | 55 | 56 | 56 |
| 8 | 8 | 9 | 8 | 8 | 9 | 8 | 8 |

| Percent | Valid Percent | Cumulative Percent |
|---|---|---|
| 3.0 | 3.7 | 3.7 |
| 15.2 | 18.5 | 22.2 |
| 63.6 | 77.8 | 100.0 |
| 81.8 | 100.0 | |
| 18.2 | | |
| 100.0 | | |
| 3.1 | 3.6 | 3.6 |
| 9.4 | 10.7 | 14.3 |
| 14.1 | 16.1 | 30.4 |
| 60.9 | 69.6 | 100.0 |
| 87.5 | 100.0 | |
| 12.5 | | |
| 100.0 | | |

| Percent | Valid Percent | Cumulative Percent |
|---|---|---|
| 9.1 | 11.1 | 11.1 |
| 6.1 | 7.4 | 18.5 |
| 3.0 | 3.7 | 22.2 |
| 63.6 | 77.8 | 100.0 |
| 81.8 | 100.0 | |
| 18.2 | | |
| 100.0 | | |
| 31.3 | 35.7 | 35.7 |
| 23.4 | 26.8 | 62.5 |
| 9.4 | 10.7 | 73.2 |
| 23.4 | 26.8 | 100.0 |
| 87.5 | 100.0 | |
| 12.5 | | |
| 100.0 | | |

| Percent | Valid Percent | Cumulative Percent |
|---|---|---|
| 27.3 | 33.3 | 33.3 |
| 9.1 | 11.1 | 44.4 |
| 3.0 | 3.7 | 48.1 |
| 42.4 | 51.9 | 100.0 |

| | | |
|---|---|---|
| 81.8 | 100.0 | |
| 18.2 | | |
| 100.0 | | |
| 57.8 | 66.1 | 66.1 |
| 9.4 | 10.7 | 76.8 |
| 1.6 | 1.8 | 78.6 |
| 18.8 | 21.4 | 100.0 |
| 87.5 | 100.0 | |
| 12.5 | | |
| 100.0 | | |

| Percent | Valid Percent | Cumulative Percent |
|---|---|---|
| 45.5 | 55.6 | 55.6 |
| 15.2 | 18.5 | 74.1 |
| 21.2 | 25.9 | 100.0 |
| 81.8 | 100.0 | |
| 18.2 | | |
| 100.0 | | |
| 73.4 | 85.5 | 85.5 |
| 7.8 | 9.1 | 94.5 |
| 4.7 | 5.5 | 100.0 |
| 85.9 | 100.0 | |
| 14.1 | | |
| 100.0 | | |

| Percent | Valid Percent | Cumulative Percent |
|---|---|---|
| 27.3 | 33.3 | 33.3 |
| 30.3 | 37.0 | 70.4 |
| 9.1 | 11.1 | 81.5 |
| 15.2 | 18.5 | 100.0 |
| 81.8 | 100.0 | |
| 18.2 | | |
| 100.0 | | |
| 46.9 | 53.6 | 53.6 |
| 26.6 | 30.4 | 83.9 |
| 9.4 | 10.7 | 94.6 |
| 4.7 | 5.4 | 100.0 |
| 87.5 | 100.0 | |
| 12.5 | | |
| 100.0 | | |

| Percent | Valid Percent | Cumulative Percent |
|---|---|---|
| 3.0 | 3.7 | 3.7 |
| 42.4 | 51.9 | 55.6 |
| 15.2 | 18.5 | 74.1 |
| 21.2 | 25.9 | 100.0 |
| 81.8 | 100.0 | |
| 18.2 | | |
| 100.0 | | |
| 25.0 | 28.6 | 28.6 |
| 39.1 | 44.6 | 73.2 |
| 10.9 | 12.5 | 85.7 |
| 12.5 | 14.3 | 100.0 |
| 87.5 | 100.0 | |
| 12.5 | | |
| 100.0 | | |

| Percent | Valid Percent | Cumulative Percent |
|---|---|---|
| 6.1 | 7.4 | 7.4 |
| 66.7 | 81.5 | 88.9 |
| 9.1 | 11.1 | 100.0 |
| 81.8 | 100.0 | |
| 18.2 | | |
| 100.0 | | |
| 6.3 | 7.3 | 7.3 |
| 70.3 | 81.8 | 89.1 |
| 9.4 | 10.9 | 100.0 |
| 85.9 | 100.0 | |
| 14.1 | | |
| 100.0 | | |

| Percent | Valid Percent | Cumulative Percent |
|---|---|---|
| 57.6 | 70.4 | 70.4 |
| 21.2 | 25.9 | 96.3 |
| 3.0 | 3.7 | 100.0 |
| 81.8 | 100.0 | |
| 18.2 | | |
| 100.0 | | |
| 65.6 | 75.0 | 75.0 |
| 21.9 | 25.0 | 100.0 |

| | | |
|---|---|---|
| 87.5 | 100.0 | |
| 12.5 | | |
| 100.0 | | |

| Percent | Valid Percent | Cumulative Percent |
|---|---|---|
| 66.7 | 81.5 | 81.5 |
| 3.0 | 3.7 | 85.2 |
| 12.1 | 14.8 | 100.0 |
| 81.8 | 100.0 | |
| 18.2 | | |
| 100.0 | | |
| 70.3 | 80.4 | 80.4 |
| 4.7 | 5.4 | 85.7 |
| 12.5 | 14.3 | 100.0 |
| 87.5 | 100.0 | |
| 12.5 | | |
| 100.0 | | |

```
USE ALL.
COMPUTE filter_$=(Test = 2).
VARIABLE LABELS filter_$ 'Test = 2 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
T-TEST GROUPS=SET(1 2)
  /MISSING=ANALYSIS
  /VARIABLES=SCORE
  /CRITERIA=CI(.95).
```

# T-Test

**Notes**

| | | |
|---|---|---|
| Output Created | | 05-SEP-2017 10:33:57 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\Toetspunt Data\Gr8 2016 (Ind).sav |
| | Active Dataset | DataSet1 |
| | Filter | Test = 2 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 97 |
| Missing Value Handling | Definition of Missing | User defined missing values are treated as missing. |
| | Cases Used | Statistics for each analysis are based on the cases with no missing or out-of-range data for any variable in the analysis. |
| Syntax | | T-TEST GROUPS=SET(1 2)<br>/MISSING=ANALYSIS<br>/VARIABLES=SCORE<br>/CRITERIA=CI(.95). |
| Resources | Processor Time | 00:00:00.00 |
| | Elapsed Time | 00:00:00.02 |

**Group Statistics**

| SET | | N | Mean |
|---|---|---|---|
| SCORE | 1 | 33 | 17.4242 |
| | 2 | 59 | 11.0169 |

**Indepe**

| | | Levene's Test for Equality of Variances | |
|---|---|---|---|
| | | F | Sig. |
| SCORE | Equal variances assumed | 0.001 | 0.978 |
| | Equal variances not assumed | | |

| Std. Deviation | Std. Error Mean | Effect size |
|---|---|---|
| 4.73702 | 0.82461 | |
| 4.84765 | 0.63111 | 1.32 |

**ɛndent Samples Test**

| t-test for Equality of Means | | | | | |
|---|---|---|---|---|---|
| t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidenc Differ Lower |
| 6.130 | 90 | 0.000 | 6.40729 | 1.04527 | 4.33067 |
| 6.170 | 67.660 | 0.000 | 6.40729 | 1.03840 | 4.33500 |

e Interval of the
ence

| Upper |
| --- |
| 8.48391 |
| 8.47958 |

```
USE ALL.
COMPUTE filter_$=(Test = 1).
VARIABLE LABELS filter_$ 'Test = 1 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
T-TEST GROUPS=SET(1 2)
  /MISSING=ANALYSIS
  /VARIABLES=SCORE
  /CRITERIA=CI(.95).
```

# T-Test

**Notes**

| | | |
|---|---|---|
| Output Created | | 05-SEP-2017 10:33:04 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\Toetspunt Data\Gr8 2016 (Ind).sav |
| | Active Dataset | DataSet1 |
| | Filter | Test = 1 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 97 |
| Missing Value Handling | Definition of Missing | User defined missing values are treated as missing. |
| | Cases Used | Statistics for each analysis are based on the cases with no missing or out-of-range data for any variable in the analysis. |
| Syntax | | T-TEST GROUPS=SET(1 2) /MISSING=ANALYSIS /VARIABLES=SCORE /CRITERIA=CI(.95). |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.05 |

[DataSet1] C:\Users\20396236\Desktop\Jordaan_T\Toetspunt Data\Gr8 20

**Group Statistics**

| SET | | N | Mean |
|---|---|---|---|
| SCORE | 1 | 27 | 12.6667 |
| | 2 | 56 | 8.5000 |

**Indepe**

| | | Levene's Test for Equality of Variances | |
|---|---|---|---|
| | | F | Sig. |
| SCORE | Equal variances assumed | 1.530 | 0.220 |
| | Equal variances not assumed | | |

16 (Ind).sav

| Std. Deviation | Std. Error Mean | Effect size |
|---|---|---|
| 4.81983 | 0.92758 | |
| 3.75621 | 0.50194 | 0.86 |

**ɛndent Samples Test**

| | t-test for Equality of Means | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | 95% Confidenc Differ |
| t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | Lower | |
| 4.309 | 81 | 0.000 | 4.16667 | 0.96708 | 2.24249 | |
| 3.951 | 41.764 | 0.000 | 4.16667 | 1.05468 | 2.03788 | |

| e Interval of the ence | |
|---|---|
| | Upper |
| | 6.09084 |
| | 6.29545 |

```
T-TEST PAIRS=PRE_SCORE WITH POST_SCORE (PAIRED)
  /CRITERIA=CI(.9500)
  /MISSING=ANALYSIS.
```

# T-Test

**Notes**

| | | |
|---|---|---|
| Output Created | | 05-SEP-2017 10:38:14 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\Toetspunt Data\Gr8 2016 (Pair).sav |
| | Active Dataset | DataSet3 |
| | Filter | <none> |
| | Weight | <none> |
| | Split File | SET |
| | N of Rows in Working Data File | 97 |
| Missing Value Handling | Definition of Missing | User defined missing values are treated as missing. |
| | Cases Used | Statistics for each analysis are based on the cases with no missing or out-of-range data for any variable in the analysis. |
| Syntax | | T-TEST PAIRS=PRE_SCORE WITH POST_SCORE (PAIRED) /CRITERIA=CI(.9500) /MISSING=ANALYSIS. |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.02 |

```
[DataSet3] C:\Users\20396236\Desktop\Jordaan_T\Toetspunt Data\Gr8
```

**Paired Samples Statistics**

| SET | | | Mean |
|---|---|---|---|
| 1 | Pair 1 | PRE_SCORE | 12.6667 |
| | | POST_SCORE | 17.4815 |
| 2 | Pair 1 | PRE_SCORE | 8.5000 |
| | | POST_SCORE | 10.9464 |

## Paired Samples Correlations

| SET | | | N |
|---|---|---|---|
| 1 | Pair 1 | PRE_SCORE & POST_SCORE | 27 |
| 2 | Pair 1 | PRE_SCORE & POST_SCORE | 56 |

**Paire**

| SET | | | Mean |
|---|---|---|---|
| 1 | Pair 1 | PRE_SCORE - POST_SCORE | -4.81481 |
| 2 | Pair 1 | PRE_SCORE - POST_SCORE | -2.44643 |

3 2016 (Pair).sav

| N | Std. Deviation | Std. Error Mean | Effect Size |
|---|---|---|---|
| 27 | 4.81983 | 0.92758 | |
| 27 | 5.07157 | 0.97602 | 0.95 |
| 56 | 3.75621 | 0.50194 | |
| 56 | 4.95221 | 0.66177 | 0.49 |

| Correlation | Sig. |
|---|---|
| 0.608 | 0.001 |
| 0.597 | 0.000 |

**d Samples Test**

| Paired Differences | | | | t | df | Sig. (2-tailed) |
|---|---|---|---|---|---|---|
| | | 95% Confidence Interval of the Difference | | | | |
| Std. Deviation | Std. Error Mean | Lower | Upper | | | |
| 4.38561 | 0.84401 | -6.54971 | -3.07992 | -5.705 | 26 | 0.000 |
| 4.05382 | 0.54171 | -3.53205 | -1.36081 | -4.516 | 55 | 0.000 |

```
RELIABILITY
  /VARIABLES=Q1 Q2
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

# Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 02-SEP-2017 10:35:21 |
| Comments | | |
| Input | Active Dataset | DataSet1 |
| | Filter | Test = 1 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 97 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |
| Syntax | | RELIABILITY /VARIABLES=Q1 Q2 /SCALE('ALL VARIABLES') ALL /MODEL=ALPHA /STATISTICS=DESCRIPTIVE SCALE CORR /SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.03 |

# Scale: ALL VARIABLES

**Case Processing Summary**

| | | N | % |
|---|---|---|---|
| Cases | Valid | 83 | 85.6 |
| | Excluded[a] | 14 | 14.4 |
| | Total | 97 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

**Reliability Statistics**

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.390 | 0.429 | 2 |

**Item Statistics**

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q1 | 2.58 | 0.783 | 83 |
| Q2 | 1.67 | 1.289 | 83 |

**Inter-Item Correlation Matrix**

| | Q1 | Q2 |
|---|---|---|
| Q1 | 1.000 | 0.273 |
| Q2 | 0.273 | 1.000 |

**Summary Item Statistics**

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 2.127 | 1.675 | 2.578 |
| Inter-Item Correlations | 0.273 | 0.273 | 0.273 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q1 | 1.67 | 1.661 | 0.273 |
| Q2 | 2.58 | 0.613 | 0.273 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 4.25 | 2.825 | 1.681 | 2 |

```
RELIABILITY
  /VARIABLES=Q4 Q6 Q7 Q8
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

# Reliability

### Notes

| | | |
|---|---|---|
| Output Created | | 02-SEP-2017 10:36:39 |
| Comments | | |
| Input | Active Dataset | DataSet1 |
| | Filter | Test = 1 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 97 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |
| Syntax | | RELIABILITY<br>/VARIABLES=Q4 Q6 Q7 Q8<br>/SCALE('ALL VARIABLES')<br>ALL<br>/MODEL=ALPHA<br><br>/STATISTICS=DESCRIPTIVE<br>SCALE CORR<br>/SUMMARY=TOTAL MEANS<br>CORR. |
| Resources | Processor Time | 00:00:00.00 |
| | Elapsed Time | 00:00:00.00 |

# Scale: ALL VARIABLES

### Case Processing Summary

| | | N | % |
|---|---|---|---|
| Cases | Valid | 81 | 83.5 |
| | Excluded[a] | 16 | 16.5 |
| | Total | 97 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.397 | 0.409 | 4 |

**Item Statistics**

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q4 | 0.49 | 1.002 | 81 |
| Q6 | 1.32 | 0.998 | 81 |
| Q7 | 1.15 | 0.709 | 81 |
| Q8 | 0.26 | 0.468 | 81 |

**Inter-Item Correlation Matrix**

| | Q4 | Q6 | Q7 |
|---|---|---|---|
| Q4 | 1.000 | 0.115 | 0.195 |
| Q6 | 0.115 | 1.000 | 0.268 |
| Q7 | 0.195 | 0.268 | 1.000 |
| Q8 | 0.097 | 0.141 | 0.071 |

**Summary Item Statistics**

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 0.806 | 0.259 | 1.321 |
| Inter-Item Correlations | 0.148 | 0.071 | 0.268 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q4 | 2.73 | 2.275 | 0.197 |
| Q6 | 1.90 | 2.140 | 0.253 |
| Q7 | 2.07 | 2.669 | 0.303 |
| Q8 | 2.96 | 3.386 | 0.156 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 3.22 | 3.875 | 1.969 | 4 |

```
RELIABILITY
  /VARIABLES=Q3 Q5 Q9
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

# Reliability

### Notes

| | | |
|---|---|---|
| Output Created | | 02-SEP-2017 10:36:59 |
| Comments | | |
| Input | Active Dataset | DataSet1 |
| | Filter | Test = 1 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 97 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |
| Syntax | | RELIABILITY<br>/VARIABLES=Q3 Q5 Q9<br>/SCALE('ALL VARIABLES')<br>ALL<br>/MODEL=ALPHA<br><br>/STATISTICS=DESCRIPTIVE<br>SCALE CORR<br>/SUMMARY=TOTAL MEANS<br>CORR. |
| Resources | Processor Time | 00:00:00.00 |
| | Elapsed Time | 00:00:00.00 |

# Scale: ALL VARIABLES

### Case Processing Summary

| | | N | % |
|---|---|---|---|
| Cases | Valid | 83 | 85.6 |
| | Excluded[a] | 14 | 14.4 |
| | Total | 97 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.487 | 0.496 | 3 |

**Item Statistics**

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q3 | 1.10 | 1.358 | 83 |
| Q5 | 0.83 | 0.973 | 83 |
| Q9 | 0.48 | 1.063 | 83 |

**Inter-Item Correlation Matrix**

| | Q3 | Q5 | Q9 |
|---|---|---|---|
| Q3 | 1.000 | 0.382 | 0.162 |
| Q5 | 0.382 | 1.000 | 0.197 |
| Q9 | 0.162 | 0.197 | 1.000 |

**Summary Item Statistics**

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 0.803 | 0.482 | 1.096 |
| Inter-Item Correlations | 0.247 | 0.162 | 0.382 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q3 | 1.31 | 2.486 | 0.345 |
| Q5 | 1.58 | 3.442 | 0.392 |
| Q9 | 1.93 | 3.800 | 0.211 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 2.41 | 5.806 | 2.410 | 3 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 0.904 | 1.540 | 0.408 | 2 |
| 0.000 | 1.000 | 0.000 | 2 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.075 | |
| 0.075 | |

| Q8 |
|---|
| 0.097 |
| 0.141 |
| 0.071 |
| 1.000 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 1.062 | 5.095 | 0.260 | 4 |
| 0.197 | 3.765 | 0.005 | 4 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.048 | 0.367 |
| 0.089 | 0.291 |
| 0.099 | 0.254 |
| 0.027 | 0.392 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 0.614 | 2.275 | 0.095 | 3 |
| 0.220 | 2.360 | 0.011 | 3 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.153 | 0.329 |
| 0.165 | 0.271 |
| 0.048 | 0.531 |

```
SPLIT FILE OFF.
RELIABILITY
  /VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

# Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 02-SEP-2017 10:39:09 |
| Comments | | |
| Input | Active Dataset | DataSet1 |
| | Filter | Test = 1 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 97 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |
| Syntax | | RELIABILITY /VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 /SCALE('ALL VARIABLES') ALL /MODEL=ALPHA /STATISTICS=DESCRIPTIVE SCALE CORR /SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.00 |
| | Elapsed Time | 00:00:00.00 |

# Scale: ALL VARIABLES

**Case Processing Summary**

| | | N | % |
|---|---|---|---|
| Cases | Valid | 81 | 83.5 |
| | Excluded[a] | 16 | 16.5 |

| | | | |
|---|---|---|---|
| | Total | 97 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

## Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.637 | 0.641 | 9 |

## Item Statistics

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q1 | 2.57 | 0.790 | 81 |
| Q2 | 1.70 | 1.289 | 81 |
| Q3 | 1.12 | 1.364 | 81 |
| Q4 | 0.49 | 1.002 | 81 |
| Q5 | 0.85 | 0.976 | 81 |
| Q6 | 1.32 | 0.998 | 81 |
| Q7 | 1.15 | 0.709 | 81 |
| Q8 | 0.26 | 0.468 | 81 |
| Q9 | 0.49 | 1.074 | 81 |

## Inter-Item Correlation

| | Q1 | Q2 | Q3 |
|---|---|---|---|
| Q1 | 1.000 | 0.290 | 0.120 |
| Q2 | 0.290 | 1.000 | 0.085 |
| Q3 | 0.120 | 0.085 | 1.000 |
| Q4 | 0.084 | 0.212 | 0.193 |
| Q5 | 0.208 | 0.203 | 0.371 |
| Q6 | 0.305 | 0.123 | 0.467 |
| Q7 | -0.063 | 0.008 | 0.407 |
| Q8 | 0.104 | 0.212 | -0.012 |
| Q9 | 0.137 | 0.152 | 0.154 |

## Summary Item Statistics

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 1.107 | 0.259 | 2.568 |
| Inter-Item Correlations | 0.165 | -0.090 | 0.467 |

## Item-Total Statistics

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Q1 | 7.40 | 18.017 | 0.301 |
| Q2 | 8.26 | 16.044 | 0.286 |
| Q3 | 8.84 | 14.236 | 0.444 |
| Q4 | 9.47 | 17.627 | 0.241 |
| Q5 | 9.11 | 16.150 | 0.454 |
| Q6 | 8.64 | 16.183 | 0.434 |
| Q7 | 8.81 | 18.078 | 0.345 |
| Q8 | 9.70 | 19.661 | 0.188 |
| Q9 | 9.47 | 17.602 | 0.212 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 9.96 | 20.661 | 4.545 | 9 |

**Matrix**

| Q4 | Q5 | Q6 | Q7 | Q8 | Q9 |
|---|---|---|---|---|---|
| 0.084 | 0.208 | 0.305 | -0.063 | 0.104 | 0.137 |
| 0.212 | 0.203 | 0.123 | 0.008 | 0.212 | 0.152 |
| 0.193 | 0.371 | 0.467 | 0.407 | -0.012 | 0.154 |
| 1.000 | 0.216 | 0.115 | 0.195 | 0.097 | -0.090 |
| 0.216 | 1.000 | 0.191 | 0.285 | 0.167 | 0.190 |
| 0.115 | 0.191 | 1.000 | 0.268 | 0.141 | 0.142 |
| 0.195 | 0.285 | 0.268 | 1.000 | 0.071 | 0.165 |
| 0.097 | 0.167 | 0.141 | 0.071 | 1.000 | 0.040 |
| -0.090 | 0.190 | 0.142 | 0.165 | 0.040 | 1.000 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 2.309 | 9.905 | 0.509 | 9 |
| 0.557 | -5.178 | 0.014 | 9 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|

| | |
|---|---|
| 0.206 | 0.613 |
| 0.172 | 0.622 |
| 0.373 | 0.572 |
| 0.137 | 0.626 |
| 0.245 | 0.575 |
| 0.312 | 0.580 |
| 0.250 | 0.608 |
| 0.092 | 0.634 |
| 0.109 | 0.635 |

```
NONPAR CORR
  /VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9
  /PRINT=SPEARMAN TWOTAIL NOSIG
  /MISSING=PAIRWISE.
```

# Nonparametric Correlations

**Notes**

| | | |
|---|---|---|
| Output Created | | 16-SEP-2017 15:11:26 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\Toetspunt Data\Gr8 2017 (Indep).sav |
| | Active Dataset | DataSet1 |
| | Filter | TEST = 1 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 96 |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics for each pair of variables are based on all the cases with valid data for that pair. |
| Syntax | | NONPAR CORR /VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 /PRINT=SPEARMAN TWOTAIL NOSIG /MISSING=PAIRWISE. |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.01 |
| | Number of Cases Allowed | 262144 cases[a] |

a. Based on availability of workspace memory

**Correlations**

| | | | Q1 | Q2 |
|---|---|---|---|---|
| Spearman's rho | Q1 | Correlation Coefficient | 1.000 | 0.041 |
| | | Sig. (2-tailed) | | 0.695 |
| | | N | 93 | 93 |
| | Q2 | Correlation Coefficient | 0.041 | 1.000 |
| | | Sig. (2-tailed) | 0.695 | |

| | | | | |
|---|---|---|---|---|
| | | N | 93 | 93 |
| | Q3 | Correlation Coefficient | .216* | 0.125 |
| | | Sig. (2-tailed) | 0.037 | 0.234 |
| | | N | 93 | 93 |
| | Q4 | Correlation Coefficient | 0.047 | .258* |
| | | Sig. (2-tailed) | 0.653 | 0.012 |
| | | N | 93 | 93 |
| | Q5 | Correlation Coefficient | 0.037 | 0.005 |
| | | Sig. (2-tailed) | 0.722 | 0.959 |
| | | N | 93 | 93 |
| | Q6 | Correlation Coefficient | .303** | .269** |
| | | Sig. (2-tailed) | 0.003 | 0.009 |
| | | N | 93 | 93 |
| | Q7 | Correlation Coefficient | 0.159 | .311** |
| | | Sig. (2-tailed) | 0.127 | 0.002 |
| | | N | 93 | 93 |
| | Q8 | Correlation Coefficient | .346** | .257* |
| | | Sig. (2-tailed) | 0.001 | 0.013 |
| | | N | 93 | 93 |
| | Q9 | Correlation Coefficient | .277** | 0.149 |
| | | Sig. (2-tailed) | 0.007 | 0.154 |
| | | N | 93 | 93 |

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

| Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 |
|---|---|---|---|---|---|---|
| .216* | 0.047 | 0.037 | .303** | 0.159 | .346** | .277** |
| 0.037 | 0.653 | 0.722 | 0.003 | 0.127 | 0.001 | 0.007 |
| 93 | 93 | 93 | 93 | 93 | 93 | 93 |
| 0.125 | .258* | 0.005 | .269** | .311** | .257* | 0.149 |
| 0.234 | 0.012 | 0.959 | 0.009 | 0.002 | 0.013 | 0.154 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 93 | 93 | 93 | 93 | 93 | 93 | 93 |
| 1.000 | .348** | -0.035 | 0.185 | .279** | .290** | .372** |
| | 0.001 | 0.737 | 0.075 | 0.007 | 0.005 | 0.000 |
| 93 | 93 | 93 | 93 | 93 | 93 | 93 |
| .348** | 1.000 | 0.147 | 0.186 | .280** | 0.164 | 0.182 |
| 0.001 | | 0.160 | 0.074 | 0.007 | 0.115 | 0.080 |
| 93 | 93 | 93 | 93 | 93 | 93 | 93 |
| -0.035 | 0.147 | 1.000 | .291** | .333** | 0.177 | .243* |
| 0.737 | 0.160 | | 0.005 | 0.001 | 0.089 | 0.019 |
| 93 | 93 | 93 | 93 | 93 | 93 | 93 |
| 0.185 | 0.186 | .291** | 1.000 | .338** | .340** | .364** |
| 0.075 | 0.074 | 0.005 | | 0.001 | 0.001 | 0.000 |
| 93 | 93 | 93 | 93 | 93 | 93 | 93 |
| .279** | .280** | .333** | .338** | 1.000 | .373** | .326** |
| 0.007 | 0.007 | 0.001 | 0.001 | | 0.000 | 0.001 |
| 93 | 93 | 93 | 93 | 93 | 93 | 93 |
| .290** | 0.164 | 0.177 | .340** | .373** | 1.000 | .551** |
| 0.005 | 0.115 | 0.089 | 0.001 | 0.000 | | 0.000 |
| 93 | 93 | 93 | 93 | 93 | 93 | 93 |
| .372** | 0.182 | .243* | .364** | .326** | .551** | 1.000 |
| 0.000 | 0.080 | 0.019 | 0.000 | 0.001 | 0.000 | |
| 93 | 93 | 93 | 93 | 93 | 93 | 93 |

```
FACTOR
  /VARIABLES Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9
  /MISSING LISTWISE
  /ANALYSIS Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9
  /PRINT UNIVARIATE INITIAL CORRELATION DET KMO EXTRACTION ROTATION
  /FORMAT SORT BLANK(.316)
  /CRITERIA MINEIGEN(1) ITERATE(25)
  /EXTRACTION PC
  /CRITERIA ITERATE(25)
  /ROTATION VARIMAX
  /METHOD=CORRELATION.
```

# Factor Analysis

**Notes**

| | | |
|---|---|---|
| Output Created | | 16-SEP-2017 15:13:22 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\Toetspunt Data\Gr8 2017 (Indep).sav |
| | Active Dataset | DataSet1 |
| | Filter | TEST = 1 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 96 |
| Missing Value Handling | Definition of Missing | MISSING=EXCLUDE: User-defined missing values are treated as missing. |
| | Cases Used | LISTWISE: Statistics are based on cases with no missing values for any variable used. |

| | | |
|---|---|---|
| Syntax | | FACTOR<br>/VARIABLES Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9<br>/MISSING LISTWISE<br>/ANALYSIS Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9<br>/PRINT UNIVARIATE INITIAL CORRELATION DET KMO EXTRACTION ROTATION<br>/FORMAT SORT BLANK(.316)<br>/CRITERIA MINEIGEN(1) ITERATE(25)<br>/EXTRACTION PC<br>/CRITERIA ITERATE(25)<br>/ROTATION VARIMAX<br>/METHOD=CORRELATION. |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.04 |
| | Maximum Memory Required | 11368 (11.102K) bytes |

**Descriptive Statistics**

| | Mean | Std. Deviation | Analysis N |
|---|---|---|---|
| Q1 | 2.31 | 1.042 | 93 |
| Q2 | 0.24 | 0.772 | 93 |
| Q3 | 0.46 | 0.854 | 93 |
| Q4 | 0.24 | 0.772 | 93 |
| Q5 | 0.12 | 0.413 | 93 |
| Q6 | 0.59 | 0.912 | 93 |
| Q7 | 0.46 | 0.995 | 93 |
| Q8 | 0.66 | 0.994 | 93 |
| Q9 | 0.67 | 0.901 | 93 |

**Correlati**

| | | Q1 | Q2 |
|---|---|---|---|
| Correlation | Q1 | 1.000 | 0.042 |
| | Q2 | 0.042 | 1.000 |
| | Q3 | 0.203 | 0.113 |
| | Q4 | 0.042 | 0.179 |
| | Q5 | 0.065 | -0.055 |
| | Q6 | 0.296 | 0.216 |
| | Q7 | 0.174 | 0.337 |
| | Q8 | 0.314 | 0.192 |
| | Q9 | 0.262 | 0.177 |

a. Determinant = .237

## KMO and Bartlett's Test

| | | |
|---|---|---|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | 0.708 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 127.087 |
| | df | 36 |
| | Sig. | 0.000 |

## Communalities

| | Initial | Extraction |
|---|---|---|
| Q1 | 1.000 | 0.594 |
| Q2 | 1.000 | 0.788 |
| Q3 | 1.000 | 0.787 |
| Q4 | 1.000 | 0.786 |
| Q5 | 1.000 | 0.845 |
| Q6 | 1.000 | 0.495 |
| Q7 | 1.000 | 0.602 |
| Q8 | 1.000 | 0.607 |
| Q9 | 1.000 | 0.498 |

Extraction Method: Principal Component Analysis.

## Total Variance E

| | Initial Eigenvalues | | |
|---|---|---|---|
| Component | Total | % of Variance | Cumulative % |
| 1 | 2.734 | 30.373 | 30.373 |
| 2 | 1.171 | 13.012 | 43.385 |
| 3 | 1.093 | 12.142 | 55.527 |
| 4 | 1.004 | 11.151 | 66.678 |
| 5 | 0.846 | 9.400 | 76.078 |
| 6 | 0.648 | 7.196 | 83.274 |
| 7 | 0.590 | 6.554 | 89.828 |
| 8 | 0.490 | 5.440 | 95.268 |
| 9 | 0.426 | 4.732 | 100.000 |

Extraction Method: Principal Component Analysis.

## Component Matrix[a]

| | Component | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| Q8 | 0.722 | | |
| Q7 | 0.709 | | |
| Q9 | 0.655 | | |
| Q6 | 0.585 | | |
| Q1 | 0.489 | -0.361 | -0.395 |
| Q5 | 0.318 | 0.694 | -0.501 |
| Q4 | 0.429 | 0.663 | |

| | | | |
|---|---|---|---|
| Q2 | 0.435 | | 0.602 |
| Q3 | 0.474 | | 0.366 |

Extraction Method: Principal Component Analysis.
a. 4 components extracted.

**Rotated Component Matrix[a]**

| | Component | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| Q1 | 0.753 | | |
| Q8 | 0.713 | | |
| Q9 | 0.654 | | |
| Q6 | 0.476 | 0.355 | 0.356 |
| Q2 | | 0.875 | |
| Q7 | 0.390 | 0.619 | |
| Q5 | | | 0.912 |
| Q3 | | | |
| Q4 | | | 0.459 |

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 7 iterations.

**Component Transformation Matrix**

| Component | 1 | 2 | 3 |
|---|---|---|---|
| 1 | 0.735 | 0.500 | 0.287 |
| 2 | -0.492 | 0.020 | 0.800 |
| 3 | -0.436 | 0.575 | -0.492 |
| 4 | 0.165 | -0.647 | -0.191 |

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

**ion Matrix[a]**

| Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 |
|---|---|---|---|---|---|---|
| 0.203 | 0.042 | 0.065 | 0.296 | 0.174 | 0.314 | 0.262 |
| 0.113 | 0.179 | -0.055 | 0.216 | 0.337 | 0.192 | 0.177 |
| 1.000 | 0.294 | -0.033 | 0.134 | 0.232 | 0.228 | 0.231 |
| 0.294 | 1.000 | 0.286 | 0.123 | 0.224 | 0.121 | 0.146 |
| -0.033 | 0.286 | 1.000 | 0.216 | 0.183 | 0.127 | 0.136 |
| 0.134 | 0.123 | 0.216 | 1.000 | 0.342 | 0.275 | 0.229 |
| 0.232 | 0.224 | 0.183 | 0.342 | 1.000 | 0.459 | 0.307 |
| 0.228 | 0.121 | 0.127 | 0.275 | 0.459 | 1.000 | 0.501 |
| 0.231 | 0.146 | 0.136 | 0.229 | 0.307 | 0.501 | 1.000 |

**xplained**

| Extraction Sums of Squared Loadings | | | Rotation Sums of Squared Loadings | | |
|---|---|---|---|---|---|
| Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 2.734 | 30.373 | 30.373 | 1.996 | 22.182 | 22.182 |
| 1.171 | 13.012 | 43.385 | 1.466 | 16.286 | 38.467 |
| 1.093 | 12.142 | 55.527 | 1.274 | 14.160 | 52.627 |
| 1.004 | 11.151 | 66.678 | 1.265 | 14.051 | 66.678 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

| 4 |
|---|
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| |
| |
| |

| |
|---|
| -0.484 |
| 0.654 |

| 4 |
|---|
| |
| |
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| |
| |
| |
| |
| 0.808 |
| 0.726 |

| 4 |
|---|
| 0.357 |
| 0.343 |
| 0.487 |
| 0.720 |

```
FREQUENCIES VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q1_A Q2_A Q3_A Q4_A Q5_A Q6_A Q7
  /ORDER=ANALYSIS.
```

# Frequencies

**Notes**

| | | |
|---|---|---|
| Output Created | | 16-SEP-2017 15:22:38 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\Toetspunt Data\Gr8 2017 (Pair).sav |
| | Active Dataset | DataSet1 |
| | Filter | <none> |
| | Weight | <none> |
| | Split File | SET |
| | N of Rows in Working Data File | 96 |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data. |
| Syntax | | FREQUENCIES VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q1_A Q2_A Q3_A Q4_A Q5_A Q6_A Q7_A Q8_A Q9_A /ORDER=ANALYSIS. |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.01 |

| SET | | | Q1 | Q2 |
|---|---|---|---|---|
| 1 | N | Valid | 42 | 42 |
| | | Missing | 0 | 0 |
| 2 | N | Valid | 51 | 51 |
| | | Missing | 3 | 3 |

# Frequency Table

**Q1**

| SET | | | Frequency | Percent |
|---|---|---|---|---|
| 1 | Valid | 0 | 1 | 2.4 |

| | | | | |
|---|---|---|---|---|
| | | 1 | 3 | 7.1 |
| | | 2 | 10 | 23.8 |
| | | 3 | 28 | 66.7 |
| | | Total | 42 | 100.0 |
| 2 | Valid | 0 | 11 | 20.4 |
| | | 1 | 1 | 1.9 |
| | | 2 | 10 | 18.5 |
| | | 3 | 29 | 53.7 |
| | | Total | 51 | 94.4 |
| | Missing | System | 3 | 5.6 |
| | Total | | 54 | 100.0 |

## Q2

| SET | | | Frequency | Percent |
|---|---|---|---|---|
| 1 | Valid | 0 | 36 | 85.7 |
| | | 1 | 2 | 4.8 |
| | | 2 | 1 | 2.4 |
| | | 3 | 3 | 7.1 |
| | | Total | 42 | 100.0 |
| 2 | Valid | 0 | 48 | 88.9 |
| | | 3 | 3 | 5.6 |
| | | Total | 51 | 94.4 |
| | Missing | System | 3 | 5.6 |
| | Total | | 54 | 100.0 |

## Q3

| SET | | | Frequency | Percent |
|---|---|---|---|---|
| 1 | Valid | 0 | 25 | 59.5 |
| | | 1 | 9 | 21.4 |
| | | 2 | 5 | 11.9 |
| | | 3 | 3 | 7.1 |
| | | Total | 42 | 100.0 |
| 2 | Valid | 0 | 42 | 77.8 |
| | | 1 | 5 | 9.3 |
| | | 2 | 2 | 3.7 |
| | | 3 | 2 | 3.7 |
| | | Total | 51 | 94.4 |
| | Missing | System | 3 | 5.6 |
| | Total | | 54 | 100.0 |

## Q4

| SET | | | Frequency | Percent |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| 1 | Valid | 0 | 37 | 88.1 |
| | | 1 | 1 | 2.4 |
| | | 2 | 1 | 2.4 |
| | | 3 | 3 | 7.1 |
| | | Total | 42 | 100.0 |
| 2 | Valid | 0 | 47 | 87.0 |
| | | 1 | 1 | 1.9 |
| | | 3 | 3 | 5.6 |
| | | Total | 51 | 94.4 |
| | Missing | System | 3 | 5.6 |
| | Total | | 54 | 100.0 |

## Q5

| SET | | | Frequency | Percent |
|---|---|---|---|---|
| 1 | Valid | 0 | 34 | 81.0 |
| | | 1 | 8 | 19.0 |
| | | Total | 42 | 100.0 |
| 2 | Valid | 0 | 50 | 92.6 |
| | | 3 | 1 | 1.9 |
| | | Total | 51 | 94.4 |
| | Missing | System | 3 | 5.6 |
| | Total | | 54 | 100.0 |

## Q6

| SET | | | Frequency | Percent |
|---|---|---|---|---|
| 1 | Valid | 0 | 17 | 40.5 |
| | | 1 | 16 | 38.1 |
| | | 2 | 4 | 9.5 |
| | | 3 | 5 | 11.9 |
| | | Total | 42 | 100.0 |
| 2 | Valid | 0 | 41 | 75.9 |
| | | 1 | 6 | 11.1 |
| | | 2 | 2 | 3.7 |
| | | 3 | 2 | 3.7 |
| | | Total | 51 | 94.4 |
| | Missing | System | 3 | 5.6 |
| | Total | | 54 | 100.0 |

## Q7

| SET | | | Frequency | Percent |
|---|---|---|---|---|
| 1 | Valid | 0 | 31 | 73.8 |
| | | 1 | 3 | 7.1 |

| | | | | |
|---|---|---|---|---|
| | | 2 | 4 | 9.5 |
| | | 3 | 4 | 9.5 |
| | | Total | 42 | 100.0 |
| 2 | Valid | 0 | 43 | 79.6 |
| | | 1 | 2 | 3.7 |
| | | 3 | 6 | 11.1 |
| | | Total | 51 | 94.4 |
| | Missing | System | 3 | 5.6 |
| | Total | | 54 | 100.0 |

**Q8**

| SET | | | Frequency | Percent |
|---|---|---|---|---|
| 1 | Valid | 0 | 17 | 40.5 |
| | | 1 | 16 | 38.1 |
| | | 2 | 3 | 7.1 |
| | | 3 | 6 | 14.3 |
| | | Total | 42 | 100.0 |
| 2 | Valid | 0 | 40 | 74.1 |
| | | 1 | 5 | 9.3 |
| | | 2 | 2 | 3.7 |
| | | 3 | 4 | 7.4 |
| | | Total | 51 | 94.4 |
| | Missing | System | 3 | 5.6 |
| | Total | | 54 | 100.0 |

**Q9**

| SET | | | Frequency | Percent |
|---|---|---|---|---|
| 1 | Valid | 0 | 7 | 16.7 |
| | | 1 | 30 | 71.4 |
| | | 3 | 5 | 11.9 |
| | | Total | 42 | 100.0 |
| 2 | Valid | 0 | 42 | 77.8 |
| | | 1 | 5 | 9.3 |
| | | 3 | 4 | 7.4 |
| | | Total | 51 | 94.4 |
| | Missing | System | 3 | 5.6 |
| | Total | | 54 | 100.0 |

**Q1**

| SET | | | Frequency | Percent |
|---|---|---|---|---|
| 1 | Valid | 1 | 4 | 9.5 |
| | | 2 | 8 | 19.0 |

| | | | | |
|---|---|---|---|---|
| | | 3 | 29 | 69.0 |
| | | Total | 41 | 97.6 |
| | Missing | System | 1 | 2.4 |
| | Total | | 42 | 100.0 |
| 2 | Valid | 0 | 7 | 13.0 |
| | | 1 | 5 | 9.3 |
| | | 2 | 12 | 22.2 |
| | | 3 | 27 | 50.0 |
| | | Total | 51 | 94.4 |
| | Missing | System | 3 | 5.6 |
| | Total | | 54 | 100.0 |

## Q2

| SET | | | Frequency | Percent |
|---|---|---|---|---|
| 1 | Valid | 0 | 19 | 45.2 |
| | | 1 | 1 | 2.4 |
| | | 2 | 2 | 4.8 |
| | | 3 | 19 | 45.2 |
| | | Total | 41 | 97.6 |
| | Missing | System | 1 | 2.4 |
| | Total | | 42 | 100.0 |
| 2 | Valid | 0 | 30 | 55.6 |
| | | 2 | 5 | 9.3 |
| | | 3 | 16 | 29.6 |
| | | Total | 51 | 94.4 |
| | Missing | System | 3 | 5.6 |
| | Total | | 54 | 100.0 |

## Q3

| SET | | | Frequency | Percent |
|---|---|---|---|---|
| 1 | Valid | 0 | 17 | 40.5 |
| | | 1 | 8 | 19.0 |
| | | 2 | 4 | 9.5 |
| | | 3 | 12 | 28.6 |
| | | Total | 41 | 97.6 |
| | Missing | System | 1 | 2.4 |
| | Total | | 42 | 100.0 |
| 2 | Valid | 0 | 26 | 48.1 |
| | | 1 | 10 | 18.5 |
| | | 2 | 4 | 7.4 |
| | | 3 | 11 | 20.4 |
| | | Total | 51 | 94.4 |
| | Missing | System | 3 | 5.6 |

| | | | | |
|---|---|---|---|---|
| | Total | | 54 | 100.0 |

## Q4

| SET | | | Frequency | Percent |
|---|---|---|---|---|
| 1 | Valid | 0 | 28 | 66.7 |
| | | 1 | 6 | 14.3 |
| | | 3 | 7 | 16.7 |
| | | Total | 41 | 97.6 |
| | Missing | System | 1 | 2.4 |
| | Total | | 42 | 100.0 |
| 2 | Valid | 0 | 48 | 88.9 |
| | | 1 | 1 | 1.9 |
| | | 3 | 2 | 3.7 |
| | | Total | 51 | 94.4 |
| | Missing | System | 3 | 5.6 |
| | Total | | 54 | 100.0 |

## Q5

| SET | | | Frequency | Percent |
|---|---|---|---|---|
| 1 | Valid | 0 | 30 | 71.4 |
| | | 1 | 10 | 23.8 |
| | | 3 | 1 | 2.4 |
| | | Total | 41 | 97.6 |
| | Missing | System | 1 | 2.4 |
| | Total | | 42 | 100.0 |
| 2 | Valid | 0 | 48 | 88.9 |
| | | 1 | 2 | 3.7 |
| | | 3 | 1 | 1.9 |
| | | Total | 51 | 94.4 |
| | Missing | System | 3 | 5.6 |
| | Total | | 54 | 100.0 |

## Q6

| SET | | | Frequency | Percent |
|---|---|---|---|---|
| 1 | Valid | 0 | 12 | 28.6 |
| | | 1 | 16 | 38.1 |
| | | 2 | 9 | 21.4 |
| | | 3 | 4 | 9.5 |
| | | Total | 41 | 97.6 |
| | Missing | System | 1 | 2.4 |
| | Total | | 42 | 100.0 |
| 2 | Valid | 0 | 36 | 66.7 |

| | | | | |
|---|---|---|---|---|
| | | 1 | 7 | 13.0 |
| | | 2 | 4 | 7.4 |
| | | 3 | 4 | 7.4 |
| | | Total | 51 | 94.4 |
| | Missing | System | 3 | 5.6 |
| | Total | | 54 | 100.0 |

## Q7

| SET | | | Frequency | Percent |
|---|---|---|---|---|
| 1 | Valid | 0 | 25 | 59.5 |
| | | 1 | 4 | 9.5 |
| | | 2 | 3 | 7.1 |
| | | 3 | 9 | 21.4 |
| | | Total | 41 | 97.6 |
| | Missing | System | 1 | 2.4 |
| | Total | | 42 | 100.0 |
| 2 | Valid | 0 | 42 | 77.8 |
| | | 1 | 3 | 5.6 |
| | | 3 | 6 | 11.1 |
| | | Total | 51 | 94.4 |
| | Missing | System | 3 | 5.6 |
| | Total | | 54 | 100.0 |

## Q8

| SET | | | Frequency | Percent |
|---|---|---|---|---|
| 1 | Valid | 0 | 15 | 35.7 |
| | | 1 | 12 | 28.6 |
| | | 2 | 5 | 11.9 |
| | | 3 | 9 | 21.4 |
| | | Total | 41 | 97.6 |
| | Missing | System | 1 | 2.4 |
| | Total | | 42 | 100.0 |
| 2 | Valid | 0 | 36 | 66.7 |
| | | 1 | 2 | 3.7 |
| | | 2 | 4 | 7.4 |
| | | 3 | 9 | 16.7 |
| | | Total | 51 | 94.4 |
| | Missing | System | 3 | 5.6 |
| | Total | | 54 | 100.0 |

## Q9

| SET | | | Frequency | Percent |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| 1 | Valid | 1 | 34 | 81.0 |
| | | 3 | 7 | 16.7 |
| | | Total | 41 | 97.6 |
| | Missing | System | 1 | 2.4 |
| | Total | | 42 | 100.0 |
| 2 | Valid | 0 | 38 | 70.4 |
| | | 1 | 4 | 7.4 |
| | | 2 | 1 | 1.9 |
| | | 3 | 8 | 14.8 |
| | | Total | 51 | 94.4 |
| | Missing | System | 3 | 5.6 |
| | Total | | 54 | 100.0 |

'_A Q8_A Q9_A

**Statistics**

| Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 | Q1 |
|---|---|---|---|---|---|---|---|
| 42 | 42 | 42 | 42 | 42 | 42 | 42 | 41 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 |
| 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |

| Valid Percent | Cumulative Percent |
|---|---|
| 2.4 | 2.4 |

| | |
|---|---|
| 7.1 | 9.5 |
| 23.8 | 33.3 |
| 66.7 | 100.0 |
| 100.0 | |
| 21.6 | 21.6 |
| 2.0 | 23.5 |
| 19.6 | 43.1 |
| 56.9 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 85.7 | 85.7 |
| 4.8 | 90.5 |
| 2.4 | 92.9 |
| 7.1 | 100.0 |
| 100.0 | |
| 94.1 | 94.1 |
| 5.9 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 59.5 | 59.5 |
| 21.4 | 81.0 |
| 11.9 | 92.9 |
| 7.1 | 100.0 |
| 100.0 | |
| 82.4 | 82.4 |
| 9.8 | 92.2 |
| 3.9 | 96.1 |
| 3.9 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|

| | |
|---|---|
| 88.1 | 88.1 |
| 2.4 | 90.5 |
| 2.4 | 92.9 |
| 7.1 | 100.0 |
| 100.0 | |
| 92.2 | 92.2 |
| 2.0 | 94.1 |
| 5.9 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 81.0 | 81.0 |
| 19.0 | 100.0 |
| 100.0 | |
| 98.0 | 98.0 |
| 2.0 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 40.5 | 40.5 |
| 38.1 | 78.6 |
| 9.5 | 88.1 |
| 11.9 | 100.0 |
| 100.0 | |
| 80.4 | 80.4 |
| 11.8 | 92.2 |
| 3.9 | 96.1 |
| 3.9 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 73.8 | 73.8 |
| 7.1 | 81.0 |

| | |
|---|---|
| 9.5 | 90.5 |
| 9.5 | 100.0 |
| 100.0 | |
| 84.3 | 84.3 |
| 3.9 | 88.2 |
| 11.8 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 40.5 | 40.5 |
| 38.1 | 78.6 |
| 7.1 | 85.7 |
| 14.3 | 100.0 |
| 100.0 | |
| 78.4 | 78.4 |
| 9.8 | 88.2 |
| 3.9 | 92.2 |
| 7.8 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 16.7 | 16.7 |
| 71.4 | 88.1 |
| 11.9 | 100.0 |
| 100.0 | |
| 82.4 | 82.4 |
| 9.8 | 92.2 |
| 7.8 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 9.8 | 9.8 |
| 19.5 | 29.3 |

| | |
|---|---|
| 70.7 | 100.0 |
| 100.0 | |
| | |
| | |
| 13.7 | 13.7 |
| 9.8 | 23.5 |
| 23.5 | 47.1 |
| 52.9 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 46.3 | 46.3 |
| 2.4 | 48.8 |
| 4.9 | 53.7 |
| 46.3 | 100.0 |
| 100.0 | |
| | |
| | |
| 58.8 | 58.8 |
| 9.8 | 68.6 |
| 31.4 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 41.5 | 41.5 |
| 19.5 | 61.0 |
| 9.8 | 70.7 |
| 29.3 | 100.0 |
| 100.0 | |
| | |
| | |
| 51.0 | 51.0 |
| 19.6 | 70.6 |
| 7.8 | 78.4 |
| 21.6 | 100.0 |
| 100.0 | |
| | |

| | |
|---|---|
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 68.3 | 68.3 |
| 14.6 | 82.9 |
| 17.1 | 100.0 |
| 100.0 | |
| | |
| | |
| 94.1 | 94.1 |
| 2.0 | 96.1 |
| 3.9 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 73.2 | 73.2 |
| 24.4 | 97.6 |
| 2.4 | 100.0 |
| 100.0 | |
| | |
| | |
| 94.1 | 94.1 |
| 3.9 | 98.0 |
| 2.0 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 29.3 | 29.3 |
| 39.0 | 68.3 |
| 22.0 | 90.2 |
| 9.8 | 100.0 |
| 100.0 | |
| | |
| | |
| 70.6 | 70.6 |

| | |
|---|---|
| 13.7 | 84.3 |
| 7.8 | 92.2 |
| 7.8 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 61.0 | 61.0 |
| 9.8 | 70.7 |
| 7.3 | 78.0 |
| 22.0 | 100.0 |
| 100.0 | |
| | |
| | |
| 82.4 | 82.4 |
| 5.9 | 88.2 |
| 11.8 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 36.6 | 36.6 |
| 29.3 | 65.9 |
| 12.2 | 78.0 |
| 22.0 | 100.0 |
| 100.0 | |
| | |
| | |
| 70.6 | 70.6 |
| 3.9 | 74.5 |
| 7.8 | 82.4 |
| 17.6 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|

| | |
|---|---|
| 82.9 | 82.9 |
| 17.1 | 100.0 |
| 100.0 | |
| | |
| | |
| 74.5 | 74.5 |
| 7.8 | 82.4 |
| 2.0 | 84.3 |
| 15.7 | 100.0 |
| 100.0 | |
| | |
| | |

| Q2 | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 |
|---|---|---|---|---|---|---|---|
| 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 |
| 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |

```
T-TEST GROUPS=SET(1 2)
  /MISSING=ANALYSIS
  /VARIABLES=SCORE
  /CRITERIA=CI(.95).
```

# T-Test

### Notes

| | | |
|---|---|---|
| Output Created | | 16-SEP-2017 15:15:06 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\Toetspunt Data\Gr8 2017 (Indep).sav |
| | Active Dataset | DataSet1 |
| | Filter | TEST = 2 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 96 |
| Missing Value Handling | Definition of Missing | User defined missing values are treated as missing. |
| | Cases Used | Statistics for each analysis are based on the cases with no missing or out-of-range data for any variable in the analysis. |
| Syntax | | T-TEST GROUPS=SET(1 2)<br>/MISSING=ANALYSIS<br>/VARIABLES=SCORE<br>/CRITERIA=CI(.95). |
| Resources | Processor Time | 00:00:00.05 |
| | Elapsed Time | 00:00:00.02 |

### Group Statistics

| SET | | N | Mean |
|---|---|---|---|
| SCORE | 1 | 41 | 10.9268 |
| | 2 | 51 | 6.7843 |

### Indepe

| | Levene's Test for Equality of Variances |
|---|---|

| | | F | Sig. |
|---|---|---|---|
| SCORE | Equal variances assumed | 0.003 | 0.954 |
| | Equal variances not assumed | | |

| Std. Deviation | Std. Error Mean | Effect Size |
|---|---|---|
| 5.47901 | 0.85568 | |
| 5.13153 | 0.71856 | 0.76 |

**endent Samples Test**

| | | | t-test for Equality of Means | | | |
|---|---|---|---|---|---|---|
| | | | | | Std. Error | 95% Confidenc<br>Differ |

| t | df | Sig. (2-tailed) | Mean Difference | Difference | Lower |
|---|---|---|---|---|---|
| 3.734 | 90 | 0.000 | 4.14252 | 1.10936 | 1.93858 |
| 3.707 | 83.205 | 0.000 | 4.14252 | 1.11737 | 1.92020 |

e Interval of the
ence

| Upper |
| --- |
| 6.34645 |
| 6.36483 |

```
T-TEST GROUPS=SET(1 2)
  /MISSING=ANALYSIS
  /VARIABLES=SCORE
  /CRITERIA=CI(.95).
```

# T-Test

### Notes

| | | |
|---|---|---|
| Output Created | | 16-SEP-2017 15:14:06 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\Toetspunt Data\Gr8 2017 (Indep).sav |
| | Active Dataset | DataSet1 |
| | Filter | TEST = 1 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 96 |
| Missing Value Handling | Definition of Missing | User defined missing values are treated as missing. |
| | Cases Used | Statistics for each analysis are based on the cases with no missing or out-of-range data for any variable in the analysis. |
| Syntax | | T-TEST GROUPS=SET(1 2)<br>/MISSING=ANALYSIS<br>/VARIABLES=SCORE<br>/CRITERIA=CI(.95). |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.01 |

### Group Statistics

| SET | | N | Mean |
|---|---|---|---|
| SCORE | 1 | 42 | 7.5000 |
| | 2 | 51 | 4.2941 |

### Indepe

| Levene's Test for Equality of Variances |
|---|

| | | F | Sig. |
|---|---|---|---|
| SCORE | Equal variances assumed | 0.183 | 0.669 |
| | Equal variances not assumed | | |

| Std. Deviation | Std. Error Mean | Effect Size |
|---|---|---|
| 3.97093 | 0.61273 | 0.80 |
| 3.99647 | 0.55962 | |

**endent Samples Test**

| | | | t-test for Equality of Means | | | |
|---|---|---|---|---|---|---|
| | | | | | Std. Error | 95% Confidenc Differ |

| t | df | Sig. (2-tailed) | Mean Difference | Difference | Lower |
|---|---|---|---|---|---|
| 3.861 | 91 | 0.000 | 3.20588 | 0.83034 | 1.55651 |
| 3.863 | 87.821 | 0.000 | 3.20588 | 0.82982 | 1.55674 |

e Interval of the
ence

| Upper |
| --- |
| 4.85526 |
| 4.85503 |

```
SAVE OUTFILE='C:\Users\20396236\Desktop\Jordaan_T\Toetspunt Data\Gr8 20
  /COMPRESSED.
T-TEST PAIRS=PRE_SCORE WITH POST_SCORE (PAIRED)
  /CRITERIA=CI(.9500)
  /MISSING=ANALYSIS.
```

# T-Test

**Notes**

| | | |
|---|---|---|
| Output Created | | 16-SEP-2017 15:21:02 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\Toetspunt Data\Gr8 2017 (Pair).sav |
| | Active Dataset | DataSet1 |
| | Filter | <none> |
| | Weight | <none> |
| | Split File | SET |
| | N of Rows in Working Data File | 96 |
| Missing Value Handling | Definition of Missing | User defined missing values are treated as missing. |
| | Cases Used | Statistics for each analysis are based on the cases with no missing or out-of-range data for any variable in the analysis. |
| Syntax | | T-TEST PAIRS=PRE_SCORE WITH POST_SCORE (PAIRED) /CRITERIA=CI(.9500) /MISSING=ANALYSIS. |
| Resources | Processor Time | 00:00:00.00 |
| | Elapsed Time | 00:00:00.01 |

```
[DataSet1] C:\Users\20396236\Desktop\Jordaan_T\Toetspunt Data\Gr8
```

**Paired Samples Statistics**

| SET | | | Mean |
|---|---|---|---|
| 1 | Pair 1 | PRE_SCORE | 7.5366 |
| | | POST_SCORE | 10.9268 |
| 2 | Pair 1 | PRE_SCORE | 3.9375 |

| | | | |
|---|---|---|---|
| | | POST_SCORE | 6.6667 |

## Paired Samples Correlations

| SET | | | N |
|---|---|---|---|
| 1 | Pair 1 | PRE_SCORE & POST_SCORE | 41 |
| 2 | Pair 1 | PRE_SCORE & POST_SCORE | 48 |

## Paire

| SET | | | Mean |
|---|---|---|---|
| 1 | Pair 1 | PRE_SCORE - POST_SCORE | -3.39024 |
| 2 | Pair 1 | PRE_SCORE - POST_SCORE | -2.72917 |

17 (Pair).sav'

3 2017 (Pair).sav

| N | Std. Deviation | Std. Error Mean | Effect Size |
|---|---|---|---|
| 41 | 4.01309 | 0.62674 | |
| 41 | 5.47901 | 0.85568 | 0.62 |
| 48 | 3.73828 | 0.53957 | |

| | | | |
|---|---|---|---|
| 48 | 5.24844 | 0.75755 | 0.52 |

| Correlation | Sig. |
|---|---|
| 0.766 | 0.000 |
| 0.761 | 0.000 |

**d Samples Test**

| Paired Differences | | | | | | |
|---|---|---|---|---|---|---|
| | | 95% Confidence Interval of the Difference | | | | |
| Std. Deviation | Std. Error Mean | Lower | Upper | t | df | Sig. (2-tailed) |
| 3.52759 | 0.55092 | -4.50369 | -2.27680 | -6.154 | 40 | 0.000 |
| 3.41299 | 0.49262 | -3.72020 | -1.73814 | -5.540 | 47 | 0.000 |

```
RELIABILITY
  /VARIABLES=Q1 Q2
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

# Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 16-SEP-2017 15:09:55 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\Toetspunt Data\Gr8 2017 (Indep).sav |
| | Active Dataset | DataSet1 |
| | Filter | TEST = 1 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 96 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |
| Syntax | | RELIABILITY /VARIABLES=Q1 Q2 /SCALE('ALL VARIABLES') ALL /MODEL=ALPHA /STATISTICS=DESCRIPTIVE SCALE CORR /SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.00 |
| | Elapsed Time | 00:00:00.01 |

# Scale: ALL VARIABLES

**Case Processing Summary**

| | | N | % |
|---|---|---|---|
| Cases | Valid | 93 | 96.9 |
| | Excluded[a] | 3 | 3.1 |
| | Total | 96 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

**Reliability Statistics**

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.078 | 0.081 | 2 |

**Item Statistics**

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q1 | 2.31 | 1.042 | 93 |
| Q2 | 0.24 | 0.772 | 93 |

**Inter-Item Correlation Matrix**

| | Q1 | Q2 |
|---|---|---|
| Q1 | 1.000 | 0.042 |
| Q2 | 0.042 | 1.000 |

**Summary Item Statistics**

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 1.274 | 0.237 | 2.312 |
| Inter-Item Correlations | 0.042 | 0.042 | 0.042 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q1 | 0.24 | 0.596 | 0.042 |
| Q2 | 2.31 | 1.086 | 0.042 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 2.55 | 1.750 | 1.323 | 2 |

```
RELIABILITY
  /VARIABLES=Q4 Q6 Q7 Q8
  /SCALE('ALL VARIABLES') ALL
```

```
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

# Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 16-SEP-2017 15:09:55 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\Toetspunt Data\Gr8 2017 (Indep).sav |
| | Active Dataset | DataSet1 |
| | Filter | TEST = 1 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 96 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |
| Syntax | | RELIABILITY<br>/VARIABLES=Q4 Q6 Q7 Q8<br>/SCALE('ALL VARIABLES') ALL<br>/MODEL=ALPHA<br><br>/STATISTICS=DESCRIPTIVE SCALE CORR<br>/SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.00 |
| | Elapsed Time | 00:00:00.01 |

# Scale: ALL VARIABLES

**Case Processing Summary**

| | | N | % |
|---|---|---|---|
| Cases | Valid | 93 | 96.9 |

| | | | |
|---|---|---|---|
| | Excluded[a] | 3 | 3.1 |
| | Total | 96 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.593 | 0.581 | 4 |

### Item Statistics

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q4 | 0.24 | 0.772 | 93 |
| Q6 | 0.59 | 0.912 | 93 |
| Q7 | 0.46 | 0.995 | 93 |
| Q8 | 0.66 | 0.994 | 93 |

### Inter-Item Correlation Matrix

| | Q4 | Q6 | Q7 |
|---|---|---|---|
| Q4 | 1.000 | 0.123 | 0.224 |
| Q6 | 0.123 | 1.000 | 0.342 |
| Q7 | 0.224 | 0.342 | 1.000 |
| Q8 | 0.121 | 0.275 | 0.459 |

### Summary Item Statistics

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 0.487 | 0.237 | 0.656 |
| Inter-Item Correlations | 0.257 | 0.121 | 0.459 |

### Item-Total Statistics

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q4 | 1.71 | 4.839 | 0.207 |
| Q6 | 1.35 | 4.014 | 0.354 |
| Q7 | 1.48 | 3.274 | 0.520 |
| Q8 | 1.29 | 3.556 | 0.425 |

### Scale Statistics

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 1.95 | 6.138 | 2.478 | 4 |

```
RELIABILITY
  /VARIABLES=Q3 Q5 Q9
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

# Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 16-SEP-2017 15:09:55 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\Toetspunt Data\Gr8 2017 (Indep).sav |
| | Active Dataset | DataSet1 |
| | Filter | TEST = 1 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 96 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |
| Syntax | | RELIABILITY /VARIABLES=Q3 Q5 Q9 /SCALE('ALL VARIABLES') ALL /MODEL=ALPHA /STATISTICS=DESCRIPTIVE SCALE CORR /SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.00 |
| | Elapsed Time | 00:00:00.06 |

# Scale: ALL VARIABLES

## Case Processing Summary

| | | N | % |
|---|---|---|---|
| Cases | Valid | 93 | 96.9 |
| | Excluded[a] | 3 | 3.1 |
| | Total | 96 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

## Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.303 | 0.273 | 3 |

## Item Statistics

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q3 | 0.46 | 0.854 | 93 |
| Q5 | 0.12 | 0.413 | 93 |
| Q9 | 0.67 | 0.901 | 93 |

## Inter-Item Correlation Matrix

| | Q3 | Q5 | Q9 |
|---|---|---|---|
| Q3 | 1.000 | -0.033 | 0.231 |
| Q5 | -0.033 | 1.000 | 0.136 |
| Q9 | 0.231 | 0.136 | 1.000 |

## Summary Item Statistics

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 0.416 | 0.118 | 0.667 |
| Inter-Item Correlations | 0.111 | -0.033 | 0.231 |

## Item-Total Statistics

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q3 | 0.78 | 1.084 | 0.186 |
| Q5 | 1.13 | 1.896 | 0.068 |
| Q9 | 0.58 | 0.877 | 0.271 |

a. The value is negative due to a negative average covariance among items. This violates reliability model assum
codings.

## Scale Statistics

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|

| | | | |
|---|---|---|---|
| 1.25 | 2.145 | 1.464 | 3 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 2.075 | 9.773 | 2.153 | 2 |
| 0.000 | 1.000 | 0.000 | 2 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.002 | |
| 0.002 | |

| Q8 |
|---|
| 0.121 |
| 0.275 |
| 0.459 |
| 1.000 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 0.419 | 2.773 | 0.034 | 4 |
| 0.338 | 3.782 | 0.016 | 4 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.053 | 0.629 |
| 0.137 | 0.538 |
| 0.283 | 0.393 |
| 0.227 | 0.480 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 0.548 | 5.636 | 0.077 | 3 |
| 0.264 | -6.896 | 0.014 | 3 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.058 | 0.187 |
| 0.023 | 0.375 |
| 0.074 | -.054[a] |

ıptions. You may want to check item

# Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 16-SEP-2017 15:06:15 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\Toetspunt Data\Gr8 2017 (Indep).sav |
| | Active Dataset | DataSet1 |
| | Filter | TEST = 1 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 96 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |
| Syntax | | RELIABILITY /VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 /SCALE('ALL VARIABLES') ALL /MODEL=ALPHA<br><br>/STATISTICS=DESCRIPTIVE SCALE CORR /SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.01 |

[DataSet1] C:\Users\20396236\Desktop\Jordaan_T\Toetspunt Data\Gr8 20

## Scale: ALL VARIABLES

**Case Processing Summary**

| | | N | % |
|---|---|---|---|
| Cases | Valid | 93 | 96.9 |
| | Excluded[a] | 3 | 3.1 |

| | | | |
|---|---|---|---|
| | Total | 96 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

## Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.707 | 0.697 | 9 |

## Item Statistics

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q1 | 2.31 | 1.042 | 93 |
| Q2 | 0.24 | 0.772 | 93 |
| Q3 | 0.46 | 0.854 | 93 |
| Q4 | 0.24 | 0.772 | 93 |
| Q5 | 0.12 | 0.413 | 93 |
| Q6 | 0.59 | 0.912 | 93 |
| Q7 | 0.46 | 0.995 | 93 |
| Q8 | 0.66 | 0.994 | 93 |
| Q9 | 0.67 | 0.901 | 93 |

## Inter-Item Correlation

| | Q1 | Q2 | Q3 |
|---|---|---|---|
| Q1 | 1.000 | 0.042 | 0.203 |
| Q2 | 0.042 | 1.000 | 0.113 |
| Q3 | 0.203 | 0.113 | 1.000 |
| Q4 | 0.042 | 0.179 | 0.294 |
| Q5 | 0.065 | -0.055 | -0.033 |
| Q6 | 0.296 | 0.216 | 0.134 |
| Q7 | 0.174 | 0.337 | 0.232 |
| Q8 | 0.314 | 0.192 | 0.228 |
| Q9 | 0.262 | 0.177 | 0.231 |

## Summary Item Statistics

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 0.638 | 0.118 | 2.312 |
| Inter-Item Correlations | 0.203 | -0.055 | 0.501 |

## Item-Total Statistics

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Q1 | 3.43 | 14.574 | 0.329 |
| Q2 | 5.51 | 15.927 | 0.285 |
| Q3 | 5.28 | 15.334 | 0.331 |
| Q4 | 5.51 | 15.927 | 0.285 |
| Q5 | 5.62 | 17.411 | 0.203 |
| Q6 | 5.15 | 14.542 | 0.418 |
| Q7 | 5.28 | 13.443 | 0.527 |
| Q8 | 5.09 | 13.362 | 0.540 |
| Q9 | 5.08 | 14.244 | 0.474 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 5.74 | 18.281 | 4.276 | 9 |

17 (Indep).sav

**Matrix**

| Q4 | Q5 | Q6 | Q7 | Q8 | Q9 |
|---|---|---|---|---|---|
| 0.042 | 0.065 | 0.296 | 0.174 | 0.314 | 0.262 |
| 0.179 | -0.055 | 0.216 | 0.337 | 0.192 | 0.177 |
| 0.294 | -0.033 | 0.134 | 0.232 | 0.228 | 0.231 |
| 1.000 | 0.286 | 0.123 | 0.224 | 0.121 | 0.146 |
| 0.286 | 1.000 | 0.216 | 0.183 | 0.127 | 0.136 |
| 0.123 | 0.216 | 1.000 | 0.342 | 0.275 | 0.229 |
| 0.224 | 0.183 | 0.342 | 1.000 | 0.459 | 0.307 |
| 0.121 | 0.127 | 0.275 | 0.459 | 1.000 | 0.501 |
| 0.146 | 0.136 | 0.229 | 0.307 | 0.501 | 1.000 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 2.194 | 19.545 | 0.432 | 9 |
| 0.556 | -9.180 | 0.014 | 9 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|

| | |
|---|---|
| 0.175 | 0.695 |
| 0.172 | 0.698 |
| 0.184 | 0.690 |
| 0.207 | 0.698 |
| 0.179 | 0.708 |
| 0.219 | 0.674 |
| 0.338 | 0.649 |
| 0.383 | 0.646 |
| 0.290 | 0.662 |

```
NONPAR CORR
  /VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8
  /PRINT=SPEARMAN TWOTAIL NOSIG
  /MISSING=PAIRWISE.
```

# Nonparametric Correlations

**Notes**

| | | |
|---|---|---|
| Output Created | | 16-SEP-2017 14:24:01 |
| Comments | | |
| Input | Active Dataset | DataSet1 |
| | Filter | TEST = 1 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 102 |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics for each pair of variables are based on all the cases with valid data for that pair. |
| Syntax | | NONPAR CORR /VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 /PRINT=SPEARMAN TWOTAIL NOSIG /MISSING=PAIRWISE. |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.04 |
| | Number of Cases Allowed | 285975 cases[a] |

a. Based on availability of workspace memory

**Correlations**

| | | | Q1 | Q2 |
|---|---|---|---|---|
| Spearman's rho | Q1 | Correlation Coefficient | 1.000 | 0.094 |
| | | Sig. (2-tailed) | | 0.365 |
| | | N | 95 | 95 |
| | Q2 | Correlation Coefficient | 0.094 | 1.000 |
| | | Sig. (2-tailed) | 0.365 | |
| | | N | 95 | 95 |
| | Q3 | Correlation Coefficient | .261* | .272** |
| | | Sig. (2-tailed) | 0.011 | 0.008 |
| | | N | 95 | 95 |

| | | | | |
|---|---|---|---|---|
| | Q4 | Correlation Coefficient | .353** | .323** |
| | | Sig. (2-tailed) | 0.000 | 0.001 |
| | | N | 95 | 95 |
| | Q5 | Correlation Coefficient | .229* | .293** |
| | | Sig. (2-tailed) | 0.026 | 0.004 |
| | | N | 95 | 95 |
| | Q6 | Correlation Coefficient | 0.106 | 0.159 |
| | | Sig. (2-tailed) | 0.304 | 0.124 |
| | | N | 95 | 95 |
| | Q7 | Correlation Coefficient | 0.072 | 0.063 |
| | | Sig. (2-tailed) | 0.487 | 0.541 |
| | | N | 95 | 95 |
| | Q8 | Correlation Coefficient | -0.034 | 0.147 |
| | | Sig. (2-tailed) | 0.747 | 0.155 |
| | | N | 95 | 95 |

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

| Q3 | Q4 | Q5 | Q6 | Q7 | Q8 |
|---|---|---|---|---|---|
| .261* | .353** | .229* | 0.106 | 0.072 | -0.034 |
| 0.011 | 0.000 | 0.026 | 0.304 | 0.487 | 0.747 |
| 95 | 95 | 95 | 95 | 95 | 95 |
| .272** | .323** | .293** | 0.159 | 0.063 | 0.147 |
| 0.008 | 0.001 | 0.004 | 0.124 | 0.541 | 0.155 |
| 95 | 95 | 95 | 95 | 95 | 95 |
| 1.000 | .475** | .372** | 0.165 | 0.091 | .208* |
|  | 0.000 | 0.000 | 0.110 | 0.382 | 0.043 |
| 95 | 95 | 95 | 95 | 95 | 95 |

| | | | | | |
|---|---|---|---|---|---|
| .475** | 1.000 | .416** | 0.122 | .204* | 0.198 |
| 0.000 | | 0.000 | 0.240 | 0.048 | 0.054 |
| 95 | 95 | 95 | 95 | 95 | 95 |
| .372** | .416** | 1.000 | .247* | .243* | 0.167 |
| 0.000 | 0.000 | | 0.016 | 0.017 | 0.106 |
| 95 | 95 | 95 | 95 | 95 | 95 |
| 0.165 | 0.122 | .247* | 1.000 | 0.197 | 0.064 |
| 0.110 | 0.240 | 0.016 | | 0.056 | 0.536 |
| 95 | 95 | 95 | 95 | 95 | 95 |
| 0.091 | .204* | .243* | 0.197 | 1.000 | .213* |
| 0.382 | 0.048 | 0.017 | 0.056 | | 0.038 |
| 95 | 95 | 95 | 95 | 95 | 95 |
| .208* | 0.198 | 0.167 | 0.064 | .213* | 1.000 |
| 0.043 | 0.054 | 0.106 | 0.536 | 0.038 | |
| 95 | 95 | 95 | 95 | 95 | 95 |

```
FACTOR
  /VARIABLES Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8
  /MISSING LISTWISE
  /ANALYSIS Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8
  /PRINT UNIVARIATE INITIAL CORRELATION DET KMO EXTRACTION ROTATION
  /FORMAT SORT BLANK(.316)
  /CRITERIA MINEIGEN(1) ITERATE(500)
  /EXTRACTION PC
  /CRITERIA ITERATE(500)
  /ROTATION VARIMAX
  /METHOD=CORRELATION.
```

# Factor Analysis

**Notes**

| | | |
|---|---|---|
| Output Created | | 16-SEP-2017 14:27:51 |
| Comments | | |
| Input | Active Dataset | DataSet1 |
| | Filter | TEST = 1 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 102 |
| Missing Value Handling | Definition of Missing | MISSING=EXCLUDE: User-defined missing values are treated as missing. |
| | Cases Used | LISTWISE: Statistics are based on cases with no missing values for any variable used. |

| | | |
|---|---|---|
| Syntax | | FACTOR<br>/VARIABLES Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8<br>/MISSING LISTWISE<br>/ANALYSIS Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8<br>/PRINT UNIVARIATE INITIAL CORRELATION DET KMO EXTRACTION ROTATION<br>/FORMAT SORT BLANK(.316)<br>/CRITERIA MINEIGEN(1) ITERATE(500)<br>/EXTRACTION PC<br>/CRITERIA ITERATE(500)<br>/ROTATION VARIMAX<br>/METHOD=CORRELATION. |
| Resources | Processor Time | 00:00:00.00 |
| | Elapsed Time | 00:00:00.04 |
| | Maximum Memory Required | 9264 (9.047K) bytes |

**Descriptive Statistics**

| | Mean | Std. Deviation | Analysis N |
|---|---|---|---|
| Q1 | 2.61 | 0.719 | 95 |
| Q2 | 2.32 | 1.094 | 95 |
| Q3 | 1.67 | 1.267 | 95 |
| Q4 | 1.21 | 1.081 | 95 |
| Q5 | 1.06 | 1.319 | 95 |
| Q6 | 1.51 | 1.304 | 95 |
| Q7 | 0.15 | 0.461 | 95 |
| Q8 | 0.46 | 0.885 | 95 |

**Correlation M**

| | | Q1 | Q2 |
|---|---|---|---|
| Correlation | Q1 | 1.000 | 0.185 |
| | Q2 | 0.185 | 1.000 |
| | Q3 | 0.268 | 0.290 |
| | Q4 | 0.353 | 0.348 |
| | Q5 | 0.251 | 0.318 |
| | Q6 | 0.099 | 0.193 |
| | Q7 | 0.079 | 0.054 |
| | Q8 | -0.014 | 0.177 |

a. Determinant = .328

## KMO and Bartlett's Test

| | | |
|---|---|---|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | 0.758 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 100.892 |
| | df | 28 |
| | Sig. | 0.000 |

## Communalities

| | Initial | Extraction |
|---|---|---|
| Q1 | 1.000 | 0.588 |
| Q2 | 1.000 | 0.398 |
| Q3 | 1.000 | 0.546 |
| Q4 | 1.000 | 0.621 |
| Q5 | 1.000 | 0.546 |
| Q6 | 1.000 | 0.474 |
| Q7 | 1.000 | 0.659 |
| Q8 | 1.000 | 0.835 |

Extraction Method: Principal Component Analysis.

## Total Variance E

| | Initial Eigenvalues | | |
|---|---|---|---|
| Component | Total | % of Variance | Cumulative % |
| 1 | 2.574 | 32.180 | 32.180 |
| 2 | 1.053 | 13.167 | 45.347 |
| 3 | 1.039 | 12.991 | 58.338 |
| 4 | 0.898 | 11.219 | 69.557 |
| 5 | 0.732 | 9.148 | 78.705 |
| 6 | 0.686 | 8.573 | 87.278 |
| 7 | 0.534 | 6.675 | 93.953 |
| 8 | 0.484 | 6.047 | 100.000 |

Extraction Method: Principal Component Analysis.

## Component Matrix[a]

| | Component | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| Q4 | 0.758 | | |
| Q3 | 0.702 | | |
| Q5 | 0.702 | | |
| Q2 | 0.596 | | |
| Q1 | 0.511 | -0.343 | -0.457 |
| Q7 | 0.378 | 0.718 | |
| Q6 | 0.386 | 0.527 | |
| Q8 | 0.324 | | 0.854 |

Extraction Method: Principal Component Analysis.

a. 3 components extracted.

**Rotated Component Matrix[a]**

| | Component | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| Q4 | 0.768 | | |
| Q3 | 0.723 | | |
| Q1 | 0.640 | | -0.422 |
| Q2 | 0.596 | | |
| Q5 | 0.580 | 0.455 | |
| Q7 | | 0.797 | |
| Q6 | | 0.669 | |
| Q8 | | | 0.887 |

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 4 iterations.

**Component Transformation Matrix**

| Component | 1 | 2 | 3 |
|---|---|---|---|
| 1 | 0.898 | 0.417 | 0.137 |
| 2 | -0.434 | 0.892 | 0.126 |
| 3 | -0.070 | -0.172 | 0.983 |

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

**atrix**[a]

| Q3 | Q4 | Q5 | Q6 | Q7 | Q8 |
|---|---|---|---|---|---|
| 0.268 | 0.353 | 0.251 | 0.099 | 0.079 | -0.014 |
| 0.290 | 0.348 | 0.318 | 0.193 | 0.054 | 0.177 |
| 1.000 | 0.470 | 0.388 | 0.172 | 0.102 | 0.193 |
| 0.470 | 1.000 | 0.401 | 0.128 | 0.193 | 0.220 |
| 0.388 | 0.401 | 1.000 | 0.210 | 0.282 | 0.075 |
| 0.172 | 0.128 | 0.210 | 1.000 | 0.176 | 0.035 |
| 0.102 | 0.193 | 0.282 | 0.176 | 1.000 | 0.118 |
| 0.193 | 0.220 | 0.075 | 0.035 | 0.118 | 1.000 |

**xplained**

| Extraction Sums of Squared Loadings | | | Rotation Sums of Squared Loadings | | |
|---|---|---|---|---|---|
| Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 2.574 | 32.180 | 32.180 | 2.281 | 28.513 | 28.513 |
| 1.053 | 13.167 | 45.347 | 1.318 | 16.471 | 44.984 |
| 1.039 | 12.991 | 58.338 | 1.068 | 13.354 | 58.338 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

```
DATASET ACTIVATE DataSet1.

SAVE OUTFILE='C:\Users\20396236\Desktop\Jordaan_T\Toetspunt Data\Gr9 2016 (Pair).
  /COMPRESSED.
FREQUENCIES VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q1_A Q2_A Q3_A Q4_A Q5_A Q6_A Q7_A
    Q3_B Q4_B Q5_B Q6_B Q7_B Q8_B
  /ORDER=ANALYSIS.
```

# Frequencies

**Notes**

| | | |
|---|---|---|
| Output Created | | 16-SEP-2017 14:43:35 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\Toetspunt Data\Gr9 2016 (Pair).sav |
| | Active Dataset | DataSet1 |
| | Filter | <none> |
| | Weight | <none> |
| | Split File | SET |
| | N of Rows in Working Data File | 102 |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data. |
| Syntax | | FREQUENCIES VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q1_A Q2_A Q3_A Q4_A Q5_A Q6_A Q7_A Q8_A Q1_B Q2_B Q3_B Q4_B Q5_B Q6_B Q7_B Q8_B /ORDER=ANALYSIS. |
| Resources | Processor Time | 00:00:00.03 |
| | Elapsed Time | 00:00:00.05 |

| SET | | | Q1 | Q2 |
|---|---|---|---|---|
| 1 | N | Valid | 27 | 27 |
| | | Missing | 1 | 1 |
| 2 | N | Valid | 68 | 68 |
| | | Missing | 6 | 6 |

# Frequency Table

## Q1

| SET | | | Frequency | Percent |
|---|---|---|---|---|
| 1 | Valid | 1 | 2 | 7.1 |
| | | 2 | 3 | 10.7 |
| | | 3 | 22 | 78.6 |
| | | Total | 27 | 96.4 |
| | Missing | System | 1 | 3.6 |
| | Total | | 28 | 100.0 |
| 2 | Valid | 0 | 2 | 2.7 |
| | | 1 | 5 | 6.8 |
| | | 2 | 14 | 18.9 |
| | | 3 | 47 | 63.5 |
| | | Total | 68 | 91.9 |
| | Missing | System | 6 | 8.1 |
| | Total | | 74 | 100.0 |

## Q2

| SET | | | Frequency | Percent |
|---|---|---|---|---|
| 1 | Valid | 0 | 1 | 3.6 |
| | | 2 | 4 | 14.3 |
| | | 3 | 22 | 78.6 |
| | | Total | 27 | 96.4 |
| | Missing | System | 1 | 3.6 |
| | Total | | 28 | 100.0 |
| 2 | Valid | 0 | 13 | 17.6 |
| | | 1 | 4 | 5.4 |
| | | 2 | 11 | 14.9 |
| | | 3 | 40 | 54.1 |
| | | Total | 68 | 91.9 |
| | Missing | System | 6 | 8.1 |
| | Total | | 74 | 100.0 |

## Q3

| SET | | | Frequency | Percent |
|---|---|---|---|---|
| 1 | Valid | 0 | 1 | 3.6 |
| | | 1 | 10 | 35.7 |
| | | 3 | 16 | 57.1 |
| | | Total | 27 | 96.4 |
| | Missing | System | 1 | 3.6 |
| | Total | | 28 | 100.0 |

| | | | | |
|---|---|---|---|---|
| 2 | Valid | 0 | 22 | 29.7 |
| | | 1 | 17 | 23.0 |
| | | 2 | 3 | 4.1 |
| | | 3 | 26 | 35.1 |
| | | Total | 68 | 91.9 |
| | Missing | System | 6 | 8.1 |
| | Total | | 74 | 100.0 |

**Q4**

| SET | | | Frequency | Percent |
|---|---|---|---|---|
| 1 | Valid | 0 | 1 | 3.6 |
| | | 1 | 4 | 14.3 |
| | | 2 | 18 | 64.3 |
| | | 3 | 4 | 14.3 |
| | | Total | 27 | 96.4 |
| | Missing | System | 1 | 3.6 |
| | Total | | 28 | 100.0 |
| 2 | Valid | 0 | 37 | 50.0 |
| | | 1 | 4 | 5.4 |
| | | 2 | 22 | 29.7 |
| | | 3 | 5 | 6.8 |
| | | Total | 68 | 91.9 |
| | Missing | System | 6 | 8.1 |
| | Total | | 74 | 100.0 |

**Q5**

| SET | | | Frequency | Percent |
|---|---|---|---|---|
| 1 | Valid | 0 | 9 | 32.1 |
| | | 1 | 6 | 21.4 |
| | | 2 | 1 | 3.6 |
| | | 3 | 11 | 39.3 |
| | | Total | 27 | 96.4 |
| | Missing | System | 1 | 3.6 |
| | Total | | 28 | 100.0 |
| 2 | Valid | 0 | 42 | 56.8 |
| | | 1 | 9 | 12.2 |
| | | 3 | 17 | 23.0 |
| | | Total | 68 | 91.9 |
| | Missing | System | 6 | 8.1 |
| | Total | | 74 | 100.0 |

**Q6**

| SET | | | Frequency | Percent |
|---|---|---|---|---|
| 1 | Valid | 0 | 3 | 10.7 |
| | | 1 | 11 | 39.3 |
| | | 2 | 1 | 3.6 |
| | | 3 | 12 | 42.9 |
| | | Total | 27 | 96.4 |
| | Missing | System | 1 | 3.6 |
| | Total | | 28 | 100.0 |
| 2 | Valid | 0 | 27 | 36.5 |
| | | 1 | 14 | 18.9 |
| | | 2 | 1 | 1.4 |
| | | 3 | 26 | 35.1 |
| | | Total | 68 | 91.9 |
| | Missing | System | 6 | 8.1 |
| | Total | | 74 | 100.0 |

**Q7**

| SET | | | Frequency | Percent |
|---|---|---|---|---|
| 1 | Valid | 0 | 23 | 82.1 |
| | | 1 | 4 | 14.3 |
| | | Total | 27 | 96.4 |
| | Missing | System | 1 | 3.6 |
| | Total | | 28 | 100.0 |
| 2 | Valid | 0 | 61 | 82.4 |
| | | 1 | 5 | 6.8 |
| | | 2 | 1 | 1.4 |
| | | 3 | 1 | 1.4 |
| | | Total | 68 | 91.9 |
| | Missing | System | 6 | 8.1 |
| | Total | | 74 | 100.0 |

**Q8**

| SET | | | Frequency | Percent |
|---|---|---|---|---|
| 1 | Valid | 0 | 19 | 67.9 |
| | | 1 | 5 | 17.9 |
| | | 2 | 1 | 3.6 |
| | | 3 | 2 | 7.1 |
| | | Total | 27 | 96.4 |
| | Missing | System | 1 | 3.6 |
| | Total | | 28 | 100.0 |
| 2 | Valid | 0 | 49 | 66.2 |
| | | 1 | 13 | 17.6 |

| | | | | |
|---|---|---|---|---|
| | | 3 | 6 | 8.1 |
| | | Total | 68 | 91.9 |
| | Missing | System | 6 | 8.1 |
| | Total | | 74 | 100.0 |

## Q1

| SET | | | Frequency | Percent |
|---|---|---|---|---|
| 1 | Valid | 2 | 2 | 7.1 |
| | | 3 | 26 | 92.9 |
| | | Total | 28 | 100.0 |
| 2 | Valid | 0 | 6 | 8.1 |
| | | 1 | 1 | 1.4 |
| | | 2 | 15 | 20.3 |
| | | 3 | 46 | 62.2 |
| | | Total | 68 | 91.9 |
| | Missing | System | 6 | 8.1 |
| | Total | | 74 | 100.0 |

## Q2

| SET | | | Frequency | Percent |
|---|---|---|---|---|
| 1 | Valid | 0 | 4 | 14.3 |
| | | 1 | 1 | 3.6 |
| | | 2 | 3 | 10.7 |
| | | 3 | 20 | 71.4 |
| | | Total | 28 | 100.0 |
| 2 | Valid | 0 | 14 | 18.9 |
| | | 1 | 1 | 1.4 |
| | | 2 | 1 | 1.4 |
| | | 3 | 52 | 70.3 |
| | | Total | 68 | 91.9 |
| | Missing | System | 6 | 8.1 |
| | Total | | 74 | 100.0 |

## Q3

| SET | | | Frequency | Percent |
|---|---|---|---|---|
| 1 | Valid | 0 | 3 | 10.7 |
| | | 2 | 2 | 7.1 |
| | | 3 | 23 | 82.1 |
| | | Total | 28 | 100.0 |
| 2 | Valid | 0 | 24 | 32.4 |
| | | 1 | 2 | 2.7 |
| | | 3 | 42 | 56.8 |

| | | | | |
|---|---|---|---|---|
| | | Total | 68 | 91.9 |
| | Missing | System | 6 | 8.1 |
| | Total | | 74 | 100.0 |

## Q4

| SET | | | Frequency | Percent |
|---|---|---|---|---|
| 1 | Valid | 0 | 4 | 14.3 |
| | | 1 | 2 | 7.1 |
| | | 2 | 12 | 42.9 |
| | | 3 | 10 | 35.7 |
| | | Total | 28 | 100.0 |
| 2 | Valid | 0 | 26 | 35.1 |
| | | 1 | 5 | 6.8 |
| | | 2 | 19 | 25.7 |
| | | 3 | 18 | 24.3 |
| | | Total | 68 | 91.9 |
| | Missing | System | 6 | 8.1 |
| | Total | | 74 | 100.0 |

## Q5

| SET | | | Frequency | Percent |
|---|---|---|---|---|
| 1 | Valid | 0 | 10 | 35.7 |
| | | 2 | 1 | 3.6 |
| | | 3 | 17 | 60.7 |
| | | Total | 28 | 100.0 |
| 2 | Valid | 0 | 43 | 58.1 |
| | | 1 | 1 | 1.4 |
| | | 2 | 1 | 1.4 |
| | | 3 | 23 | 31.1 |
| | | Total | 68 | 91.9 |
| | Missing | System | 6 | 8.1 |
| | Total | | 74 | 100.0 |

## Q6

| SET | | | Frequency | Percent |
|---|---|---|---|---|
| 1 | Valid | 0 | 16 | 57.1 |
| | | 3 | 12 | 42.9 |
| | | Total | 28 | 100.0 |
| 2 | Valid | 0 | 37 | 50.0 |
| | | 3 | 31 | 41.9 |
| | | Total | 68 | 91.9 |
| | Missing | System | 6 | 8.1 |

| | | | | |
|---|---|---|---|---|
| | Total | | 74 | 100.0 |

## Q7

| SET | | | Frequency | Percent |
|---|---|---|---|---|
| 1 | Valid | 0 | 23 | 82.1 |
| | | 1 | 1 | 3.6 |
| | | 2 | 1 | 3.6 |
| | | 3 | 3 | 10.7 |
| | | Total | 28 | 100.0 |
| 2 | Valid | 0 | 63 | 85.1 |
| | | 2 | 1 | 1.4 |
| | | 3 | 4 | 5.4 |
| | | Total | 68 | 91.9 |
| | Missing | System | 6 | 8.1 |
| | Total | | 74 | 100.0 |

## Q8

| SET | | | Frequency | Percent |
|---|---|---|---|---|
| 1 | Valid | 0 | 7 | 25.0 |
| | | 1 | 9 | 32.1 |
| | | 2 | 2 | 7.1 |
| | | 3 | 10 | 35.7 |
| | | Total | 28 | 100.0 |
| 2 | Valid | 0 | 37 | 50.0 |
| | | 1 | 7 | 9.5 |
| | | 2 | 6 | 8.1 |
| | | 3 | 18 | 24.3 |
| | | Total | 68 | 91.9 |
| | Missing | System | 6 | 8.1 |
| | Total | | 74 | 100.0 |

## Q1

| SET | | | Frequency | Percent |
|---|---|---|---|---|
| 1 | Valid | 1 | 1 | 3.6 |
| | | 2 | 8 | 28.6 |
| | | 3 | 19 | 67.9 |
| | | Total | 28 | 100.0 |
| 2 | Valid | 1 | 12 | 16.2 |
| | | 2 | 12 | 16.2 |
| | | 3 | 40 | 54.1 |
| | | Total | 64 | 86.5 |
| | Missing | System | 10 | 13.5 |

| | | | | |
|---|---|---|---|---|
| | Total | | 74 | 100.0 |

## Q2

| SET | | | Frequency | Percent |
|---|---|---|---|---|
| 1 | Valid | 1 | 3 | 10.7 |
| | | 2 | 10 | 35.7 |
| | | 3 | 15 | 53.6 |
| | | Total | 28 | 100.0 |
| 2 | Valid | 0 | 3 | 4.1 |
| | | 1 | 7 | 9.5 |
| | | 2 | 19 | 25.7 |
| | | 3 | 35 | 47.3 |
| | | Total | 64 | 86.5 |
| | Missing | System | 10 | 13.5 |
| | Total | | 74 | 100.0 |

## Q3

| SET | | | Frequency | Percent |
|---|---|---|---|---|
| 1 | Valid | 1 | 2 | 7.1 |
| | | 2 | 3 | 10.7 |
| | | 3 | 23 | 82.1 |
| | | Total | 28 | 100.0 |
| 2 | Valid | 0 | 17 | 23.0 |
| | | 1 | 9 | 12.2 |
| | | 2 | 3 | 4.1 |
| | | 3 | 35 | 47.3 |
| | | Total | 64 | 86.5 |
| | Missing | System | 10 | 13.5 |
| | Total | | 74 | 100.0 |

## Q4

| SET | | | Frequency | Percent |
|---|---|---|---|---|
| 1 | Valid | 0 | 2 | 7.1 |
| | | 1 | 3 | 10.7 |
| | | 2 | 19 | 67.9 |
| | | 3 | 4 | 14.3 |
| | | Total | 28 | 100.0 |
| 2 | Valid | 0 | 19 | 25.7 |
| | | 1 | 17 | 23.0 |
| | | 2 | 25 | 33.8 |
| | | 3 | 3 | 4.1 |
| | | Total | 64 | 86.5 |

| | | | | |
|---|---|---|---|---|
| | Missing | System | 10 | 13.5 |
| | Total | | 74 | 100.0 |

## Q5

| SET | | | Frequency | Percent |
|---|---|---|---|---|
| 1 | Valid | 0 | 6 | 21.4 |
| | | 1 | 5 | 17.9 |
| | | 2 | 1 | 3.6 |
| | | 3 | 16 | 57.1 |
| | | Total | 28 | 100.0 |
| 2 | Valid | 0 | 21 | 28.4 |
| | | 1 | 20 | 27.0 |
| | | 2 | 3 | 4.1 |
| | | 3 | 20 | 27.0 |
| | | Total | 64 | 86.5 |
| | Missing | System | 10 | 13.5 |
| | Total | | 74 | 100.0 |

## Q6

| SET | | | Frequency | Percent |
|---|---|---|---|---|
| 1 | Valid | 0 | 5 | 17.9 |
| | | 1 | 12 | 42.9 |
| | | 2 | 4 | 14.3 |
| | | 3 | 7 | 25.0 |
| | | Total | 28 | 100.0 |
| 2 | Valid | 0 | 8 | 10.8 |
| | | 1 | 32 | 43.2 |
| | | 2 | 2 | 2.7 |
| | | 3 | 22 | 29.7 |
| | | Total | 64 | 86.5 |
| | Missing | System | 10 | 13.5 |
| | Total | | 74 | 100.0 |

## Q7

| SET | | | Frequency | Percent |
|---|---|---|---|---|
| 1 | Valid | 0 | 11 | 39.3 |
| | | 1 | 13 | 46.4 |
| | | 2 | 3 | 10.7 |
| | | 3 | 1 | 3.6 |
| | | Total | 28 | 100.0 |
| 2 | Valid | 0 | 43 | 58.1 |
| | | 1 | 16 | 21.6 |

| | | | | |
|---|---|---|---|---|
| | | 2 | 3 | 4.1 |
| | | 3 | 2 | 2.7 |
| | | Total | 64 | 86.5 |
| | Missing | System | 10 | 13.5 |
| | Total | | 74 | 100.0 |

**Q8**

| SET | | | Frequency | Percent |
|---|---|---|---|---|
| 1 | Valid | 0 | 4 | 14.3 |
| | | 1 | 8 | 28.6 |
| | | 2 | 3 | 10.7 |
| | | 3 | 13 | 46.4 |
| | | Total | 28 | 100.0 |
| 2 | Valid | 0 | 23 | 31.1 |
| | | 1 | 19 | 25.7 |
| | | 2 | 5 | 6.8 |
| | | 3 | 17 | 23.0 |
| | | Total | 64 | 86.5 |
| | Missing | System | 10 | 13.5 |
| | Total | | 74 | 100.0 |

sav'

Q8_A Q1_B Q2_B

**Statistics**

| Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q1 | Q2 |
|---|---|---|---|---|---|---|---|
| 27 | 27 | 27 | 27 | 27 | 27 | 28 | 28 |
| 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 |
| 68 | 68 | 68 | 68 | 68 | 68 | 68 | 68 |
| 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |

| Valid Percent | Cumulative Percent |
|---|---|
| 7.4 | 7.4 |
| 11.1 | 18.5 |
| 81.5 | 100.0 |
| 100.0 | |
| | |
| | |
| 2.9 | 2.9 |
| 7.4 | 10.3 |
| 20.6 | 30.9 |
| 69.1 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 3.7 | 3.7 |
| 14.8 | 18.5 |
| 81.5 | 100.0 |
| 100.0 | |
| | |
| | |
| 19.1 | 19.1 |
| 5.9 | 25.0 |
| 16.2 | 41.2 |
| 58.8 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 3.7 | 3.7 |
| 37.0 | 40.7 |
| 59.3 | 100.0 |
| 100.0 | |
| | |
| | |

| | |
|---|---|
| 32.4 | 32.4 |
| 25.0 | 57.4 |
| 4.4 | 61.8 |
| 38.2 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 3.7 | 3.7 |
| 14.8 | 18.5 |
| 66.7 | 85.2 |
| 14.8 | 100.0 |
| 100.0 | |
| | |
| | |
| 54.4 | 54.4 |
| 5.9 | 60.3 |
| 32.4 | 92.6 |
| 7.4 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 33.3 | 33.3 |
| 22.2 | 55.6 |
| 3.7 | 59.3 |
| 40.7 | 100.0 |
| 100.0 | |
| | |
| | |
| 61.8 | 61.8 |
| 13.2 | 75.0 |
| 25.0 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 11.1 | 11.1 |
| 40.7 | 51.9 |
| 3.7 | 55.6 |
| 44.4 | 100.0 |
| 100.0 | |
| | |
| | |
| 39.7 | 39.7 |
| 20.6 | 60.3 |
| 1.5 | 61.8 |
| 38.2 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 85.2 | 85.2 |
| 14.8 | 100.0 |
| 100.0 | |
| | |
| | |
| 89.7 | 89.7 |
| 7.4 | 97.1 |
| 1.5 | 98.5 |
| 1.5 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 70.4 | 70.4 |
| 18.5 | 88.9 |
| 3.7 | 92.6 |
| 7.4 | 100.0 |
| 100.0 | |
| | |
| | |
| 72.1 | 72.1 |
| 19.1 | 91.2 |

| | |
|---|---|
| 8.8 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 7.1 | 7.1 |
| 92.9 | 100.0 |
| 100.0 | |
| 8.8 | 8.8 |
| 1.5 | 10.3 |
| 22.1 | 32.4 |
| 67.6 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 14.3 | 14.3 |
| 3.6 | 17.9 |
| 10.7 | 28.6 |
| 71.4 | 100.0 |
| 100.0 | |
| 20.6 | 20.6 |
| 1.5 | 22.1 |
| 1.5 | 23.5 |
| 76.5 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 10.7 | 10.7 |
| 7.1 | 17.9 |
| 82.1 | 100.0 |
| 100.0 | |
| 35.3 | 35.3 |
| 2.9 | 38.2 |
| 61.8 | 100.0 |

| | |
|---|---|
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 14.3 | 14.3 |
| 7.1 | 21.4 |
| 42.9 | 64.3 |
| 35.7 | 100.0 |
| 100.0 | |
| 38.2 | 38.2 |
| 7.4 | 45.6 |
| 27.9 | 73.5 |
| 26.5 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 35.7 | 35.7 |
| 3.6 | 39.3 |
| 60.7 | 100.0 |
| 100.0 | |
| 63.2 | 63.2 |
| 1.5 | 64.7 |
| 1.5 | 66.2 |
| 33.8 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 57.1 | 57.1 |
| 42.9 | 100.0 |
| 100.0 | |
| 54.4 | 54.4 |
| 45.6 | 100.0 |
| 100.0 | |
| | |

| | |
|---|---|
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 82.1 | 82.1 |
| 3.6 | 85.7 |
| 3.6 | 89.3 |
| 10.7 | 100.0 |
| 100.0 | |
| 92.6 | 92.6 |
| 1.5 | 94.1 |
| 5.9 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 25.0 | 25.0 |
| 32.1 | 57.1 |
| 7.1 | 64.3 |
| 35.7 | 100.0 |
| 100.0 | |
| 54.4 | 54.4 |
| 10.3 | 64.7 |
| 8.8 | 73.5 |
| 26.5 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 3.6 | 3.6 |
| 28.6 | 32.1 |
| 67.9 | 100.0 |
| 100.0 | |
| 18.8 | 18.8 |
| 18.8 | 37.5 |
| 62.5 | 100.0 |
| 100.0 | |
| | |

| | |
|---|---|
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 10.7 | 10.7 |
| 35.7 | 46.4 |
| 53.6 | 100.0 |
| 100.0 | |
| 4.7 | 4.7 |
| 10.9 | 15.6 |
| 29.7 | 45.3 |
| 54.7 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 7.1 | 7.1 |
| 10.7 | 17.9 |
| 82.1 | 100.0 |
| 100.0 | |
| 26.6 | 26.6 |
| 14.1 | 40.6 |
| 4.7 | 45.3 |
| 54.7 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 7.1 | 7.1 |
| 10.7 | 17.9 |
| 67.9 | 85.7 |
| 14.3 | 100.0 |
| 100.0 | |
| 29.7 | 29.7 |
| 26.6 | 56.3 |
| 39.1 | 95.3 |
| 4.7 | 100.0 |
| 100.0 | |

| | |
|---|---|
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 21.4 | 21.4 |
| 17.9 | 39.3 |
| 3.6 | 42.9 |
| 57.1 | 100.0 |
| 100.0 | |
| 32.8 | 32.8 |
| 31.3 | 64.1 |
| 4.7 | 68.8 |
| 31.3 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 17.9 | 17.9 |
| 42.9 | 60.7 |
| 14.3 | 75.0 |
| 25.0 | 100.0 |
| 100.0 | |
| 12.5 | 12.5 |
| 50.0 | 62.5 |
| 3.1 | 65.6 |
| 34.4 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 39.3 | 39.3 |
| 46.4 | 85.7 |
| 10.7 | 96.4 |
| 3.6 | 100.0 |
| 100.0 | |
| 67.2 | 67.2 |
| 25.0 | 92.2 |

| | |
|---|---|
| 4.7 | 96.9 |
| 3.1 | 100.0 |
| 100.0 | |
| | |
| | |

| Valid Percent | Cumulative Percent |
|---|---|
| 14.3 | 14.3 |
| 28.6 | 42.9 |
| 10.7 | 53.6 |
| 46.4 | 100.0 |
| 100.0 | |
| 35.9 | 35.9 |
| 29.7 | 65.6 |
| 7.8 | 73.4 |
| 26.6 | 100.0 |
| 100.0 | |
| | |
| | |

| Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q1 | Q2 | Q3 |
|---|---|---|---|---|---|---|---|---|
| 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 68 | 68 | 68 | 68 | 68 | 68 | 64 | 64 | 64 |
| 6 | 6 | 6 | 6 | 6 | 6 | 10 | 10 | 10 |

| Q4 | Q5 | Q6 | Q7 | Q8 |
|---|---|---|---|---|
| 28 | 28 | 28 | 28 | 28 |
| 0 | 0 | 0 | 0 | 0 |
| 64 | 64 | 64 | 64 | 64 |
| 10 | 10 | 10 | 10 | 10 |

```
USE ALL.
COMPUTE filter_$=(TEST = 2).
VARIABLE LABELS filter_$ 'TEST = 2 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
T-TEST GROUPS=SET(1 2)
  /MISSING=ANALYSIS
  /VARIABLES=SCORE
  /CRITERIA=CI(.95).
```

# T-Test

### Notes

| | | |
|---|---|---|
| Output Created | | 16-SEP-2017 14:30:29 |
| Comments | | |
| Input | Active Dataset | DataSet1 |
| | Filter | TEST = 2 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 102 |
| Missing Value Handling | Definition of Missing | User defined missing values are treated as missing. |
| | Cases Used | Statistics for each analysis are based on the cases with no missing or out-of-range data for any variable in the analysis. |
| Syntax | | T-TEST GROUPS=SET(1 2)<br>/MISSING=ANALYSIS<br>/VARIABLES=SCORE<br>/CRITERIA=CI(.95). |
| Resources | Processor Time | 00:00:00.03 |
| | Elapsed Time | 00:00:00.03 |

### Group Statistics

| SET | | N | Mean |
|---|---|---|---|
| SCORE | 1 | 28 | 15.0714 |
| | 2 | 68 | 11.8382 |

**Indepe**

| | | Levene's Test for Equality of Variances | |
|---|---|---|---|
| | | F | Sig. |
| SCORE | Equal variances assumed | 4.588 | 0.035 |
| | Equal variances not assumed | | |

| Std. Deviation | Std. Error Mean | Effect size |
|---|---|---|
| 4.15379 | 0.78499 | |
| 5.61610 | 0.68105 | 0.58 |

**endent Samples Test**

| t-test for Equality of Means | | | | | |
|---|---|---|---|---|---|
| t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidenc Differ Lower |
| 2.749 | 94 | 0.007 | 3.23319 | 1.17617 | 0.89788 |
| 3.111 | 67.526 | 0.003 | 3.23319 | 1.03925 | 1.15913 |

| e Interval of the ence | |
|---|---|
| | Upper |
| | 5.56851 |
| | 5.30725 |

```
USE ALL.
COMPUTE filter_$=(TEST = 3).
VARIABLE LABELS filter_$ 'TEST = 3 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
T-TEST GROUPS=SET(1 2)
  /MISSING=ANALYSIS
  /VARIABLES=SCORE
  /CRITERIA=CI(.95).
```

# T-Test

**Notes**

| | | |
|---|---|---|
| Output Created | | 16-SEP-2017 14:31:12 |
| Comments | | |
| Input | Active Dataset | DataSet1 |
| | Filter | TEST = 3 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 102 |
| Missing Value Handling | Definition of Missing | User defined missing values are treated as missing. |
| | Cases Used | Statistics for each analysis are based on the cases with no missing or out-of-range data for any variable in the analysis. |
| Syntax | | T-TEST GROUPS=SET(1 2)<br>/MISSING=ANALYSIS<br>/VARIABLES=SCORE<br>/CRITERIA=CI(.95). |
| Resources | Processor Time | 00:00:00.00 |
| | Elapsed Time | 00:00:00.03 |

**Group Statistics**

| SET | | N | Mean |
|---|---|---|---|
| SCORE | 1 | 28 | 15.8214 |
| | 2 | 64 | 12.4688 |

**Indepe**

| | | Levene's Test for Equality of Variances | |
|---|---|---|---|
| | | F | Sig. |
| SCORE | Equal variances assumed | 1.946 | 0.166 |
| | Equal variances not assumed | | |

| Std. Deviation | Std. Error Mean | Effect size |
|---|---|---|
| 3.68233 | 0.69589 | |
| 4.65975 | 0.58247 | 0.72 |

**endent Samples Test**

| t-test for Equality of Means | | | | | |
|---|---|---|---|---|---|
| t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidenc Differ Lower |
| 3.371 | 90 | 0.001 | 3.35268 | 0.99457 | 1.37680 |
| 3.694 | 64.513 | 0.000 | 3.35268 | 0.90749 | 1.54004 |

| e Interval of the ence | |
|---|---|
| Upper | |
| 5.32856 | |
| 5.16532 | |

```
T-TEST GROUPS=SET(1 2)
  /MISSING=ANALYSIS
  /VARIABLES=SCORE
  /CRITERIA=CI(.95).
```

# T-Test

### Notes

| | | |
|---|---|---|
| Output Created | | 16-SEP-2017 14:28:52 |
| Comments | | |
| Input | Active Dataset | DataSet1 |
| | Filter | TEST = 1 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 102 |
| Missing Value Handling | Definition of Missing | User defined missing values are treated as missing. |
| | Cases Used | Statistics for each analysis are based on the cases with no missing or out-of-range data for any variable in the analysis. |
| Syntax | | T-TEST GROUPS=SET(1 2)<br>/MISSING=ANALYSIS<br>/VARIABLES=SCORE<br>/CRITERIA=CI(.95). |
| Resources | Processor Time | 00:00:00.03 |
| | Elapsed Time | 00:00:00.03 |

### Group Statistics

| SET | | N | Mean |
|---|---|---|---|
| SCORE | 1 | 27 | 13.5185 |
| | 2 | 68 | 9.9853 |

### Indepe

| | | Levene's Test for Equality of Variances | |
|---|---|---|---|
| | | F | Sig. |
| SCORE | Equal variances assumed | 4.260 | 0.042 |

| | | | |
|---|---|---|---|
| | Equal variances not assumed | | |

| Std. Deviation | Std. Error Mean | Effect size |
|---|---|---|
| 3.44596 | 0.66318 | |
| 4.74261 | 0.57513 | 0.74 |

**endent Samples Test**

| | | | | | t-test for Equality of Means |
|---|---|---|---|---|---|
| | | | | | 95% Confidenc Differ |
| t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | Lower |
| 3.515 | 93 | 0.001 | 3.53322 | 1.00510 | 1.53730 |

| | | | | | |
|---|---|---|---|---|---|
| 4.025 | 65.449 | 0.000 | 3.53322 | 0.87782 | 1.78032 |

e Interval of the
ence

| Upper |
| --- |
| 5.52915 |

| |
|---|
| 5.28613 |

```
T-TEST PAIRS=PRE_SCORE WITH POST_SCORE (PAIRED)
  /CRITERIA=CI(.9500)
  /MISSING=ANALYSIS.
```

# T-Test

**Notes**

| | | |
|---|---|---|
| Output Created | | 16-SEP-2017 14:39:16 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\Toetspunt Data\Gr9 2016 (Pair).sav |
| | Active Dataset | DataSet1 |
| | Filter | <none> |
| | Weight | <none> |
| | Split File | SET |
| | N of Rows in Working Data File | 102 |
| Missing Value Handling | Definition of Missing | User defined missing values are treated as missing. |
| | Cases Used | Statistics for each analysis are based on the cases with no missing or out-of-range data for any variable in the analysis. |
| Syntax | | T-TEST PAIRS=PRE_SCORE WITH POST_SCORE (PAIRED)<br>/CRITERIA=CI(.9500)<br>/MISSING=ANALYSIS. |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.00 |

```
[DataSet1] C:\Users\20396236\Desktop\Jordaan_T\Toetspunt Data\Gr9
```

**Paired Samples Statistics**

| SET | | | Mean |
|---|---|---|---|
| 1 | Pair 1 | PRE_SCORE | 13.5185 |
| | | POST_SCORE | 15.0000 |
| 2 | Pair 1 | PRE_SCORE | 9.7273 |
| | | POST_SCORE | 12.0758 |

## Paired Samples Correlations

| SET | | | N |
|---|---|---|---|
| 1 | Pair 1 | PRE_SCORE & POST_SCORE | 27 |
| 2 | Pair 1 | PRE_SCORE & POST_SCORE | 66 |

**Paire**

| SET | | | Mean |
|---|---|---|---|
| 1 | Pair 1 | PRE_SCORE - POST_SCORE | -1.48148 |
| 2 | Pair 1 | PRE_SCORE - POST_SCORE | -2.34848 |

) 2016 (Pair).sav

| N | Std. Deviation | Std. Error Mean | Effect Size |
|---|---|---|---|
| 27 | 3.44596 | 0.66318 | |
| 27 | 4.21536 | 0.81125 | 0.35 |
| 66 | 4.56254 | 0.56161 | |
| 66 | 5.48371 | 0.67500 | 0.43 |

| Correlation | Sig. |
|---|---|
| 0.675 | 0.000 |
| 0.618 | 0.000 |

**d Samples Test**

| Paired Differences | | | | t | df | Sig. (2-tailed) |
|---|---|---|---|---|---|---|
| | | 95% Confidence Interval of the Difference | | | | |
| Std. Deviation | Std. Error Mean | Lower | Upper | | | |
| 3.16678 | 0.60945 | -2.73422 | -0.22875 | -2.431 | 26 | 0.022 |
| 4.46695 | 0.54984 | -3.44660 | -1.25037 | -4.271 | 65 | 0.000 |

```
T-TEST PAIRS=PRE_SCORE WITH POST_POST_SCORE (PAIRED)
  /CRITERIA=CI(.9500)
  /MISSING=ANALYSIS.
```

# T-Test

### Notes

| | | |
|---|---|---|
| Output Created | | 16-SEP-2017 14:40:38 |
| Comments | | |
| Input | Data | C:\Users\20396236\Desktop\Jordaan_T\Toetspunt Data\Gr9 2016 (Pair).sav |
| | Active Dataset | DataSet1 |
| | Filter | <none> |
| | Weight | <none> |
| | Split File | SET |
| | N of Rows in Working Data File | 102 |
| Missing Value Handling | Definition of Missing | User defined missing values are treated as missing. |
| | Cases Used | Statistics for each analysis are based on the cases with no missing or out-of-range data for any variable in the analysis. |
| Syntax | | T-TEST PAIRS=PRE_SCORE WITH POST_POST_SCORE (PAIRED)<br>/CRITERIA=CI(.9500)<br>/MISSING=ANALYSIS. |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.01 |

### Paired Samples Statistics

| SET | | | Mean |
|---|---|---|---|
| 1 | Pair 1 | PRE_SCORE | 13.5185 |
| | | POST_POST_SCORE | 15.7407 |
| 2 | Pair 1 | PRE_SCORE | 10.1129 |
| | | POST_POST_SCORE | 12.4677 |

### Paired Samples Correlations

| SET | N |
|---|---|

| | | | |
|---|---|---|---|
| 1 | Pair 1 | PRE_SCORE & POST_POST_SCORE | 27 |
| 2 | Pair 1 | PRE_SCORE & POST_POST_SCORE | 62 |

**Paire**

| SET | | | Mean |
|---|---|---|---|
| 1 | Pair 1 | PRE_SCORE - POST_POST_SCORE | -2.22222 |
| 2 | Pair 1 | PRE_SCORE - POST_POST_SCORE | -2.35484 |

| N | Std. Deviation | Std. Error Mean | Effect Size |
|---|---|---|---|
| 27 | 3.44596 | 0.66318 | |
| 27 | 3.72716 | 0.71729 | 0.60 |
| 62 | 4.78078 | 0.60716 | |
| 62 | 4.72773 | 0.60042 | 0.49 |

| Correlation | Sig. |
|---|---|

| | |
|---|---|
| 0.595 | 0.001 |
| 0.646 | 0.000 |

**d Samples Test**

| Paired Differences | | | | | | |
|---|---|---|---|---|---|---|
| | | 95% Confidence Interval of the Difference | | | | |
| Std. Deviation | Std. Error Mean | Lower | Upper | t | df | Sig. (2-tailed) |
| 3.23839 | 0.62323 | -3.50329 | -0.94116 | -3.566 | 26 | 0.001 |
| 4.00040 | 0.50805 | -3.37075 | -1.33893 | -4.635 | 61 | 0.000 |

```
USE ALL.
COMPUTE filter_$=(TEST = 1).
VARIABLE LABELS filter_$ 'TEST = 1 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
RELIABILITY
  /VARIABLES=Q1 Q2 Q6
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

## Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 16-SEP-2017 14:22:26 |
| Comments | | |
| Input | Active Dataset | DataSet1 |
| | Filter | TEST = 1 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 102 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |
| Syntax | | RELIABILITY /VARIABLES=Q1 Q2 Q6 /SCALE('ALL VARIABLES') ALL /MODEL=ALPHA /STATISTICS=DESCRIPTIVE SCALE CORR /SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.01 |

## Scale: ALL VARIABLES

## Case Processing Summary

| | | N | % |
|---|---|---|---|
| Cases | Valid | 95 | 93.1 |
| | Excluded[a] | 7 | 6.9 |
| | Total | 102 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

## Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.347 | 0.362 | 3 |

## Item Statistics

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q1 | 2.61 | 0.719 | 95 |
| Q2 | 2.32 | 1.094 | 95 |
| Q6 | 1.51 | 1.304 | 95 |

## Inter-Item Correlation Matrix

| | Q1 | Q2 | Q6 |
|---|---|---|---|
| Q1 | 1.000 | 0.185 | 0.099 |
| Q2 | 0.185 | 1.000 | 0.193 |
| Q6 | 0.099 | 0.193 | 1.000 |

## Summary Item Statistics

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 2.144 | 1.505 | 2.611 |
| Inter-Item Correlations | 0.159 | 0.099 | 0.193 |

## Item-Total Statistics

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q1 | 3.82 | 3.446 | 0.178 |
| Q2 | 4.12 | 2.401 | 0.248 |
| Q6 | 4.93 | 2.005 | 0.199 |

## Scale Statistics

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|

| | | | |
|---|---|---|---|
| 6.43 | 4.439 | 2.107 | 3 |

```
RELIABILITY
  /VARIABLES=Q3 Q4 Q5
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

# Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 16-SEP-2017 14:22:26 |
| Comments | | |
| Input | Active Dataset | DataSet1 |
| | Filter | TEST = 1 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 102 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |
| Syntax | | RELIABILITY /VARIABLES=Q3 Q4 Q5 /SCALE('ALL VARIABLES') ALL /MODEL=ALPHA /STATISTICS=DESCRIPTIVE SCALE CORR /SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.02 |

# Scale: ALL VARIABLES

**Case Processing Summary**

| | N | % |
|---|---|---|

| | | | |
|---|---|---|---|
| Cases | Valid | 95 | 93.1 |
| | Excluded[a] | 7 | 6.9 |
| | Total | 102 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

**Reliability Statistics**

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.679 | 0.685 | 3 |

**Item Statistics**

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q3 | 1.67 | 1.267 | 95 |
| Q4 | 1.21 | 1.081 | 95 |
| Q5 | 1.06 | 1.319 | 95 |

**Inter-Item Correlation Matrix**

| | Q3 | Q4 | Q5 |
|---|---|---|---|
| Q3 | 1.000 | 0.470 | 0.388 |
| Q4 | 0.470 | 1.000 | 0.401 |
| Q5 | 0.388 | 0.401 | 1.000 |

**Summary Item Statistics**

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 1.316 | 1.063 | 1.674 |
| Inter-Item Correlations | 0.420 | 0.388 | 0.470 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q3 | 2.27 | 4.052 | 0.507 |
| Q4 | 2.74 | 4.643 | 0.522 |
| Q5 | 2.88 | 4.061 | 0.459 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 3.95 | 8.242 | 2.871 | 3 |

```
RELIABILITY
```

```
/VARIABLES=Q7 Q8
/SCALE('ALL VARIABLES') ALL
/MODEL=ALPHA
/STATISTICS=DESCRIPTIVE SCALE CORR
/SUMMARY=TOTAL MEANS CORR.
```

# Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 16-SEP-2017 14:22:26 |
| Comments | | |
| Input | Active Dataset | DataSet1 |
| | Filter | TEST = 1 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 102 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |
| Syntax | | RELIABILITY /VARIABLES=Q7 Q8 /SCALE('ALL VARIABLES') ALL /MODEL=ALPHA /STATISTICS=DESCRIPTIVE SCALE CORR /SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.03 |
| | Elapsed Time | 00:00:00.01 |

# Scale: ALL VARIABLES

**Case Processing Summary**

| | | N | % |
|---|---|---|---|
| Cases | Valid | 95 | 93.1 |
| | Excluded[a] | 7 | 6.9 |
| | Total | 102 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

## Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.176 | 0.211 | 2 |

## Item Statistics

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q7 | 0.15 | 0.461 | 95 |
| Q8 | 0.46 | 0.885 | 95 |

## Inter-Item Correlation Matrix

| | Q7 | Q8 |
|---|---|---|
| Q7 | 1.000 | 0.118 |
| Q8 | 0.118 | 1.000 |

## Summary Item Statistics

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 0.305 | 0.147 | 0.463 |
| Inter-Item Correlations | 0.118 | 0.118 | 0.118 |

## Item-Total Statistics

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q7 | 0.46 | 0.783 | 0.118 |
| Q8 | 0.15 | 0.212 | 0.118 |

## Scale Statistics

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 0.61 | 1.091 | 1.045 | 2 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 1.105 | 1.734 | 0.328 | 3 |
| 0.094 | 1.953 | 0.002 | 3 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.038 | 0.319 |
| 0.065 | 0.154 |
| 0.041 | 0.290 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 0.611 | 1.574 | 0.101 | 3 |
| 0.082 | 1.212 | 0.002 | 3 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.269 | 0.564 |
| 0.277 | 0.559 |
| 0.212 | 0.634 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 0.316 | 3.143 | 0.050 | 2 |
| 0.000 | 1.000 | 0.000 | 2 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.014 | |
| 0.014 | |

```
USE ALL.
COMPUTE filter_$=(TEST = 2).
VARIABLE LABELS filter_$ 'TEST = 2 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
RELIABILITY
  /VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

## Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 16-SEP-2017 14:20:25 |
| Comments | | |
| Input | Active Dataset | DataSet1 |
| | Filter | TEST = 2 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 102 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |
| Syntax | | RELIABILITY /VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 /SCALE('ALL VARIABLES') ALL /MODEL=ALPHA /STATISTICS=DESCRIPTIVE SCALE CORR /SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.00 |
| | Elapsed Time | 00:00:00.01 |

## Scale: ALL VARIABLES

### Case Processing Summary

| | | N | % |
|---|---|---|---|
| Cases | Valid | 96 | 94.1 |
| | Excluded[a] | 6 | 5.9 |
| | Total | 102 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.670 | 0.675 | 8 |

### Item Statistics

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q1 | 2.61 | 0.800 | 96 |
| Q2 | 2.35 | 1.187 | 96 |
| Q3 | 2.09 | 1.354 | 96 |
| Q4 | 1.59 | 1.210 | 96 |
| Q5 | 1.30 | 1.473 | 96 |
| Q6 | 1.34 | 1.500 | 96 |
| Q7 | 0.27 | 0.827 | 96 |
| Q8 | 1.21 | 1.297 | 96 |

### Inter-Item Correlation Matri

| | Q1 | Q2 | Q3 |
|---|---|---|---|
| Q1 | 1.000 | 0.179 | 0.238 |
| Q2 | 0.179 | 1.000 | 0.339 |
| Q3 | 0.238 | 0.339 | 1.000 |
| Q4 | 0.152 | 0.248 | 0.409 |
| Q5 | 0.216 | -0.002 | 0.313 |
| Q6 | 0.226 | 0.085 | 0.139 |
| Q7 | 0.080 | 0.051 | 0.193 |
| Q8 | 0.241 | 0.225 | 0.402 |

### Summary Item Statistics

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 1.598 | 0.271 | 2.615 |
| Inter-Item Correlations | 0.206 | -0.002 | 0.412 |

## Item-Total Statistics

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q1 | 10.17 | 25.888 | 0.345 |
| Q2 | 10.43 | 24.689 | 0.274 |
| Q3 | 10.69 | 20.891 | 0.534 |
| Q4 | 11.19 | 22.786 | 0.440 |
| Q5 | 11.48 | 21.957 | 0.377 |
| Q6 | 11.44 | 23.470 | 0.249 |
| Q7 | 12.51 | 26.316 | 0.275 |
| Q8 | 11.57 | 22.121 | 0.453 |

## Scale Statistics

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 12.78 | 29.331 | 5.416 | 8 |

| Q4 | Q5 | Q6 | Q7 | Q8 |
|---|---|---|---|---|
| 0.152 | 0.216 | 0.226 | 0.080 | 0.241 |
| 0.248 | -0.002 | 0.085 | 0.051 | 0.225 |
| 0.409 | 0.313 | 0.139 | 0.193 | 0.402 |
| 1.000 | 0.412 | 0.078 | 0.122 | 0.236 |
| 0.412 | 1.000 | 0.143 | 0.174 | 0.242 |
| 0.078 | 0.143 | 1.000 | 0.213 | 0.195 |
| 0.122 | 0.174 | 0.213 | 1.000 | 0.231 |
| 0.236 | 0.242 | 0.195 | 0.231 | 1.000 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 2.344 | 9.654 | 0.559 | 8 |
| 0.414 | -252.796 | 0.011 | 8 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.136 | 0.649 |
| 0.178 | 0.660 |
| 0.333 | 0.591 |
| 0.281 | 0.620 |
| 0.257 | 0.637 |
| 0.104 | 0.675 |
| 0.101 | 0.659 |
| 0.230 | 0.615 |

```
USE ALL.
COMPUTE filter_$=(TEST = 3).
VARIABLE LABELS filter_$ 'TEST = 3 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
RELIABILITY
  /VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

## Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | 16-SEP-2017 14:20:56 |
| Comments | | |
| Input | Active Dataset | DataSet1 |
| | Filter | TEST = 3 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 102 |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics are based on all cases with valid data for all variables in the procedure. |
| Syntax | | RELIABILITY /VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 /SCALE('ALL VARIABLES') ALL /MODEL=ALPHA /STATISTICS=DESCRIPTIVE SCALE CORR /SUMMARY=TOTAL MEANS CORR. |
| Resources | Processor Time | 00:00:00.00 |
| | Elapsed Time | 00:00:00.01 |

## Scale: ALL VARIABLES

### Case Processing Summary

| | | N | % |
|---|---|---|---|
| Cases | Valid | 92 | 90.2 |
| | Excluded[a] | 10 | 9.8 |
| | Total | 102 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.694 | 0.697 | 8 |

### Item Statistics

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Q1 | 2.50 | 0.734 | 92 |
| Q2 | 2.37 | 0.808 | 92 |
| Q3 | 2.14 | 1.219 | 92 |
| Q4 | 1.40 | 0.927 | 92 |
| Q5 | 1.53 | 1.279 | 92 |
| Q6 | 1.55 | 1.083 | 92 |
| Q7 | 0.54 | 0.762 | 92 |
| Q8 | 1.45 | 1.226 | 92 |

### Inter-Item Correlation Matri

| | Q1 | Q2 | Q3 |
|---|---|---|---|
| Q1 | 1.000 | 0.037 | 0.227 |
| Q2 | 0.037 | 1.000 | 0.259 |
| Q3 | 0.227 | 0.259 | 1.000 |
| Q4 | 0.364 | 0.108 | 0.436 |
| Q5 | 0.310 | 0.148 | 0.247 |
| Q6 | 0.118 | 0.027 | 0.040 |
| Q7 | 0.157 | 0.188 | 0.307 |
| Q8 | 0.153 | 0.165 | 0.369 |

### Summary Item Statistics

| | Mean | Minimum | Maximum |
|---|---|---|---|
| Item Means | 1.686 | 0.543 | 2.500 |
| Inter-Item Correlations | 0.223 | 0.027 | 0.450 |

## Item-Total Statistics

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation |
|---|---|---|---|
| Q1 | 10.99 | 18.758 | 0.341 |
| Q2 | 11.12 | 19.183 | 0.230 |
| Q3 | 11.35 | 15.526 | 0.463 |
| Q4 | 12.09 | 16.828 | 0.497 |
| Q5 | 11.96 | 15.251 | 0.458 |
| Q6 | 11.93 | 18.655 | 0.175 |
| Q7 | 12.95 | 17.898 | 0.463 |
| Q8 | 12.04 | 15.097 | 0.510 |

## Scale Statistics

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 13.49 | 21.461 | 4.633 | 8 |

| Q4 | Q5 | Q6 | Q7 | Q8 |
|---|---|---|---|---|
| 0.364 | 0.310 | 0.118 | 0.157 | 0.153 |
| 0.108 | 0.148 | 0.027 | 0.188 | 0.165 |
| 0.436 | 0.247 | 0.040 | 0.307 | 0.369 |
| 1.000 | 0.244 | 0.192 | 0.232 | 0.373 |
| 0.244 | 1.000 | 0.070 | 0.376 | 0.450 |
| 0.192 | 0.070 | 1.000 | 0.230 | 0.126 |
| 0.232 | 0.376 | 0.230 | 1.000 | 0.303 |
| 0.373 | 0.450 | 0.126 | 0.303 | 1.000 |

| Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|
| 1.957 | 4.600 | 0.403 | 8 |
| 0.423 | 16.641 | 0.014 | 8 |

| Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|
| 0.198 | 0.676 |
| 0.087 | 0.694 |
| 0.304 | 0.645 |
| 0.322 | 0.642 |
| 0.317 | 0.647 |
| 0.089 | 0.713 |
| 0.241 | 0.655 |
| 0.320 | 0.632 |

```
USE ALL.
COMPUTE filter_$=(TEST = 1).
VARIABLE LABELS filter_$ 'TEST = 1 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
RELIABILITY
  /VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

## Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | |
| Comments | | |
| Input | Active Dataset | |
| | Filter | |
| | Weight | |
| | Split File | |
| | N of Rows in Working Data File | |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | |
| | Cases Used | |
| Syntax | | |
| Resources | Processor Time | |
| | Elapsed Time | |

[DataSet1]

### Warnings

Text: Q9 Command: RELIABILITY
An undefined variable name, or a scratch or system variable was specified in a variable list which accepts only standard variables.
Check spelling and verify the existence of this variable.
Execution of this command stops.

Error in the variable list.

```
RELIABILITY
  /VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

## Reliability

### Notes

| | | |
|---|---|---|
| Output Created | | |
| Comments | | |
| Input | Active Dataset | |
| | Filter | |
| | Weight | |
| | Split File | |
| | N of Rows in Working Data File | |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | |
| | Cases Used | |
| Syntax | | |
| Resources | Processor Time | |

| | Elapsed Time |
|---|---|

## Scale: ALL VARIABLES

### Case Processing Summary

| Cases | Valid | |
|---|---|---|
| | Excluded[a] | |
| | Total | |

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items |
|---|---|
| 0.677 | 0.675 |

### Item Statistics

| | Mean |
|---|---|
| Q1 | 2.61 |
| Q2 | 2.32 |
| Q3 | 1.67 |
| Q4 | 1.21 |
| Q5 | 1.06 |
| Q6 | 1.51 |
| Q7 | 0.15 |
| Q8 | 0.46 |

### Inte

| | Q1 |
|---|---|
| Q1 | 1.000 |
| Q2 | 0.185 |
| Q3 | 0.268 |
| Q4 | 0.353 |
| Q5 | 0.251 |
| Q6 | 0.099 |
| Q7 | 0.079 |
| Q8 | -0.014 |

### Summa

| | Mean |
|---|---|

| | |
|---|---|
| Item Means | 1.374 |
| Inter-Item Correlations | 0.206 |

**Item-Total Statis**

| | Scale Mean if Item Deleted |
|---|---|
| Q1 | 8.38 |
| Q2 | 8.67 |
| Q3 | 9.32 |
| Q4 | 9.78 |
| Q5 | 9.93 |
| Q6 | 9.48 |
| Q7 | 10.84 |
| Q8 | 10.53 |

**Scale Statistics**

| Mean | Variance |
|---|---|
| 10.99 | 21.883 |

```
RELIABILITY
  /VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

# Reliability

**Notes**

| | | |
|---|---|---|
| Output Created | | |
| Comments | | |
| Input | Active Dataset | |
| | Filter | |
| | Weight | |
| | Split File | |
| | N of Rows in Working Data File | |
| | Matrix Input | |
| Missing Value Handling | Definition of Missing | |
| | Cases Used | |

| | | |
|---|---|---|
| Syntax | | |
| Resources | Processor Time | |
| | Elapsed Time | |

## Scale: ALL VARIABLES

### Case Processing Summary

| | | |
|---|---|---|
| Cases | Valid | |
| | Excluded[a] | |
| | Total | |

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items |
|---|---|
| 0.677 | 0.675 |

### Item Statistics

| | Mean |
|---|---|
| Q1 | 2.61 |
| Q2 | 2.32 |
| Q3 | 1.67 |
| Q4 | 1.21 |
| Q5 | 1.06 |
| Q6 | 1.51 |
| Q7 | 0.15 |
| Q8 | 0.46 |

### Inte

| | Q1 |
|---|---|
| Q1 | 1.000 |
| Q2 | 0.185 |

| | |
|---|---|
| Q3 | 0.268 |
| Q4 | 0.353 |
| Q5 | 0.251 |
| Q6 | 0.099 |
| Q7 | 0.079 |
| Q8 | -0.014 |

**Summa**

| | Mean |
|---|---|
| Item Means | 1.374 |
| Inter-Item Correlations | 0.206 |

**Item-Total Statis**

| | Scale Mean if Item Deleted |
|---|---|
| Q1 | 8.38 |
| Q2 | 8.67 |
| Q3 | 9.32 |
| Q4 | 9.78 |
| Q5 | 9.93 |
| Q6 | 9.48 |
| Q7 | 10.84 |
| Q8 | 10.53 |

**Scale Statistics**

| Mean | Variance |
|---|---|
| 10.99 | 21.883 |

| | |
|---|---|
| | 16-SEP-2017 14:16:05 |
| | |
| DataSet1 | |
| TEST = 1 (FILTER) | |
| <none> | |
| <none> | |
| | 102 |
| | |
| | |
| User-defined missing values are treated as missing. | |
| | |
| Statistics are based on all cases with valid data for all variables in the procedure. | |
| | |
| RELIABILITY<br>/VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9<br>/SCALE('ALL VARIABLES') ALL<br>/MODEL=ALPHA<br><br>/STATISTICS=DESCRIPTIVE SCALE CORR<br>/SUMMARY=TOTAL MEANS CORR. | |
| | |
| | 00:00:00.00 |
| | 00:00:00.03 |

| | |
|---|---|
| | 16-SEP-2017 14:16:38 |
| | |
| DataSet1 | |
| TEST = 1 (FILTER) | |
| <none> | |
| <none> | |
| | 102 |
| | |
| | |
| User-defined missing values are treated as missing. | |
| | |
| Statistics are based on all cases with valid data for all variables in the procedure. | |
| | |
| RELIABILITY<br>  /VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8<br>  /SCALE('ALL VARIABLES') ALL<br>  /MODEL=ALPHA<br><br>/STATISTICS=DESCRIPTIVE SCALE CORR<br>  /SUMMARY=TOTAL MEANS CORR. | |
| | |
| | 00:00:00.02 |

| |
|---|
| 00:00:00.07 |

| N | % |
|---|---|
| 95 | 93.1 |
| 7 | 6.9 |
| 102 | 100.0 |

| N of Items |
|---|
| 8 |

| Std. Deviation | N |
|---|---|
| 0.719 | 95 |
| 1.094 | 95 |
| 1.267 | 95 |
| 1.081 | 95 |
| 1.319 | 95 |
| 1.304 | 95 |
| 0.461 | 95 |
| 0.885 | 95 |

**r-Item Correlation Matrix**

| Q2 | Q3 | Q4 | Q5 | Q6 | Q7 |
|---|---|---|---|---|---|
| 0.185 | 0.268 | 0.353 | 0.251 | 0.099 | 0.079 |
| 1.000 | 0.290 | 0.348 | 0.318 | 0.193 | 0.054 |
| 0.290 | 1.000 | 0.470 | 0.388 | 0.172 | 0.102 |
| 0.348 | 0.470 | 1.000 | 0.401 | 0.128 | 0.193 |
| 0.318 | 0.388 | 0.401 | 1.000 | 0.210 | 0.282 |
| 0.193 | 0.172 | 0.128 | 0.210 | 1.000 | 0.176 |
| 0.054 | 0.102 | 0.193 | 0.282 | 0.176 | 1.000 |
| 0.177 | 0.193 | 0.220 | 0.075 | 0.035 | 0.118 |

**ary Item Statistics**

| Minimum | Maximum | Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| 0.147 | 2.611 | 2.463 | 17.714 | 0.712 | 8 |
| -0.014 | 0.470 | 0.485 | -32.585 | 0.014 | 8 |

**stics**

| Scale Variance if Item Deleted | Corrected Item-Total Correlation | Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|---|---|
| 19.344 | 0.320 | 0.160 | 0.660 |
| 16.903 | 0.420 | 0.197 | 0.633 |
| 15.282 | 0.504 | 0.298 | 0.608 |
| 15.940 | 0.553 | 0.363 | 0.599 |
| 15.069 | 0.495 | 0.295 | 0.611 |
| 17.508 | 0.245 | 0.085 | 0.685 |
| 20.602 | 0.256 | 0.118 | 0.673 |
| 19.571 | 0.195 | 0.092 | 0.681 |

| Std. Deviation | N of Items |
|---|---|
| 4.678 | 8 |

| | |
|---|---|
| | 16-SEP-2017 14:17:35 |
| | |
| DataSet1 | |
| TEST = 1 (FILTER) | |
| <none> | |
| <none> | |
| | 102 |
| | |
| User-defined missing values are treated as missing. | |
| | |
| Statistics are based on all cases with valid data for all variables in the procedure. | |

```
RELIABILITY
  /VARIABLES=Q1 Q2 Q3 Q4
Q5 Q6 Q7 Q8
  /SCALE('ALL VARIABLES')
ALL
  /MODEL=ALPHA

/STATISTICS=DESCRIPTIVE
SCALE CORR
  /SUMMARY=TOTAL MEANS
CORR.
```

| |
|---|
| 00:00:00.02 |
| 00:00:00.01 |

| N | % |
|---|---|
| 95 | 93.1 |
| 7 | 6.9 |
| 102 | 100.0 |

| N of Items |
|---|
| 8 |

| Std. Deviation | N |
|---|---|
| 0.719 | 95 |
| 1.094 | 95 |
| 1.267 | 95 |
| 1.081 | 95 |
| 1.319 | 95 |
| 1.304 | 95 |
| 0.461 | 95 |
| 0.885 | 95 |

**r-Item Correlation Matrix**

| Q2 | Q3 | Q4 | Q5 | Q6 | Q7 |
|---|---|---|---|---|---|
| 0.185 | 0.268 | 0.353 | 0.251 | 0.099 | 0.079 |
| 1.000 | 0.290 | 0.348 | 0.318 | 0.193 | 0.054 |

| | | | | | |
|---|---|---|---|---|---|
| 0.290 | 1.000 | 0.470 | 0.388 | 0.172 | 0.102 |
| 0.348 | 0.470 | 1.000 | 0.401 | 0.128 | 0.193 |
| 0.318 | 0.388 | 0.401 | 1.000 | 0.210 | 0.282 |
| 0.193 | 0.172 | 0.128 | 0.210 | 1.000 | 0.176 |
| 0.054 | 0.102 | 0.193 | 0.282 | 0.176 | 1.000 |
| 0.177 | 0.193 | 0.220 | 0.075 | 0.035 | 0.118 |

**ary Item Statistics**

| Minimum | Maximum | Range | Maximum / Minimum | Variance | N of Items |
|---|---|---|---|---|---|
| 0.147 | 2.611 | 2.463 | 17.714 | 0.712 | 8 |
| -0.014 | 0.470 | 0.485 | -32.585 | 0.014 | 8 |

**stics**

| Scale Variance if Item Deleted | Corrected Item-Total Correlation | Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|---|---|
| 19.344 | 0.320 | 0.160 | 0.660 |
| 16.903 | 0.420 | 0.197 | 0.633 |
| 15.282 | 0.504 | 0.298 | 0.608 |
| 15.940 | 0.553 | 0.363 | 0.599 |
| 15.069 | 0.495 | 0.295 | 0.611 |
| 17.508 | 0.245 | 0.085 | 0.685 |
| 20.602 | 0.256 | 0.118 | 0.673 |
| 19.571 | 0.195 | 0.092 | 0.681 |

| Std. Deviation | N of Items |
|---|---|
| 4.678 | 8 |

| Q8 |
|---|
| -0.014 |
| 0.177 |
| 0.193 |
| 0.220 |
| 0.075 |
| 0.035 |
| 0.118 |
| 1.000 |

| Q8 |
| --- |
| -0.014 |
| 0.177 |

| |
|---|
| 0.193 |
| 0.220 |
| 0.075 |
| 0.035 |
| 0.118 |
| 1.000 |

## Feedback of SETH learners on their experiences of the SETH Academy

## *Terugvoer van SETH-leerders oor hulle ervarings van die SETH Akademie*

Dear SETH learner / *Beste SETH-leerder* Graad / *Grade* 8 / 9

To improve the Mathematics SETH activities, we request you to answer the following questions regarding your **personal experience** as honestly as possible. The information will be treated confidentially. Please encircle your grade. Thank you for your cooperation.

*Om die Wiskunde SETH-aktiwiteite te verbeter, vra ons jou om die volgende vrae aangaande jou **persoonlike ervarings** so eerlik as moontlik te beantwoord. Die inligting sal vertroulik hanteer word. Omkring asseblief jou graad. Baie dankie vir jou samewerking.*

---

1. How did you experience your involvement in the SETH Academy in general? / *Hoe het jy jou betrokkenheid by die SETH Akademie in die algemeen beleef?*

2. Give your opinion regarding the Mathematics worksheets that you worked with. / *Gee jou mening oor die Wiskunde werkkaarte waarmee jy gewerk het.*

3. How do you think can the worksheets be improved to be more effective in helping you to become a better problem-solver? / *Hoe dink jy kan die werkkaarte verbeter word om jou te help om 'n beter probleemoplosser te word?*

4. What is the **biggest** challenge in your participation in SETH? / *Wat is die **grootste** uitdaging in jou deelname aan SETH?*

## Experience of the Mathematics sessions of the SETH Academy

## *Belewenis van die Wiskundesessies van die SETH Akademie*

You may remain anonymous, I would only like to know in which grade you are.

*Jy mag anoniem bly. Ek wil netgraag weet in watter graad jy is.* **Gr 8 / 9**

1. How do you experience the Mathematics sessions?
   *Hoe beleef jy die Wiskundesessies?*

2. What do you find the most challenging about them?
   *Wat is vir jou die mees uitdagende omtrent hulle?*

3. What type of technology is used during the sessions, if any?
   *Watter tipe tegnologie word tydens die sessies gebruik, indien enige?*

4. What in your opinion, can be done to improve the Mathematics sessions?
   *Wat volgens jou, kan gedoen word om die Wiskundesessies te verbeter?*

5. Which aspects of the Mathematics sessions do you enjoy most?
   *Watter aspekte van die Wiskundesessies geniet jy die meeste?*

_____

_____

_____

_____

6. Which aspects of the Mathematics sessions do you not enjoy at all?
   *Watter aspekte van die Wiskundesessies geniet jy glad nie?*

_____

_____

_____

_____

7. Would you like to have more Mathematics sessions than at present? Motivate your answer.
   *Sou jy meer Wiskundesessies wil hê as op die oomblik? Motiveer jou antwoord.*

_____

_____

_____

_____

8. How do you prepare/study/learn for a Mathematics test or examination?
   *Hoe berei jy voor/studier/leer jy vir 'n Wiskundetoets of -eksamen?*

_____

_____

_____

_____

_____

9. How will you describe Mathematics as a subject?
   *Hoe sal jy Wiskunde as vak beskryf?*

_____

_____

_____

_____

_____

**Thank you for your participation – I appreciate it!**
***Baie dankie vir jou deelname – ek waardeer dit!***

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1. It was okay and by okay I mean it was……. it was whatever. Let me describe it with a emoji : l . On a scale of 1 to 5 I would give it a 3.
2. The mathematics worksheet don't co-ordinate with the maths that we are currently busy with. What I mean is, the papers ask us about work that we haven't done but are going to do later on in the year.
3. I really don't know, I'm just not in the right state of mind to answer that questions right now.
4. Time management. I can't help it but it has been a challenge to stay awake during the sessions. If the lecture is boring or if the class is hot I become sleepy.
5. Practical activities, except for going to the science lab. I don't like going to the lab, I don't ever get tired when we do things practically.
6. The maths and reading sessions. The reading material is super boring and totally not interesting. Its outdated and that really makes it difficult for me to read it enthusiastically. The format of the maths papers is really boring.
7. No, considering the fact that we will be having two sessions and in those sessions, we will just be doing the same things every time we go to SETH, but also when I hear about the plans SETH has for us, I'd want to remain a part of the SETH.
8. Yes, I won't lie but SETH has definitely changed the way I see maths. It has taught to have a positive outlook on maths.

---

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1. It was fun to learn about new topics but there were times, when doing maths that the lessons were boring and monotonous.
2. Some problems were fun and challenging but more than 80%of the work was boring and monotonous, because it wasn't challenging and it was too long.
3. More challenging questions that's short and fast. With more diversity.
4. The lessons where we had to read and give presentations. It's not very pleasant for me.
5. When we went to the Vredefort Dome or the space expedition. It's always something new and never the same.
6. Too monotonous and long math problems that wasn't challenging. I want to struggle more.
7. If it stays the same, No. The lessons are very long and time consuming. If the lessons are shorter and has more diversity then, yes.
8. No, not really. Everything is the same. It's just time consuming on days that I have sports, and that's important to me.

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93

1. It was a fun and informative program where all the learners will benefit from for the future.
2. It is nice and challenging that improves our math and problem solving skills.
3. There may be more familiar examples and also an example to demonstrate to us how to apply the knowledge.
4. The mathematics worksheets and the sessions with difficult topics. But with practice it will get better.
5. Al the activities we've done this year because it gave us a diverse view.
6. None, SETH is fun.
7. Yes, it gives us a broad view of life. It's also informative and fun.
8. Yes, many SETH activities that we do only gets discussed much later in school.

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94

1. It was fine and interesting.
2. It was challenging and some were more difficult than others.
3. Some of the questions could be asked better. One worksheet must consist of a more specific question.
4. Some of the math worksheets.
5. The experiment, it's nice to see how things work and react.
6. Some of the life skills and math worksheets.
7. Yes, it is fun but I think there could be more experiments and excursions.
8. Some of my subjects marks went up and others stayed the same. Mathematics did go up a little bit.

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95

1. It was very nice.
2. It can give us practice but sometimes it is boring and unnecessary.
3. More algebra questions.
4. To stay awake it boring and warm classes.
5. Excursions and practical sessions. It gives more insight to the practical world and that is nice.
6. Mathematics worksheets. Some of the questions is not on our level.
7. Yes, it gives me the advantage over others and I'm learning a lot.
8. No, my marks stayed the same.

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96

1. I mostly enjoyed it. Some of the sessions were a bit boring but in general it was enlightening.
2. In the beginning, it wasn't nice. But I feel it helped me to solve problems and tackle the new ones. Some worksheets were a bit difficult but it was fun to solve them. Sometimes it was upsetting to me to have solved the problem but still not understand why.
3. The students that's helping us must have a better idea of what we're doing in school to be able to help us better. If a person really struggle with a problem they must help the learners and give the steps, not just the answers. Students must also be able to explain how the problem must be solved.
4. To stay awake and not be bored in some of the lessons. To keep on trying if I don't get a math problem right.
5. If we go on excursions or when we do practical activities. I like the excursions because I like to see how things are done in the real life. I like the practical's where we can do and see things for ourselves.
6. Math worksheets although it helps a lot its boring to spent the whole Monday afternoon listening how to do math.
7. Yes, i enjoyed it a lot and I've learned so many new things that I wouldn't have learned otherwise. It also helped to make links between what we do in SETH and what we do in school.
8. Yes, I discovered on the worksheets stuff that I struggled with and had not known at the time. When we started with the work at school I was very relaxed because I had an idea of how it works.

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97

1. It was nice in general.
2. It was a good idea to give worksheets to the SETH learners to complete.
3. I believe there  should be given more time.
4. When we worked with excel on the computes.
5. The flight simulation I enjoy it when we go out and do things with our hands.
6. Maths, there wasn't enough time given for it to be fun.
7. Yes, it teaches you how the world works outside of school.
8. No, my math marks were bad and now they have went down.

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98

1. I have learned a lot of new skills and I can say I know a lot more that what I did when the year started and I know how to solve new problems.
2. Just some of the math problems were difficult and thus the difficult equations change the way I thought of a problem.
3. Of course, to make it more difficult or the teacher can provide them with an example about the same topic but just an easier one than what the SETH learners will do afterward.
4. The chemical part. How some particles react chemically when mixed in with other particles that a person could not predict.
5. The business activity where you could play games and run your own business.
6. Where we learned about where words come from and how it developed in a certain language class.
7. Yes, because I like learning new thing that I don't already know and it broadens your knowledge.
8. Yes, my math marks did improve because of the extra math I do at SETH.

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99

1. I found my involvement at the SETH academy very interesting and enjoyable. The SETH academy is a very nice place for me and I've learned a lot of new skills.
2. My meaning about the math worksheets is as follow: although sometimes it is very hard and challenging, I still enjoyed it, it helped me to understand my school math better.
3. I think the questions might just be more detailed because sometimes I do not understand the question and I don't exactly know how to answer. And answers should be discussed more thoroughly.
4. The biggest challenge was the math worksheets that we did throughout the year and also other sessions where we learned things that we almost knew nothing about. New things that we learn.
5. I liked the session where we talked about the frogs even though I'm not a nature person, this session attracted my attention. And I couldn't stop talking about it.
6. I personally did not like the session on city planning, I think it's because I don't really have an interest in geography, although we learned new things.
7. Yes, because since I started at SETH I completely started thinking in a different way and I thought about things differently. It helps me in my school subjects and also, we know things that other students do not know.
8. Yes, I only joined SETH this year and it helped me a lot. The math worksheets have taught me to start looking at math on a different level. Although my math points fell because of math lessons and how it was presented. But I believe I'll get on my feet again.

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910

1. Fun. Because you learn new and interesting things that can help me in the future.
2. It was difficult but it taught me how to solve math problems.
3. Nothing it is perfect the way it is.
4. The math worksheets and not to fall asleep if we do math.
5. The excursions, because it is fun to go to a place and to learn something about it.
6. Math worksheets.
7. I will remain in SETH because it teaches me new skills.
8. Yes, because it taught me how to solve math problems.

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911

1. It was a nice academic involvement. SETH is/was very educational and it taught me to think outside the box in certain situations.
2. Some of the questions are asked in a complex way then I don't always know what to do.
3. Balance the worksheets. Give half of the work we have done already and the other half as new work.
4. Sometimes when there was a session that didn't interest me I had to force myself to listen and to give my attention.
5. The practical activities and the Vredefort-Dome. We can use the knowledge that we've obtained earlier in the practical world.
6. The Lego activity. It felt like I won't ever use this in my life again.
7. I would like to remain in SETH. I think that the program teaches us more that we realize. We learn new skills, and how to use the skills in the outside world.
8. I think so, it helped me to understand it better, and it definitely had an influence on my performance.

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912

1. It has days when it is boring but most of the time it really helps and improves my marks.
2. It's difficult but it makes you think and very helpful for when we have to do that math at school.
3. Maybe have someone lecture us before we start with the worksheets.
4. When we do group work, I like to have a fair say but there's always someone who tries to speak over or for me.
5. I enjoyed it when we get up and actually go do something because sitting in a room the whole time can get boring.
6. Maths worksheets, because it gets very frustrating sometimes when I can't get the answer.
7. Yes, because it'll help me in the long run.
8. Yes, it motivated me to do good at school and in my personal life.

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913

1. The SETH academy is good for me, as it exposes you to more fields and better things in the world. What amazes me about SETH is that it does not focus on one thing meaning science. It accommodates everybody's ability or we do have a bit of commerce which is fair enough. But in the end SETH have influenced my life in a good way ☺.
2. Regarding the math worksheets, I personally think that they are difficult, but at the end we seem to get the answers correct with assistance from the students. These worksheets 'wars us up' for exam and school. But sometimes these worksheets are way too long.
3. Well first of all they should be made shorter, so that its possible for us to finish them. Because we often get a math worksheet over ten pages which we most of the time don't even finish, which on the other hand it's also a waste of paper. We should mark the whole worksheet before we move on to another worksheet so that's everybody knows where they're made a mistake, because some learners are too shy to ask the students for help.
4. When we get to work in a group, because we not very used to each other, that was at the beginning of the year, but I don't know how but we learned to interact with each other with time.
5. When we go somewhere where we see projects of people what they are doing to make the world a better place, like when we went to Ikageng. It motivates and inspires me to do something productive to benefit my brother and others all over the world.
6. Reading lesson. Because my eyes just seem to close themselves when I start reading.
7. Yes! Exposure! SETH exposes us to new things and challenges we face in our everyday life and builds us, as we are the future of this world.
8. Yes, I don't know how but then maths is much more clear and we of course learn more things as SETH is also a bonus.

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914

1. My journey with SETH-academy has been extraordinary although there are times where I feel as though the lessons are unnecessary and not beneficial but overall I have learned quite a lot of knowledge from my involvement with SETH.
2. The mathematics worksheet we did this year were very difficult and so I feel that they were not really helping us because doing something you don't understand without some explaining or tutoring prior to the attempt of working through it made the worksheet mission impossible.
3. We could have an introduction of the questions being asked before we begin answer/solving the problems explaining a bit more about the worksheets and a less complex way of asking questions would enable us to understand better of what is been asked.
4. Paying my full attention in most science based lesson has been a struggle for me, because I am more of a practical and accountancy learner.
5. The business and finance part (economics), this is because I enjoy working alone and solving problems that do exist already.
6. The English reading activity is not enjoyable because often I read the same extract more than once, or the passages are just not what I'm interested in.
7. Yes, I do. SETH has provided a good platform for me where I can broaden my knowledge and also exercise my strengths, it has improved my abilities but it would be good if they focused on each learner's needs as we have now chosen our subjects leading to our career fields.
8. SETH has opened and widen the way I approach problems in mathematics and therefor my math marks have improved and my science marks but regarding the other subjects it has not really made a change.

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915

1. SETH academy is full of opportunities that other people dot have or get! SETH is a really nice program even though sometimes I find it tiring and boring, but it's really nice.
2. The mathematics worksheet were really a challenge, even though I find then interesting and sometimes boring, I believe that they are somehow going to help us in the future.
3. I think they are effective enough, and I'm slowly but surely becoming a better problem-solver.
4. I never really thought of this question, but my biggest challenge is SETH is the people (learners) that are in SETH.

5. I enjoy doing practical activities and having excursions. I also enjoy lively theoretical activities, where the tutor is lively and happy.
6. I don't like doing maths worksheets after having a long 41 minutes' math period. But I believed that those worksheets are really going to help us.
7. I would prefer to remain part of SETH, because of the opportunities it gives and the high standard knowledge that other learners don't get.
8. Yes, I can solve difficult problems and I enjoy solving them. SETH really has an influence in my life and my academic performance. I now know a lot of stuff I didn't know before. Thank you very much!!! I really appreciate everything SETH does for us.

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916

1. I loved my experience in the SETH academy for it has helped me in so many ways it's amazing. SETH is like a great big adventure to me.
2. They are challenging and sometimes they are too hard for our level, I know it helps us and it does, but sometimes it's too much for me, and then I struggle for a while.
3. They can describe or explain better, what they would like us to do and there shouldn't be as many questions on one paper.
4. My ability to understand the maths sometimes, and to speak up in a group discussion, because it rarely turns into a group discussion about the topic.
5. I enjoyed the science topics that we do the most, because it makes me crave for more knowledge about the topic. Or the business game, that was super fun.
6. The math, because I get frustrated easily and try again and again but never got it on my own.
7. I would love to stay part of SETH, it has given me the chance to see things in a better light. And I love learning about things that are interesting and exciting.
8. Yes, it has helped me do better in math tests and in general it has helped me grow to be a better person. Thank you, for a wonderful year.

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917

1. I like most of the practical's that we do at SETH and although I am not someone that likes computer programming or engineering SETH has made me look at those particular things in a different perspective and made me aware of all the different career fields.
2. I feel that some of the questions help us revise what we learn at school and some questions are way too difficult and might make us scared for maths but they also force us to come up with solutions for maths.
3. I think that our mathematics problems should relate to something learners of "our" standard can understand and that they should correlate with the work we do in school, but they must be a bit harder to give us a challenge.
4. Sometimes after school we have a lot of homework and a test to study for but the session cannot be postponed because the arrangements have already been made.
5. I enjoyed dissecting (cutting/opening up) the frog because I am very interested in biology and I like learning how living things function and finding solutions to make it better.
6. Solid works, because I do not understand it even though they have explained it so many times.
7. Yes, because SETH opens doors with many opportunities and it educates you about new things and Fedinand Postma is a good school and also it provides me with a bursary.
8. Yes, the mathematics worksheet, some questions acted as revision. Some sessions lectures correlated with the work we did in class and helped improve.

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918

1. At first I hated it I did not see the point of SETH and felt like I was forced to be apart because of my parent, but after some time I have gained some knowledge about SETH and have realised that is beneficial reasonable and that I need it. I 25% hate SETH but 75% like it now.
2. I feel the math worksheets are too difficult for grade 9 it is also very difficult to have so much math at school only too have more in our afternoons which is probably the reason for my attitude toward the math worksheets. They are also too technical and one must concentrate to solve them.

3. I honestly do not think they are helping me become a better problem solver because my math marks are not improving, but maybe in the future they can be a great help to my math.
4. My biggest challenge is trying too actually be involved in the session especially if the session is so long. Trying to be interested and take part in the session can sometimes be quite a challenge.
5. The physics and membranes sessions was the best session of my grade 8 and 9 SETH year it was interesting, mind blowing and made you want to think why or how.
6. The mathematic session are my least favourite because they are long and tiring also because I also have math problems at school so when I have more to do at SETH it brings down my self-esteem.
7. I would like to remain of SETH because I strongly believe that no matter how boring or tiring it is at the end of the day it was worth it and someday I will need it.
8. No, it did not have any influence in my school performance because the SETH and school work are two completely different things in my eyes.

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919

1. It was really interesting this year and we had a lot of fun excursions and abilities. The group work and practical's were the best part of the SETH sessions.
2. They were difficult and we didn't understand some of the things as we had never done them before and the students didn't help much as they all had their own perspective on a sum.
3. By being made for our standard and age group.
4. The math worksheets. The life skills was also a challenge as I didn't connect with the prof giving the lesson. He didn't understand my/our life's perspectives.
5. The business activities. They are exciting and challenge us as we are playing the business games and they keep us interested.
6. The math worksheets and reading, too many math sums that are difficult and the reading questions are a lot and the books they give aren't interesting.
7. Remain in SETH, because I believe that it's a great opportunity that will benefit us in the future.
8. No, the work we do at school differs from the work we do at SETH.

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920

1. I feel that the SETH academy has helped me grow as a person. I learned new things and new ways to handle certain situations. Though I really was not enthusiastic about SETH, I kind of enjoy it.
2. I feel the math worksheets were challenging so they taught me how to think critically when solving math problems. They also taught me not to strive to finding the answer of the sum, but to understand the sum and how the answer was found.
3. The worksheets do not need to be improved, they are fine.
4. Having to attend a 3-hour class directly after school, on a Monday. Normally after school I'm exhausted so SETH on a Monday kind of felt like a drag.
5. I enjoy activities that involve practical works because I was already tried when I go to SETH so sitting in a class for almost 3 hours after school normally put me to sleep. So, I like practical work because I can do something that will keep me awake.
6. Activities that involve presentations. I am very shy and lazy so I don't like standing in front of people and I don't like setting up a presentation.
7. I prefer to remain in SETH because I feel in the future it is going to open a lot of doors for me and bring new opportunities to the table.
8. No, because my marks pretty much remain the same throughout the year. Even in grade 8.

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921

1. Well I must say grade 9 SETH was more enjoyable than the grade 8 one. It really helped me understand a lot of stuff and I learned a lot of stuff this at SETH than I ever did.
2. Generally, I actually liked them, because they kind of did help me with my school math. But they were long so we never really had time to finish them. I think you should break them down. And give the kids to do it during the week or give it to their teachers on a Friday or something.
3. If they are broken down into a every week thing and not just a once in a month thing so that they don't take so long.

4. Being motivated to it, and engage with the people. Sometimes to talk to our coordinators, about our problems and reasons.
5. The Physics: Chemistry session. I enjoyed it because it made me understand everything that is happening in the world and why things happen, plus the professor was on point he made enjoyable. On and the session when we did communicating but the one with mat prof was also nice and Comair.
6. This one math and reading sessions where all the math worksheets were difficult. I struggled to much, plus I was tired.
7. Yes, because I feel like it will broaden my horizons, and help me in the future.
8. On my mathematics, yes, but on the other subjects it didn't really make that big of a difference.

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922

1. I really feel that the experiences that I've had at SETH so far are experiences which opens my eyes to a bigger picture in life, it shows me that there are opportunities out there, but sometimes because of lack of communication of the lecturer, I get bored and sleepy during the lessons.
2. The maths worksheet are really challenging and really push you to your limit and it is really nice to think on a different spectrum from the maths we do at school but sometimes the questions are so hard that is sometimes seems impossible to solve it and the student teachers don't explain properly therefor you end up not even understanding the work.
3. The questions should be asked clearly and show you exactly what they want and use simple, plain English and not long big word we don't understand, and the student teachers should really be able to explain thoroughly so that you understand otherwise it would be pointless to even do the math worksheet because you don't understand and you don't learn anything from it.
4. After school where you don't have enough time to eat your lunch, but then you are expected to concentrate for the next 4 hours and sometimes the lectures are so down and don't show enthusiasm, so you end up sleeping.
5. The business plans, because it is more practical and fun.
6. Sitting down in one class and listening to the lecture speaking.
7. I would because even though there are some lessons that are not nice I feel like SETH does help in life and it also prepares you for the future.
8. No, not really but I look at life in a new different way.

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923

1. I have become more educated in different careers and the benefits of having a certain job I have also become more open minded. Your techniques have improved my lifestyle.
2. They are interesting and challenging and motivate me into working harder and trying my best to answer very question properly.
3. If they were to handle basics first before making it difficult so we can clearly understand what the solution would be e.g. Have a simple volume question then a difficult one so we clearly understand what to do.
4. Staying awake and interested in some of the sessions which I found uninteresting and unnecessary but do understand that you have to cater to everybody's interests.
5. The business session where we got to play games and so forth because it taught me more on the business world and how up and down things can become. I also liked the session on energy it was very interesting.
6. The one on rock and meteors or meteorites. It was very uninteresting and boring.
7. I would stay because even though SETH spends most of my afternoon I learn a lot of new things and become exposed to new careers and learn how to become a better person and more open minded.
8. Yes, my math marks have improved and I have developed easier and more understandable ways to solve problems. Regarding my performance in general I haven't noticed a change because the sessions don't target our current curriculums but future curriculum so it is beneficial to our future but not out present.

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924

1. SETH, this year was really amazing, I enjoyed most of the sessions and the lectures were explaining properly and I feel like I've learnt a lot of things this and have discovered more interests about careers.

2. I feel like the maths worksheets are sometimes too hard for us to solve because we tend to be stuck with 1 question for a lot of minutes. I feel like they should've have made the worksheets less difficult from grade 8 and then increase the difficulty as time goes on, then we would've gained a lot of experience.
3. Make the worksheets less difficult so we can get used to the problem-solving and then making it more difficult as time goes on. So, that we can at least recap from the previous 'easy' worksheet and get some ideas off how to solve the problems.
4. Being able to concentrate especially when it's too hot because most of the time after school we tend to be very tired.
5. Any activity that is practical because I like doing practical things, they keep me focused and energised. Also, activities like science because it is extraordinary and really interesting.
6. Activities like life skills because we do them at school. I prefer something different from what we know, new concepts and other things that we don't know about. Life skills is things that we know already even though not in depth but it's not enjoyable.
7. Yes, because it really is a great opportunity that can help us to thrive and it teaches us about other things that we aren't fond of. But I feel like we should start focusing on careers that'll really insist us in future.
8. No, I didn't because the questions are kind of difficult and sometimes you really don't fully understand when they explain them too but the other reason is because I didn't practice what we have done so that's another big problem.

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925

1. My interest in SETH has made me realise a lot of things about the real world than I knew first. I learnt hearing.
2. Honestly, I am not a fan of mathematics worksheet, I feel that they are "filler" sessions where SETH couldn't find lectures for us. They are fruitful in a sense, but at the same time one of the downsides of SETH.
3. Instead of having students help us individually, I'd much rather have someone explain it accurately at the front. This way we are involved in……..(kort n woord) sessions too.
4. Staying awake.
5. The excursions, we travel on inspirational and knowledge filled trips.
6. Maths worksheets, difficulty.
7. I would, I learn a lot.
8. Not really, but I feel that if I leave SETH I will have more time on my hands, this way I will be able to study.

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926

1. It has been a great SETH year especially now that we have one session a week it saves us time and makes the lessons more enjoyable, because we complete everything at once.
2. I don't understand why we never complete those worksheets, every week is a new challenge which is not nice because some personalities apart when they have to start a new task without completing the old one first (like mine).
3. Every worksheet can have its own topic e.g. algebra WS1; whole numbers WS2 etc. I will become less confusing and easier to complete.
4. Staying awake during long lectures that involve no practical work.
5. Group activities, practical work and excursions because it suits my personality type and I learn easier that way.
6. Session that do not involve any physical activities or group discussions because I battel to concentrate on a lecture for 3 hours and not fall asleep.
7. Yes, I feel SETH will open a lot of possibilities and give me an advantage, when applies for universities etc. because I would have experience in other topics, that learners in my calliba don't handle.
8. I don't think so because those worksheets are about topics we don't even handle at school and we never complete them anyways.

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927

1. Some sessions were great sessions, but some sessions were boring. I'm not complaining or anything I know that we are all different and have different gifts and interest, SETH academy is a wonderful programme because it helps us see what we like and what we don't like, so we can develop ourselves, the leaders of tomorrow.
2. They are very challenging, I enjoy challenges, they are difficult from school papers. They are the best math worksheets I've ever done because you see where math is applicable in real life, they don't just ask sums and formulas.
3. They should be more challenging. They should ask problems that involve maths we real life (reality). They should actually make us see the necessity of mathematics. The reason why most learners find maths boring and unnecessary is because they believe they are not going to use the principles and concepts that they learn at school in their lives and future careers. You should ask problems of math involving every career, because today's kids are not ignorant, they are very curious and always want to know why. That is what is going to help us build a better future for our country.
4. SETH doesn't really challenge me, my biggest challenge is that I have to try to stay awake after school after a very busy day and to be taught things I already know, because I read a lot.
5. I enjoy all the practical work like the dissecting of the frog and the excursions.
6. The maths sessions, because they don't always show the necessity of math in real life.
7. I would like to remain part of SETH if it improves.
8. Yes, because it taught me to look at the bigger picture and learn to solve problems from different angels and perspectives.

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928

1. SETH was far better than last year and I am very thankful for that the sessions this year were really insightful I did learn something to be honest.
2. I didn't really see them making a difference for me at school because it doesn't really relate to the work we do in class.
3. I think we should get a SETH textbook with worked examples and activities in them which we do which ever SETH sessions are given to them.
4. Trying to take the knowledge and implement it is difficult I enjoy SETH but the things we learn aren't really benefitting us now at this age so it is difficult to take the knowledge and use it.
5. The session at membranes at the Pukke it was relating to the work we were doing in class at school and it gave me a better understanding of it.
6. The sessions at the beginning of the year were boring but towards the second term things got enjoyable.
7. I would prefer to part of SETH I can see it helping me in the future, but I have a fear that I will not get a bursary next year. I am not really strong academically and my parents can't afford SETH or school or the hostile and SETH and the Pukke has helped me a lot and I am thankful.
8. Not so much on my mathematical performance, but it has had an effect on my performance in general. Thank you, SETH, ☺

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81

1. It was good and interesting as well interesting.
2. They have shown me new workout methods.
3. Examples and guidelines should be added at the beginning.
4. Solving math equations.
5. Music and maths. It shows how almost everything has math in it.
6. Maths, because it's really hard for me to understand the questions.
7. Yes, so I can learn more and eventually do a whole better in maths.
8. Is has shown/taught me different perspective in which you could do maths. Maths marks became better honesty.

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82

1. I enjoy being part of the SETH-Academy for most of the time and sometimes it was just okay.
2. I find them very difficult but get excited when I get the answer right.
3. I don't have any suggestions.
4. The worksheet, I don't like struggling.
5. Doing practical things, I feel as though it is enlightening.
6. The worksheet, it is difficult.
7. Yes, it exposes us to more realities.
8. Yes, I improved my marks.

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83

1. It was a great experience it exposed us to a lot of different categories of carers. They helped us with a lot of stuff.
2. It's an excellent method of teaching us how to solve maths until we understand what is going on.
3. It must maybe give us examples of what we are working with to give us a head start.
4. Listening to people like (lectures).
5. The practical's. When we go out.
6. The reading sessions. Because I don't like reading.
7. I would like to remain. Because it teaches me other things that I'm not exposed to at a level of grade 8. It also helps me with my fees at school. Which me and my parents appreciate a lot.
8. Yes, it teaches me methods of which I did not know about before. Preparing me for the bigger stuff.

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84

1. It was interesting.
2. They were too hard.
3. They should match up more to our level of problem-solving.
4. Coping with the maths.
5. I enjoy going to the university, I learn a lot from what we do there.
6. Maths, it's too hard.
7. No, I realized it's not something I enjoy a lot.
8. Yes, but a little bit.

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85

1. SETH was very interesting for me despite the times I found some sessions to be boring and frustrating. I really learned so much and acquired so many skills. It was an awesome experience and I'm glad to have joined the SETH program as most of the sessions I attended were eye opening.
2. The mathematics worksheet were a hassle for me. Most of the questions in these worksheets always either left me perplexed and/or frustrated. It was really a struggle for me to comprehend and solve the problems but after a while, I got used to finishing the questions on the first page without much of a hassle.
3. Firstly, the level of difficulty could be reduced or the questions should be asked in a less complex manner. Secondly, the questions should seize to be over ±10-13 questions.

4. I struggle to sometimes fully grasp or understand the concept of the things we learn at the sessions and I always feel hesitant to ask questions as I'm always too timid or scared to do so.
5. I enjoy going to the Pukke or anywhere else for that matter, apart from school as I always get to learn something new and interesting and I'm more active e.g. Comair, Gateway to space, Nutrition etc.
6. Doing the mathematics worksheet as they're always confusing and/or frustrating me, but I do like solving problems, just not when the questions are too long and confusing.
7. I would still like to be part of SETH because I really learned a lot from all the sessions and acquired new skills in which I hope I'll use in the future.
8. Not really on my mathematics but on my performance in general, yes. I sometimes used the skills and information I learned from the SETH sessions in the classroom and it sometimes helped improve my marks.

---

86

1. I really think SETH is a life changing and a once in a lifetime opportunity. My in SETH is quite great and I'm grateful and glad to be involved in SETH.
2. I honestly think they help me to understand mathematics more, I learn new techniques and rules to apply which I also use at school.
3. They should be difficult but not to a point where you just want to give up and not concentrate anymore. But besides that, they are already good.
4. At this point I don't think I have a big challenge so I can't pin point my bigger challenge in my participation in SETH.
5. Mathematics because I learn more information of which I didn't know and I just have never thought I'm not smart enough for maths like before.
6. I love all the activities we do so I really can't say there is one which I enjoy the least.
7. Definitely. I'd love to remain a part of SETH mainly because it contributes to a lot in my daily life.
8. Yes, I think it does because every time my mark go a bit higher and I learn to think on my own.

---

87

1. I really loved and enjoyed myself.
2. I really hated it. My reason being, that it made me so frustrated and made me feel stupid.
3. Not that I can think of.
4. The maths worksheet.
5. The Comair trip. I loved it so much. I especially enjoyed the simulator.
6. Maths worksheets. Reason at question 2.
7. Yes, I would love to continue this program for the reason that I would like to understand the how's, the ways of the world.
8. Yes, it did. Nowadays when I write a maths paper, I feel anxious because I fail at SETH maths.

---

88

1. In general, it was okay, but I had my moments when I was bored and tired and felt like sleeping. But there were other times where I enjoyed it and had fun.
2. Although they are hard and difficult to understand, I honestly feel like they have positive impact on us.
3. No, they are okay.
4. The reading!!
5. Practical ones where we walk around and still learn something, because the more energised the activity the better.
6. The ones where we have to sit in a room 90% of the time and do nothing but always listen.
7. Yes, because it is something unique.
8. No, my performance in school has always been the same.

---

89

1. It is very fun to be in the SETH academy. I enjoy it.
2. I don't really like them. I never get all the answers correct. I always struggle.

3. Just make them a bit more easier or give us hints on to solve the problem.
4. That my bursary will be taken since my marks were dropping so terribly this year. Then my mom has to repay the money and at the moment my mom is unemployed.
5. Practical activities (like that one with the music and stuff, that we had at Pukke), because practical stuff interest me most.
6. When we have to sit still and listen to the professors speak the whole time with doing anything practical.
7. I would like to remain part of SETH, because some sessions are nice and I really learn from them.
8. No, my marks dropped anyways.

---

810

1. It was okay. At the beginning of the year I didn't really like it, but it got better as the year went on.
2. They were fun! Trying to work out difficult problems and then figuring out what you did wrong helped me to learn a lot.
3. More words sums could be added.
4. Being able to plan my activities so that I have enough time to do homework/study for an upcoming exam.
5. Practical and maths activities.
6. Reading, because the topics we chose were totally different to the actual reading piece that we got. I really love reading but not the way we had to.
7. Maybe, because I didn't enjoy the start of the year, I even felt like leaving but it got better in the 3rd and 4th term.
8. Yes, it changed the way I solved problems and improved my way of thinking.

---

811

1. I found interesting when we went to the engineering department to have a session because I knew it would be something fun.
2. I found it frustrating when I kept on getting a question wrong because I don't know how to solve it.
3. I think a little explaining would help so I know where to start solving the question.
4. When the Prof, Dr. or co-ordinate only speaks Afrikaans because sometimes I don't understand I am not confident enough to rise my hand.
5. I enjoy the activities that require us to go somewhere and move around or build things. E.g. Nutrition, Building a flashlight.
6. The ones in the classroom because most of the time they speak Afrikaans and I get the info later and I get bored, tired and sleepy.
7. Yes, even though I don't enjoy everything, every time. It exposes me to a lot. I got to see, experience and learn things I wouldn't have known if I wasn't in SETH.
8. Yes, my marks improved because I learnt to not give up until I get the answer right which has helped in Maths to practise.

---

812

1. It was fun and I really enjoy it.
2. I enjoyed solving them, because they were hard, and it helped me like math more.
3. I personally think that a worksheet is a worksheet, you can't make it better or worse.
4. Reaching the academic limit, and I am getting closer, and I'm trying very hard, and its working in my eyes.
5. The Comair visit, we could understand more about planes, and we touched planes, and we flew them.
6. The visit at Potch plastic it was cool to know how they do it, but it wasn't very interesting.
7. I really would like to stay in SETH, its awesomely fun.
8. Yes, it made me enjoy maths more.

---

813

1. It has been a really enjoyable experience, we always inter-act with each other and the activities and every session we always learn something new and exciting.

2. The worksheets honestly are a little challenging, however they make us think and find new approaches to solving a problem, I love it when I find a solution and I understand how I did, and the worksheets make it all possible.
3. When a child doesn't understand a question, you could add a new hint feature, type under the box/question a hint that will guide/help the child to approach the question, however don't make it easier as we need to challenge ourselves.
4. Other than mathematics worksheets which challenge us, (yes) I don't really have a big challenge, I find SETH enjoyable.
5. Our practical sessions, when we move around and build things, we learn a lot and its buckets of fun! At these lessons, we learn and have fun (e.g. river walking, building flashlights)
6. The Scholastic reading, don't get me wrong, I love reading books ect., but I feel the topics we get are too bland and not very interesting.
7. Yes, I would, I love SETH, we learn a lot and have fun. We get grand opportunities other student dream off, and for that I will always be grateful.
8. Yes, it did, SETH gave me a new approach/outlook on matters in life, not only did it improve my marks, it changed me, Thanks SETH, You rock!

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814

1. I enjoyed some sessions because I had an interest in what was going on.
2. It was challenging and I always left with a massive headache.
3. Yes. They can be more specific when asking questions.
4. The maths worksheet.
5. I think the maths, it's always challenging but I enjoy it (I don't know why).
6. Reading on the computers. 1) the topics never match what I'm reading. 2) after maths I have a headache so the computer screens make it worse.
7. I'd prefer to remain part of SETH because I believe it will help me in the long run.
8. Yes, I developed a more "mature" way of thinking when it comes to maths.

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815

1. Question left unanswered
2. They were quite challenging but nothing really strange.
3. Before we start with an worksheet we can be briefed about what we're about to do for the day. Be asked questions if we don't know a certain concept.
4. Keeping SETH'S name heled up high because I haven't really adjusted to way things are done at school.
5. Anything practical. Because I prefer applying theory than actually learning.
6. Maths and reading. I hate struggling which always seems to happen during maths lessons, here I don't really enjoy it.
7. To remain part of it. Ever since I joined SETH, I have learnt backgrounds of different types of people and learnt new places.
8. Not as such. I believe though that if I can cooperate fully in SETH, it might have a positive influence after all.

---

816

1. This year I earned a lot with the SETH academy. There was so much we did and enjoyed 99.9% of it. SETH was an opportunity I got and I believed I used it to my advantage.
2. The mathematics worksheet was a bit difficult. We learned to solve hard problems even though we struggled. Personally, I think it was great because it taught me not to give up easily.
3. I couldn't understand a few of the questions that were asked therefor could not solve the problem efficiently. If it could be improved in this regard, I will be more than thankful.
4. My biggest challenge was definitely the solving of our very difficult math problems and also interacting with other people. Being an introvert prevented me from working, laughing and communication with others.
5. I enjoy it when we get to learn more about different career choices and sometimes get to do it physically. Working with your hands is the best and funnest way to learn.

6. I am not a good listener so basically, I do not enjoy sessions where I will have to sit on the same spot and listen for hours.
7. Yes, I prefer to remain in SETH. Never in my whole life have I experienced a great opportunity to get a taste of different career choices and all. SETH offers that and so much more.
8. I find that I can solve mathematic problems better than before. And sometimes we work on solving problems that we will experience later in our grade, making us be ahead of our class mates.

---

817

1. It was very exciting for me and I embarked on many new challenges. I learned more about how things work and what you can do with it.
2. The worksheets were very difficult but it taught me endurance when it comes to solving problems, but overall it was very difficult for me.
3. Maybe give shorter questions, and provide some more algebra instead of word problems.
4. To be able to think critically as I work and to be able to help others to do something right.
5. Our agricultural, insects and water sessions as well as the business game that we had. I liked it because it was more interactive sessions.
6. Reading sessions because after math a person is exhausted and then you have to sit and read that makes me tired.
7. I would prefer to stay with SETH because I got exposed to so many things and discovered new methods of doing things that has helped me a lot in natural science(NS).
8. Yes, my math has increased little by little but SETH helped me a lot to increase my natural science.

---

818

1. It was great and I learned many new things. The excursions were definitely my favourite.
2. It was difficult! At the beginning of the year it seemed impossible, but as the year progressed it became feasible for me.
3. I think it's right as it is, because it challenges you brain to think further to solve problems.
4. Definitely mathematics!
5. The excursions, we saw new things and met new people.
6. The maths made me dispirited but it got better throughout the year.
7. Yes, it taught me many new things and made me grow as a person.
8. Yes, it taught me that if I press on I will get it right. And it improved my endurance that helps me with my school work

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819

1. This was a good year and I enjoyed it very much.
2. It is very difficult but it helped me to understand my school maths easier.
3. It can be printed larger so we can read the questions better.
4. Definitely the maths.
5. The business study, we saw how it is to own a real business.
6. The reading, the reading materials are confusing and takes a lot of time to complete.
7. Yes, we learned many new skills that we will need later in life.
8. My math performance stayed the same but I know I can do better if I work harder.

---

820

1. Really fun, most of the time, sometimes I don’t understand what is going on during a lesson.
2. Boring, difficult, impossible many of the work we have never done before.
3. It must stay hard but, just of the work we have done or be busy doing.
4. The flashlight, wind generator.
5. Mooiriver, catching incest’s and my favourite Comair, because you get to be active and not just sitting around.
6. The space expedition, the people explain everything were wrong boring and didn’t make sense.
7. Yes, I enjoy it very much and would like to learn more about everything.
8. Yes, it helped me look at problems from more than one angle.

---

821

1. It was great and I learned a lot.
2. It was very challenging and quite difficult.
3. I think it's hard enough and it helps a lot.
4. The mathematics.
5. The practical's especially the medical studies, because it is very interesting to learn about it.
6. I enjoyed everything.
7. Yes, you learn a lot.
8. Yes, it helped a lot with my problem solving in mathematics.

---

822

1. It was quite nice I learned many new things and got things right I never thought I would.
2. They were hard, but it was nice when you get one of the equations right.
3. I don't think it needs improvement it's already so challenging.
4. The mathematics worksheets ensure your brain to fire up because it is very challenging.
5. To go to Comair, because I'm thinking about becoming a pilot so it was cool to be able to fly a plane.
6. The history of mathematics because I never really use those techniques so it did not mean anything to me.
7. Not really, I would rather focus more on my sport and then I have more time to do homework.
8. Yes, I think so I have gotten very difficult math problems right and it helped with technology.

---

823

1. It was very enjoyable and educational.
2. It's a very good idea and test our knowledge of mathematics.
3. I think it's fine as it is.
4. The mathematics.
5. Mathematics and reading, because I'm crazy about mathematics and reading.
6. Do not have one.
7. Yes, it provides wonderful opportunities.
8. Yes, I have improved a lot with my way of thinking.

---

824

1. It did not help me a lot and it restricted my learning time. Sometimes it was interesting.
2. It's not nice at all and we don't really learn anything.
3. The worksheets are right it's just the students don't explain it well.
4. To learn for a test when we have SETH.
5. The building of stuff, I want to become an engineer.
6. The mathematics, because we don't get anything from it.
7. No, I wanted to do this to help me with engineering but it doesn't.
8. Yes, it came down because I did not have much time to study.

---

825

1. It was fun but there were some parts that wasn't fun, otherwise I hate it.
2. It was difficult and not pleasant, but I understand what it is for.
3. Make it a bit easier but nothing else.
4. The time management at the beginning of the year and the worksheets.
5. The one with the Legos, we learned about insects and went on nature walks. It's nice to be in nature and to learn about the great world.
6. The worksheets are too hard but I understand why.
7. Yes, it's nice and I want to accomplish something in life.
8. Not really.

---

826

1. I think SETH is a good project, but I don't know if it's worth the amount of money especially in the lower grades (8/9).
2. I think it's good exercise.
3. Question left unanswered.
4. Question left unanswered.
5. Some excursions are fun and interesting where others were boring.
6. The reading because I get the same level-score every time and I found out that I get the same reading passages even if I change the topic.
7. It depends I don't know if the amount of money is worth it.
8. No, it had no influence on my academic performance.

---

827

1. There were good times and bad times. I think SETH is a very good program, but it has its advantages and its disadvantages. Much progress has been made in different types of things in life that has influenced me! It was very enjoyable to be part of SETH.
2. It is incredibly challenging! Definitely the most difficult math out there, but I can agree with certainty that it contribute even though you don't see the improvement right away.
3. I think you should do more and more worksheets. Practice and practice often. This will help develop your brain. You have to try harder each time. It's not always fun but you will reap the rewards if you work hard.
4. To complete the math worksheets to the best of your ability and then to keep trying.
5. To go to university and to do things outside. I like practical sessions. You see things that you never really knew about.
6. Sessions at the school. It's sometimes boring, but at other times fun.
7. Yes, I definitely want to! It's a once in a lifetime opportunity. It allows exposure to different things and you can learn more about what's around you.
8. Yes, I have definitely improved in mathematics with a few%. I also became more confident and got to know myself better!!!

---

828

1. Most of the time it's a lot of fun and I really learned a lot but sometimes it is boring.
2. It is very difficult, it's boring and it's not fun. I would rather do maths at home by myself than doing the SETH worksheets.
3. To actually explain the work, might just help.
4. The problem solving, it's a nice challenge, except for the problem solving on the mathematics worksheets', I don't like it. A major challenge is to survive the boring sessions.
5. All the practical things we did on the educational trips for example the Comair excursion taught me an awful lot and it was very nice.
6. The mathematic worksheets, because it is boring and I would rather do the math as home.
7. Yes, I would like to stay apart of SETH because it teaches me awful lot of new interesting things.
8. It had no effect on my math performance, it did however improve my performance in other subjects.

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829

1. Sometimes it was good, sometimes it's not.
2. It was really not fun but if you get something right you feel good about it.
3. It helps you with problem solving.
4. The mathematical worksheets and to sometimes sit still.
5. When we build stuff at the PUK It was interesting and taught me a lot.
6. Mathematics worksheets, it was very difficult.
7. No, but my parents forced me.
8. No, my marks just stayed the same.

---

830

1. Nice but we need the session cut short during the exam period because then we have to study.
2. Difficult, but a nice challenge.
3. Focus on the work we do in class.
4. Solving hard math problems.
5. Comair, very nice and we got exposure to career choices.
6. Reading because the reading material is correct but the questions do not apply to the given passage.
7. Yes, it's nice and helps us with math. That we will need in the future.
8. Yes, SETH took away our study time and the teacher doesn't even ask those types of equations.

831

1. It has been a great privilege to be part of the SETH program. I enjoyed the new challenges very much. The sessions were very interesting and it contributed to new skills and better understanding of many topics!
2. Sometimes it was frustrating and boring, but when I finally solved the problem it made me feel very proud. It has a great contribution to patience and perseverance and it was always interesting to see how the problem were solved.
3. First start with easier questions and then gradually make the questions harder.
4. Its takes a lot of time. Now that the sessions only take place on Mondays is much better! Sometimes we do not feel like SETH because we are tired and know that we still have much work to do after SETH.
5. When we are out in nature or learning about insects. I love the nature and outdoors. I found it very interesting at Mooiriver as well as the sessions when we studied the insects (and plants).
6. The reading. It's uncomfortable to read on the computer screen and the stories makes no sense.
7. Yes, I have learned a lot and really enjoyed trying new things and to discover my potential on different levels.
8. Yes, I have learned to be patient when trying to solve math problems, and the sessions we've had has taught me more about many different topics and the knowledge I use in my school work.

832

1. There were times in the 1st quarter that was very boring and it just wasted my time. Later in the year it got better because there were more practical sessions.
2. It is very difficult and challenging, but it helps you to develop your brain, and thus it will help you in the future.
3. There may be more topics in the worksheet.
4. To complete the math worksheets and hand it in.
5. The excursions to NWU because we got a chance to do practical thing like building flash lights.
6. The theory sessions because people spoke in one monotone and therefore it is boring.
7. Yes, it has improved and is fun now.
8. No, it did not improve my marks.

833

1. Sometimes it was very nice and other times a bit frustrating but successful in the end.
2. Some of the worksheets were very nice and others were difficult that dispirited me.
3. They could make it just a little bit easier but not easy.
4. To communicate with the people around me.
5. The mathematics because you can learn and use it later in school.
6. The reading program because it makes you feel like reading the story that looks like a very short paragraph.
7. Yes, I know much more about all the careers than at the beginning of the year.
8. Not really but I feel smarter and I know I can do it.

834

1. It was very nice. I thought it was cute and enjoyed it a lot. (Especially the excursions). It opened my mind to think and introduced me to career choices.
2. Sometimes it was boring but it helped me to solve mathematical problems better.

3. To start off with easy questions and gradually making it harder.
4. Mathematics worksheets.
5. The mathematics. It refreshed my memory.
6. The mathematics. It takes time and gets boring.
7. Yes, I would very much like to because I think it's a very special experience.
8. Yes, it taught me to never give up and to always try my best.

---

835

1. In general, it was nice and interesting, I am very satisfied with the experience of the year.
2. Sometimes it was bad, but it was nice to firstly try it and secondly to make groups and laugh at our mistakes.
3. Maybe it must be a little bit more specific that's all.
4. All the nice places and things that we observe.
5. If it comes to sports, soccer and at school work life orientation because it's more practical.
6. I enjoyed everything to be honest, but if I had to choose, the geographies because it's not always interesting.
7. Yes, it's nice and we learn a lot and we also see more than we could believe.
8. Mathematics no, on the others yes, in general my parks dropped in maths drastically (98-74) but the rest increased.

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836

1. It was nice but some of the session was boring and did not teach me anything new.
2. I struggled a lot and the students didn’t help me. But after a while I began to understand.
3. It can be made a little easier and then progress to a more difficult level over time.
4. To get the boring sessions over and done with and to try and complete the mathematic worksheets.
5. Excursions because I like walking around and to touch and experience things.
6. The reading, it's boring, there is no Afrikaans so we need to read very big English words and answer questions about them (not even the English children understood it).
7. Yes, because I enjoy the excursions and it exposes me to different career choices.
8. No, the math didn’t help me. It didn’t help me in any other subjects as well.

---

837

1. It wasn’t really exciting to me. I felt I had hardly learned anything new.
2. It is a waste of time. It’s too difficult and they expect too much of us.
3. Asking questions more clear and simple.
4. Math worksheets and reading and to stay interested.
5. Practical activities because I don’t like sitting in class the whole time and hearing people preach to us.
6. Math and reading because I get frustrated when I don’t get it right.
7. No
8. No

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## Experience of the Mathematics sessions of the SETH Academy

## *Belewenis van die Wiskundesessies van die SETH Akademie*

You may remain anonymous, I would only like to know in which grade you are.

*Jy mag anoniem bly. Ek wil netgraag weet in watter graad jy is.* **Gr 8 / 9**

1. How do you experience the Mathematics sessions?
   *Hoe beleef jy die Wiskundesessies?*

2. What do you find the most challenging about them?
   *Wat is vir jou die mees uitdagende omtrent hulle?*

3. What type of technology is used during the sessions, if any?
   *Watter tipe tegnologie word tydens die sessies gebruik, indien enige?*

4. What in your opinion, can be done to improve the Mathematics sessions?
   *Wat volgens jou, kan gedoen word om die Wiskundesessies te verbeter?*

5. Which aspects of the Mathematics sessions do you enjoy most?
   *Watter aspekte van die Wiskundesessies geniet jy die meeste?*

_____

_____

_____

_____

6. Which aspects of the Mathematics sessions do you not enjoy at all?
   *Watter aspekte van die Wiskundesessies geniet jy glad nie?*

_____

_____

_____

_____

7. Would you like to have more Mathematics sessions than at present? Motivate your answer.
   *Sou jy meer Wiskundesessies wil hê as op die oomblik? Motiveer jou antwoord.*

_____

_____

_____

_____

8. How do you prepare/study/learn for a Mathematics test or examination?
   *Hoe berei jy voor/studier/leer jy vir 'n Wiskundetoets of -eksamen?*

_____

_____

_____

_____

_____

9. How will you describe Mathematics as a subject?
   *Hoe sal jy Wiskunde as vak beskryf?*

_____

_____

_____

_____

_____

**Thank you for your participation – I appreciate it!**
***Baie dankie vir jou deelname – ek waardeer dit!***

## Task-based interview questions for the learners

1. How do you feel when you must solve a mathematics problem? **Hoe voel jy wanneer jy ‘n wiskunde probleem moet oplos?**
2. What do you do before you start solving a problem**? Wat doen jy voordat jy begin om ‘n wiskunde probleem op te los?**
3. Explain to me how you solved this problem. **Verduidelik vir my hoe jy hierdie probleem opgelos het?**
4. Do you think that you have solved this problem correctly? Explain why. **Dink jy jy het hierdie probleem korrek opgelos? Verduidelik waarom**
5. What do you normally do once you have reached a solution to the problem? **Wat doen jy gewoonlik sodra jy ‘n probleem opgelos het?**
6. Do you see yourself as a good problem-solver? Why? **Sien jy jouself as ‘n goeie probleemoplosser? Hoekom?**

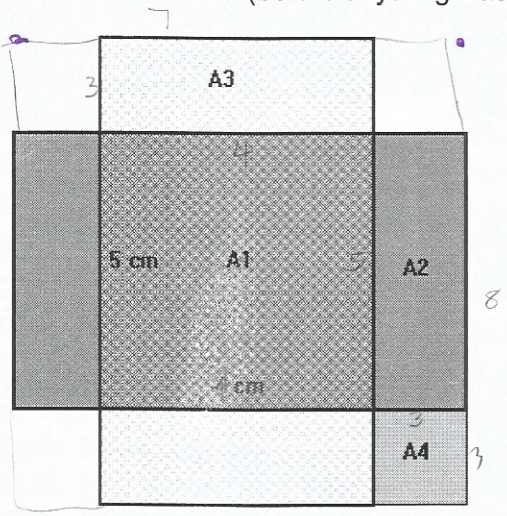
S 22

**Vraag 8**

Vier klein vierkantige stukkies hout is op die vier hoeke van 'n reghoekige stuk hout uitgesny. Die hout is daarna gebruik om 'n boks te maak. Die volume van die boks is $60cm^3$ en die lengte is 5cm en die breedte 4cm. Bereken die oorspronklike oppervlakte van die stuk hout (voor enige stukke uitgesny is).

**Question 8**

Four small square pieces of wood are cut out of the four corners of a rectangular piece of wood. The wood is then used to make a box. The volume of the box is $60cm^3$. The length is 5cm and the breadth 4cm. Calculate the original area of the piece of wood (before anything was cut out).




$V = l \times b \times h$

$= 7cm \times 6cm \times 3cm$

$= 126$

$V = l \times b \times h$

$60 = 5 \times 4 \times h$

$60 = 20h$

$\frac{60}{20} = \frac{20h}{20}$

$3 = h$

∴ Die vierkantige blokkies wat uitgesny is, is $3cm \times 3cm$

So die sylengtes van die reghoekige stuk hout gaan met 3cm verleng.

$5 + 3 = 8$

$4 + 3 = 7$

Oppervlakte $= l \times b$

$= 8 \times 7$

$= 56cm^2$

$l = 10$

$b = 11$

$10 \times 11 = 110cm^2$

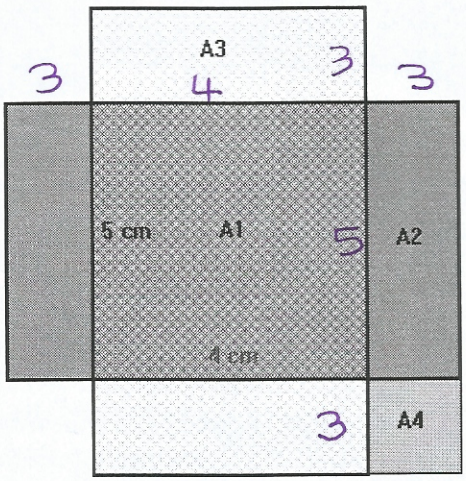
S1

**Vraag 8**

Vier klein vierkantige stukkies hout is op die vier hoeke van 'n reghoekige stuk hout uitgesny. Die hout is daarna gebruik om 'n boks te maak. Die volume van die boks is $60cm^3$ en die lengte is 5cm en die breedte 4cm. Bereken die oorspronklike oppervlakte van die stuk hout (voor enige stukke uitgesny is).

**Question 8**

Four small square pieces of wood are cut out of the four corners of a rectangular piece of wood. The wood is then used to make a box. The volume of the box is $60cm^3$. The length is 5cm and the breadth 4cm. Calculate the original area of the piece of wood (before anything was cut out).




$V = l \times b \times h$

$60cm^3 = 5cm \times 4cm \times x$

$60cm^3 = 20x$

$x = 3$

$\therefore 60cm^3 = 5cm \times 4cm \times 3cm$

$\Rightarrow$ height $= 3cm$

$A_1 = 5cm \times 4cm$

$= 20cm^2$ ✓

$A_2 = l \times b$

$= 5cm \times 3cm$

$= 15cm^2$

$A_3 = l \times b$

$= 4 \times 3cm$

$= 12cm^2$

$A_4 = l \times b$

$= 3^2$

$= 9cm^2$

10 X 11

= 110

The original Area

$= 2(A_1 + A_2 + A_3) + A_4$

$= 2(20cm^2 + 15cm^2 + 12cm^2) + 9cm^2$

$= (40cm^2 + 30cm^2 + 24cm^2) + 9cm^2$

$= 103cm^2$

8 L104

**Vraag 7**

Die volgende inligting van drie sirkels word aan jou gegee:

A is die grootste sirkel, B is die middelste grootte sirkel en C is die kleinste sirkel. Sirkel A het 'n deursnee van 20cm. Die kleiner sirkels word so geteken dat die radius van sirkel A die deursnee van sirkel B is en die radius van sirkel B die deursnee van sirkel C is. Bereken die oppervlakte van sirkel C.

**Question 7**

The following information about three circles are given to you:

A is the largest circle; B is the middle-sized circle and C is the smallest circle. Circle A has a diameter of 20cm. The smaller circles are drawn in such a way that the radius of circle A is the diameter of circle B and the radius of circle B is the diameter of circle C. Calculate the area of the circle C.

$\pi r^2$

$= 3,14 \times 2,5^2 cm^2$

$= 3,14 \times 6,25 cm^2$

$= \frac{157}{8}$

$= 19,62 cm^2$

C

Oppervlak van sirkel C is $19,62 cm^2$.

8S58

**Vraag 7**

Die volgende inligting van drie sirkels word aan jou gegee:

A is die grootste sirkel, B is die middelste grootte sirkel en C is die kleinste sirkel. Sirkel A het 'n deursnee van 20cm. Die kleiner sirkels word so geteken dat die radius van sirkel A die deursnee van sirkel B is en die radius van sirkel B die deursnee van sirkel C is. Bereken die oppervlakte van sirkel C.

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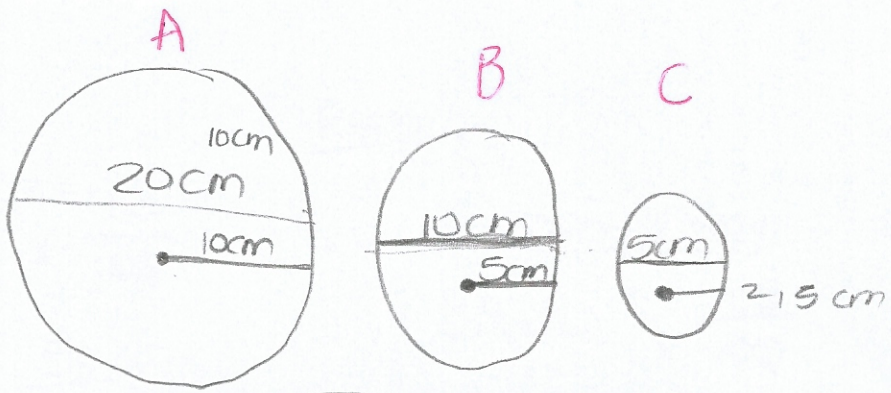



3

$A = \pi r^2$

$13,5 \times \pi r^2$

~~13,5~~ $\times$ 2,5 cm $\times$ 2,5cm

3,14

~~13,5 $\times$ 6,25cm~~

3,14 x 2,5cm x 2,5cm

3,14 x 6,25cm

19,6250cm$^2$

2,5 x 2,5 = 6,25

13,5 x 3,14 = 42,39

2,5 + 2,5 = 5,0

8 S 61

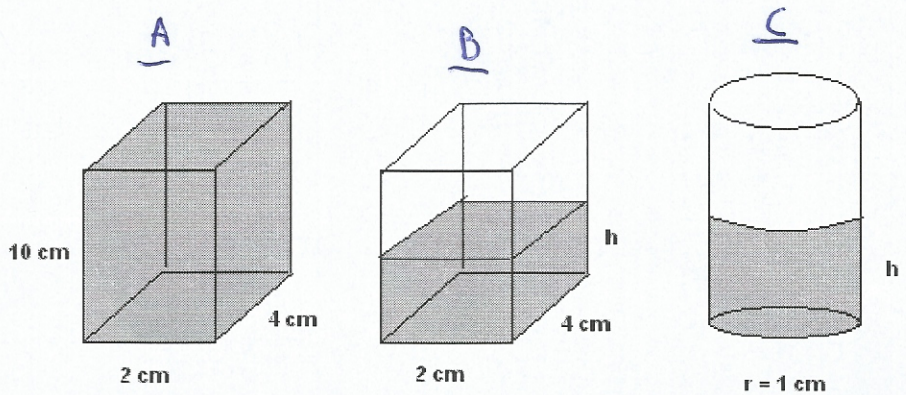
**Vraag 5**

Die reghoekige prisma aan die linkerkant was aanvanklik vol water. Water is toe daaruit gegooi in die reghoekige prisma en silinder aan die regterkant sodat die hoogtes van die water in beide houers (die reghoekige silinder en die reghoekige prisma) gelyk is. Bereken die hoogte h van die water in beide houers. (Rond jou antwoord af tot die naaste tiende van 'n cm).

**Question 5**

The cuboid on the left was initially filled with water. Water is then emptied from it into the cuboid on the right and the rectangular cylinder on the right in such a way that the height h in both containers (the rectangular cylinder and the cuboid) are equal. Calculate the height h of the water in these two containers to the right. (Round your answer to the nearest tenth of a cm)

58.6




A) $V = L \times B \times H$

$= 4 \times 2 \times 10$

$= 80 cm^3$

$V = L \times B \times H$

$= 4 \times 2 \times 5$

$= 40 cm^3$

$V = \pi r^2 h$

$= \pi (1)^2 (5)$

$= \pi (5)$

$= 15 cm^3$

C

H=5 -> te min

H=7 -> te min

H=8 -> te veel

H=7,5 -> te veel

H=7,3 -> te veel

H=7.2 -> net reg.

Die hoogte van albei houers is 7.2cm.

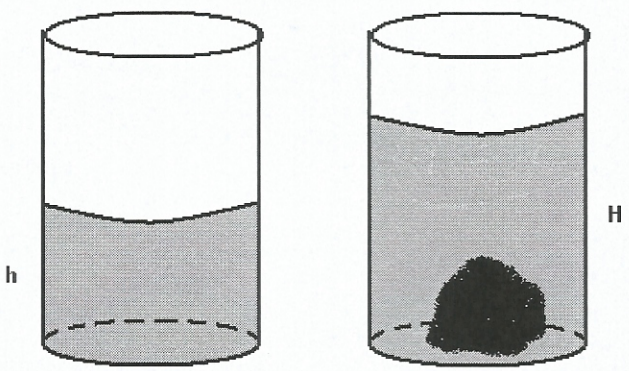
L 56

**Vraag 3**

Die hoogte **h** van water in 'n silindriese houer met radius **r = 5 cm** is gelyk aan **10cm**. Peter moet die volume van 'n klip met 'n onreëlmatige vorm meet en besluit om die klip binne-in die houer met water te sit. Die hoogte van die water binne die houer styg tot **H = 13,2cm**. Bereken die volume van die klip in kubieke sentimeter.

**Question 3**

The height **h** of water in a cylindrical container with radius **r = 5cm** is equal to **10cm**. Peter has to measure the volume of an irregularly shaped rock. He decides to place the rock inside the container filled with water. The height of the water inside the container rises to **H = 13,2cm.** Calculate the volume of the rock in cubic centimeter.




3

Voor klip:

$V = \pi r^2 h$

$V = \pi (5\,cm)^2 (10\,cm)$

$V = \pi \cdot 250\,cm^3$

$\therefore V \approx 785{,}40\,cm^3$ ✓

met klip:

$V = \pi r^2 h$

$V = \pi (5\,cm)^2 (13{,}2\,cm)$

$V = \pi \cdot 330\,cm^3$

$\therefore V \approx 1036{,}73\,cm^3$ ✓

$\therefore$ Volume v. klip $= \pi \cdot 330\,cm^3 - \pi \cdot 250\,cm^3$

$= \pi \cdot 80\,cm^3$

Volume v. klip $\approx 251{,}33\,cm^3$ ✓

**Vraag 4**

Panarotti's bedien twee ronde Hawaiian pizzas van dieselfde dikte in verskillende groottes (dus verskillende oppervlaktes). Die kleiner pizza het 'n deursnee van 30cm and kos R 72,90. Die groter pizza het 'n deursnee van 40cm en kos R 92,90. Watter een van die twee pizzas is beter waarde vir geld? Wys jou redenering.
[Wenk: R per oppervlakte]

**Question 4**

Panarotti's serve two round Hawaiian pizzas with the same thickness but different sizes (thus different areas). The smaller pizza has a diameter of 30cm and costs R 72,90. The larger pizza has a diameter of 40cm and costs R 92,90. Which of the two pizzas is better value for money? Show your reasoning. [Hint: R per area]

P1

$Opp = \pi r^2$

$= 3,14(15)^2$

$= 706,5.$

$706,5 \div 72,90.$

$= R9,69.$

Pizza 1 kos R9,69 per $cm^3$

Jy betaal R72,90 vir 706,5 oppervlakte

P2.

$Opp = \pi r^2$

$= 3,14(20)^2$

$= 1256$

$1256 \div 92,90.$

$= 13,52$

Pizza 2 kos R13,52 per $cm^3$

Jy betaal R92,90 vir 1256 oppervlakte.

R92,90 - R72,90 = R20.

1256 - 706,5 = 549,5

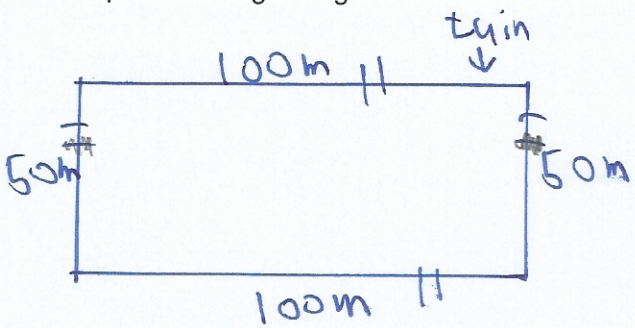
Ek sal sê Pizza 2 sal beter waarde vir jou geld wees, want vir R20 meer kry jy 10cm die pizza meer en ~~jou~~ oppervlakte van die pizza styg met 549,5 $cm^2$ meer as Pizza 1 sin.

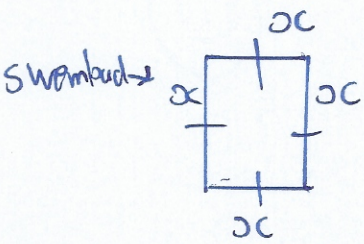
8 L101.

**Vraag 6**

Mev. Scheepers beplan om 'n swembad in haar tuin te laat bou. Die tuin is in die vorm van 'n reghoek met lengte 100m en breedte 50m. Sy wil graag 'n vierkantige swembad hê. Bereken die lengte van een sy van die swembad as die oorblywende deel van die tuin (sonder die swembad) gelyk is aan die helfte van die oorspronklike reghoekige tuin.

oppe 5000 $m^2$




$5000\,m^2 - x^2 m^2 = 2500\,m^2$

$x^2 = 2500\,m^2$

$x = 50m$

1 Sy lengte van die swembad = 50m

**Question 6**

Mrs. Scheepers plans to build a swimming pool in her garden. The garden is in the form of a rectangle with length 100m and width 50m. She wants to build a square pool. Calculate the length of one side of the pool if the remaining part of the garden (without the swimming pool) equals one half of the original rectangular garden.

Klein pizza = 9,70 cm² / R. of R0,101 cm²

Groot pizza = 13,53 cm² / R. R0,07 / cm².

**Vraag 4**

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**Question 4**

Panarotti's serve two round Hawaiian pizzas with the same thickness but different sizes (thus different areas). The smaller pizza has a diameter of 30cm and costs R 72,90. The larger pizza has a diameter of 40cm and costs R 92,90. Which of the two pizzas is better value for money? Show your reasoning. [Hint: R per area]

Kleiner Pizza

Oppv. $= \pi r^2$
$= \pi(30 \div 2)^2$
$= \pi(15)^2$
$= 225\pi$
$= 706,8583471\ cm^2$

Groter pizza

Oppv. $= \pi r^2$
$= \pi(40 \div 2)^2$
$= \pi(20)^2$
$= 400\pi$
$= 1256,637061\ cm^2$.

Klein pizza: $\frac{706,8583471\ cm^2}{R72,90}$

$= R9,696273623 / cm^2$
$\approx R9,70 / cm^2$

Groter pizza: $\frac{1256,637061\ cm^2}{R\ 92,90}$

$= R13,52677138 / cm^2$
$\approx R\ 13,53 / cm^2$

∴ Die groter pizza is beter waarde vir geld.

**Vraag 5**

Mnr. Venter het die toetspunte van sy 25 graad 9 leerders aangeteken. Hy het hierdie toetspunte gebruik en 'n gemiddeld van 72% gekry. Sandra se punt van 86 is verkeerdelik nagesien as 36. Wat is die korrekte gemiddeld vir die toets nou?

**Question 5**

Mr. Venter wrote down the test marks of his 25 grade 9 learners. He used these marks to calculate an average of 72%. Sandra's mark of 86 has been incorrectly marked as 36. What is the correct average of the test mark now?

9 × 25 = 225 · 25 × 72 = 1800

· 1800 + (86 − 36)
= 1800 + 50
= 1850

· 1850 ÷ 25
= 74 % klasgemiddeld

(Sandra se gemiddeld vir haar toet is 86 %.)

C

S(17) 4

# Grade 8 Learners

**8L104**

1. **How do you feel when you must solve a mathematics problem? Hoe voel jy wanneer jy ‘n wiskunde probleem moet oplos?**

Dit hang af van soos die vraag. As ek daarmee sukkel dan sal ek dalk bietjie senuweeagtig voel, maar gewoonlik hou ek van wiskunde so dis vir my lekker.

2. **What do you do before you start solving a problem? Wat doen jy voordat jy begin om ‘n wiskunde probleem op te los?**

Jy lees en dan lees jy weer en dan lees jy weer. Want baie keer dan lees jy net een keer en dan lees jy dalk iets mis en dan doen jy soos die hele som verkeerd. Wat met my gebeur het, ek weet nie of was dit in hierdie toets of ’n ander toets, maar toe lees ek een brokkie inligting mis en toe doen ek die hele som verkeerd en toe ek weer lees toe lees ek dit eers raak.

3.. **Explain to me how you solved this problem. Verduidelik vir my hoe jy hierdie probleem opgelos het?**

**T: Ons gaan bietjie kyk na vraag 7. Nou jy’t dalk al vergeet, maar vraag 7 is die probleem met die drie sirkels.**

O, ja

(vraag 4 word bespreek)

**T:Kan ons gou-gou vinnig daaroor praat? Jy’t baie, baie goedgedoen, net hier teen die einde ’n klein foutjie gemaak. Kom ons kyk gou-gou. Hierdie is die deursnee van die sirkels nè? Die 20 die 10 en die 5. Ek gaan nou sommer hier teken dan kan ek ook makliker praat. Elke keer is die kleiner sirkel die helfte van die groter een se deursnee. Wat weet jy van die radius van ’n sirkel?**

Dit is die helfte van die deursnee.

**T: Goed so die groot sirkel se radius is dan 10 die tweede een sin is?**

5

**T:En die kleintjie?**

2,5

**T: Sien jy hier is jou fout. So jy't regtig goed begin. Dit is net jy het nie ingesien dat dit die helfte van die 5 moet wees nie en dat die deursnee 5 is en nie die radius nie. Dan sou jy hom reggekry het.**

**4. Do you think that you have solved this problem correctly? Explain why.**
**Dink jy, jy het hierdie probleem korrek opgelos? Verduidelik waarom**

Ek dink so, ek weet nie hoe ander sou mens dit doen nie. Ek het dit geteken op soos 'n rofwegpappier,

**T: Jy moes dit hier geteken het dat ek dit kon sien.**

Maar ek dink dis reg. Eks nou nie seker nie.

**5. What do you normally do once you have reached a solution to the problem? Wat doen jy gewoonlik sodra jy 'n probleem opgelos het?**

Ons moet dan soos 'n getal sin skryf en soos sê die oppervlakte van sirkel C is soos die antwoord.

**T: Aanvaar jy dis reg of dink jy bietjie oor die antwoord?**

Soos gewoonlik as ek dink soos dit maak nie sin lekker of iets nie, dan sal ek soos weer lees en dit dalk weer doen met potlood of iets, maar gewoonlik gaan ek net aan.

**6. Do you see yourself as a good problem-solver? Why? Sien jy jouself as 'n goeie probleem oplosser? Hoekom?**

Ja, ek dink so. Soos ek gesê het soos ek geniet wiskunde en so, so ek dink as jy dit geniet dan is dit net vanself soos makliker so ja.

**T: Kry jy goeie punte?**

In soos wiskunde ja, maar soos ja in wiskunde.

**T: Oefen jy hard? Oefen jy baie? Of dink jy dis net 'n natuurlike talent wat jy het?**

Wel die meneer gee vir ons so baie om te oefen, maar ek dink ook soos ek het die talent om wiskunde te doen.

**8L97**

1. **How do you feel when you must solve a mathematics problem? Hoe voel jy wanneer jy ‘n wiskunde probleem moet oplos?**

Dis net lekker om ’n wiskunde probleem op te los vir my, so dis daai lekker gevoel wanneer ek ’n wiskunde probleem oplos.

2. **What do you do before you start solving a problem? Wat doen jy voordat jy begin om ‘n wiskunde probleem op te los?**

Ek lees eers die vraag totdat ek heeltemal verstaan wat die vraag vir my vra. Dan skryf ek eers ’n algebraïese vergelyking as ek kan en dan los ek hom op.

3.. **Explain to me how you solved this problem. Verduidelik vir my hoe jy hierdie probleem opgelos het?**
**T: kyk hier jy’t reg begin 100 maal 50, maar kyk wat is jou antwoord?**

Ja, nou ja dis verkeerd.

**T: Ek dink jy het opgetel in plaas van vermenigvuldig so jy kry 150. Wat is 100 maal 50? Een maal 5?**

5000

**T: Nou as jy weer na hierdie probleem kyk as dit nou die oppervlakte van die tuin is en sy wil ’n swembad bou wat die helfte van hierdie is, maar die swembad is ’n vierkant, dink jy, jy gaan dit nou reg kry?**

Ja, dan dink ek sal dit makliker lees.

**T: Wat is die helfte van 5000**

2500

**T: Okay, maar dit moet n vierkant wees ne? Met ’n oppervlakte van 2500. Hoe lank gaan n sy wees? Hoe moet jy dit uitwerk?**

Jy deel 2500 deur 4, want jy moet 4 sye kry.

**T: Maar onthou hierdie is die oppervlakte nie die omtrek nie.**

Dan deel jy dit deur twee dalk.

**T: Dink bietjie mooi, wat is die oppervlakte van ’n vierkant?**

Dit is die lengte maal die breedte.

**T: Of die sy maal sy want die lengte en die breedte is gelyk as jy dan het jy mos die oppervlakte is sy kwadraat. Wat gaan dan die sy se lente wees? Want hoe los ek, as ek ’n kwadraat het, hoe kry ek die gewone getal?**

Jy gebruik die vierkantswortel.

**T: Kan jy hom uit jou kop se? Wat is die vierkantswortel van 25?**

5

**T: En van ’n 100?**

10

**T: So hoe lank is die sy?**

50

**4.Do you think that you have solved this problem correctly? Explain why. Dink jy, jy het hierdie probleem korrek opgelos? Verduidelik waarom**

Ek dink nie so nie, want ek dink ek het ’n iets heeltemal anders hier gedoen.

**5.What do you normally do once you have reached a solution to the problem? Wat doen jy gewoonlik sodra jy ‘n probleem opgelos het?**

Dan gewoonlik sal ek aangaan met die res van die vraestel en dan aan die einde as daar tyd is sal ek terug kom na die vrae waaroor ek twyfel, maar ek sal ook as ek dadelik twyfel en dink nee, hierdie vraag is nou glad nie reg nie sal ek ook die vraag oor doen.

**T: Wanneer dink jy ’n vraag is glad nie reg nie, hoe weet jy?**

Wanneer ek kyk en ek die som wat hulle vir my vra klink nie vir my reg by die antwoord nie.

**T: Okay, so as ons dan nou kyk na die antwoord, dink jy as die reghoekige tuin 100m by 50m is dat ’n swembad van 50 by 50 daar sal inpas?**

Ja, ’n swembad van 50 by 50 sal daar inpas.

**T: Want dis die helfte van die tuin ne?**

6. **Do you see yourself as a good problem-solver? Why? Sien jy jouself as ‘n goeie probleem oplosser? Hoekom?**

Ek voel net dis vir my baie maklik om probleme op te los in wiskunde so ek voel ja dit is vir my lekker om probleme op te los.

**T: Is dit omdat jy van wiskunde hou of omdat jy net ’n natuurlike talent daarvoor het?**

Ek dink dis albei want as jy ’n natuurlike talent daarvan het en jy hou nie van wiskunde nie dan maak dit dan ook moeiliker.

**8L101**

1. **How do you feel when you must solve a mathematics problem? Hoe voel jy wanneer jy ‘n wiskunde probleem moet oplos?**

Ek voel nogal opgewonde, want ek hou baie daarvan om probleme op te los. Dis vir my baie interessant om te sien hoe sekere goed op sekere maniere gesien kan word en opgelos kan word.

**T: Is jy nooit bietjie bang nie?**

Nee, ek hou baie, baie daarvan.

**T: Is dit vit jou net ’n uitdaging?**

Dis vir my ’n uitdaging dis wat ek wil doen ek hou baie daarvan om goed op te los

2. **What do you do before you start solving a problem? Wat doen jy voordat jy begin om ‘n wiskunde probleem op te los?**

Ek lees mooi deur wat die situasie is en gewoonlik as ’n som te moeilik is skep ek vir myself my eie speel-speel situasie en kyk of ek dit reg doen of ek iets reg doen of ek weet wat ek doen, maar en ek lees dit gewoonlik baie, baie goed deur. Ek skryf dit vir myself neer as ek enigsins ’n probleem oplos al die inligting skryf ek vir myself neer.

**T: Ons is ook daai jare so geleer skryf wat jy het wat gegee is en wat jy moet soek, veral by meetkunde, dit help ook baie.**

Dan skryf ek als in by meetkunde veral as jy uitwerk dan skryf jy dit in as ’n bewys.

3.. **Explain to me how you solved this problem. Verduidelik vir my hoe jy hierdie probleem opgelos het?**

**T: Die probleem van die swembad, daar is ’n C wat beteken hy is “correct” in Engels, so hy is reg, maar ek wil hê jy moet vir my verduidelik hoe jou kop gewerk het. Kom ons kyk net vinnig, sy wil ’n swembad bou, die tuin is 100m by 50 m. Maar sy wil die helfte van die tuin moet vir die swembad gaan en die swembad moet ’n vierkant wees.**

Dit moet ’n vierkant wees, wel eerstens dit beteken as die oppervlakte beteken dan dis 25000 vierkante meter met die lengtes en die breedtes in gewerk as jy die oppervlak wil bereken en ons almal weet ’n vierkant se sye, se eienskappe is dat die vier sye van die vierkant reg is, en hierso staan bereken dat die lengte van een sy van die swembad van die oorblywende deel van die tuin gelyk is aan die helfte van die oorspronklike reghoekige tuin. So dit beteken nou x kwadraat, dis mos die oppervlakte vierkant jy maal die sye met mekaar dan gee die oppervlakte moet gelyk wees aan die helfte van die oppervlakte van die reghoek, want dis mos hoe die eienskappe werk? Al vier sye gaan gelyk wees. Dit beteken 5000 vierkante meter wat die oppervlakte is wat ek reeds bewys het en uitgewerk het minus x kwadraat want ek het x gebruik as ’n sy lengte van die vierkant en x kwadraat is mos die oppervlakte en dit los jou met 2500 vierkante meter en as jy x kwadraat 2500 m is beteken dit x is 50.

**T: Hoekom is x 50?**

Want die vierkantswortel van 2500 is 50. Wat se die sy lengte van die swembad is 50.

**T: En kan ’n mens dit toets?**

Ja, as jy nou se 50 meter kwadraat. Dit los jou met 2500 vierkante meter en jy gaan die vierkante inwerk is dit presies die helfte van 5000 vierkante meter.

**T: Was dit vir jou ’n maklike som of bietjie dinkwerk?**

Dit was dink werk want as jy als moet deurlees dan gaan jy deur baie om te doen deur te werk, maar as jy als neerskryf word dit baie makliker.

**T: En ek sien die manier waarop jy dit neergeskryf het maak ook mooi sin. Prentjies help baie in wiskunde en kleur. Partykeer leer ek vir die studente hulle kan kleure ook gebruik of ’n high lighter of omkring belangrike inligting, want mens kyk dit mis as jy niks doen nie**

As jy als vir jouself neerskryf raak als baie, baie makliker

**T: Ek wil net gou-gou kyk jy’t regtig, jy’t alles reggehad jy’t net een klein foutjie gemaak**

Die laaste enetjie?

**T: O daar ja, maar by die laaste een die een van die toeskouers op die veld**.

Ek dink ek het hom verkeerd want ek het nie mooi gedink deur die..

T: Mens moet net eintlik ’n aanname maak ne?

Mmmm, want ek het gereken ’n vierkante meter maar toe kom ek nie agter vierkante meter is redelik groot nie so  omtrent...

T: Hoeveel mense kan jy dink jy kan daar?

Omtrent 4 mense insit dis omtrent 23 000

T: Dit is dan die regte antwoord, hier is ’n ander ene waar jy net by die koekie ene van die kind wat die koekies eet het jy net ’n foutjie daar gemaak. Jy’t gesê + 90, maar dit moet + iets anderste wees. so verder is alles reg en ek is baie trots op jou.

4. **Do you think that you have solved this problem correctly? Explain why. Dink jy, jy het hierdie probleem korrek opgelos? Verduidelik waarom**
5. **What do you normally do once you have reached a solution to the problem? Wat doen jy gewoonlik sodra jy ‘n probleem opgelos het?**

Wel dit hang af of daar ’n volgende probleem is, kom ons se dis nou die laaste probleem situasie sal ek gaan kyk kan mens dit toepas in die regte lewe kan mens dit toepas in ander situasies en dan sal ek gaan kyk daarvoor, maar andersins sal ek net ’n ander probleem opvolg dan sal ek aangaan.

**T: En soos nou, het jy agter gekom wat het ek met jou gedoen? Ek het vir jou gevra kan ’n mens hierdie 50m kan ’n mens dit toets? Kan jy bepaal of dit reg of verkeerd is?**

Ja, ek toets my antwoord ook ja.

**T: Goed nè, baie keer is die antwoord te groot te klein minus dan kan jy sommer sien.**

Veral in situasies waar jy kan toets, as jy hom toets dan weet jy of jy reg is.

**T: Mens kan nie altyd dit toets nie nè?**

Nie altyd nie ja.

**T: Maar hierdie is ’n lewenswerklike voorbeeld, so mens kan dit fisies gaan toets.**

6. **Do you see yourself as a good problem-solver? Why? Sien jy jouself as ‘n goeie probleem oplosser? Hoekom?**

Nogal ja tannie, ek hou baie daarvan so hoe meer ek probleme oplos hoe makliker raak dit vir my en uitdagend raak dit vir my en ek los dit partykeer dan nou nogal vinnig op en ander kere vat ek lank ek beskou myself as redelik goed.

**8S58**

1. **How do you feel when you have to solve a mathematics problem? Hoe voel jy wanneer jy ‘n wiskunde probleem moet oplos?**

Mam sometimes it’s scary but then I try to solve it.

**T: Why is it sometimes scary?**

Mam it’s difficult sometimes that is all .... so yeah, I get scared sometimes.

**T: Because they look difficult, yes, I remember that feeling.**

2. **What do you do before you start solving a problem? Wat doen jy voordat jy begin om ‘n wiskunde probleem op te los?**

I just read it through. I just read through it mam.

**T: Just once?**

No mam

**T: Until you understand. That’s the right thing to do because its English I’m also Afrikaans speaking. So, the English we have to understand what the problem is really asking us to do.**

3.. **Explain to me how you solved this problem. Verduidelik vir my hoe jy hierdie probleem opgelos het?**

**Right now, we are going to look at question 7 that you did for me. The other day. It’s the one about the circles. I want you to, maybe you can just look at it a little to refresh your memory. Try to explain to me why you did it like this.**

So, mam the diameter of the circle is 20 so obviously the radius of it is half of 20, so its 10. So here they said the B circle is the radius, the diameter of it is the radius of the circle A. So, I did it 10 cm then they said the radius of B is half than the diameter. So i made it 5 centimetre. So, see mam the radius of it is 5cm and the half of it, the diameter of it is 5 then die radius of it is 2.5cm which is half of 5 cm.

**T: Okay, then how do we determine the area of a circle? The formula is given in front but let me write it for you**

Area is equals to pie times radius squared. So, the radius squared you see you times it by 2.5cm times 2.5 which as a squared then the pie is 3,14. Then you test it mam.

**4.Do you think that you have solved this problem correctly? Explain why.**
**Dink jy, jy het hierdie probleem korrek opgelos? Verduidelik waarom**

I don't know mam, yeah i think so.

**T: Yes, it is, it's perfect. Its 100% correct and I don't think it is a very easy problem because yeah well do you think you can solve it without drawing the circles?**

No mam

**T: I think it's a bit difficult to do that so you drew the circles and you can see them now and now you did it so well by putting the 20 the 10 and the 5 and the realizing that the radius is half-half half of each diameter. Its excellent. Really well done. And I was saying that the language is a little confusing.**

Yes, mam it is mam,

**5.What do you normally do once you have reached a solution to the problem? Wat doen jy gewoonlik sodra jy 'n probleem opgelos het?**

I check it mam. I check it first.

**T: Do you check your calculations? What else?**

I check the statement again and then do it again to check if its correct or not.

**T: Does it happen sometimes that you get an answer that just looks wrong?**

Yes, mam

**T: Why? Is this a difficult question?**

Yes, mam it is

**T: Sometimes the answers are to big or it can also be too small.**

It's like this mam coma 6250 it is to big.

**T: But remember this is the area. So, it's the area of the circle so 19, 64 for some small radius it looks good. If you do this one it will be 10 times**

**10 times pie. Its 100 times 3,14 so it will be much bigger that for the little circle.**

6. **Do you see yourself as a good problem-solver? Why? Sien jy jouself as 'n goeie probleem oplosser? Hoekom?**

Yes mam, i just feel like it. Like I'm good in problem solving

**T: Do you get good maths marks?**

I got good marks in primary but then here.

**T: I want to ask why do you think is that so. What is different between grade 8 and grade 7?**

The teachers here they don't teach the same

**T: Do you think that the only reason?**

Yes mam

**T: If you think about what you learn in grade 8 that you didn't learn in grade 7. Algebra?**

Yes

**T: Now suddenly working with x and y and all that.**

And its confusing mam, x is confusing algebra

**T: You see it's not just the teachers it's the content it's the stuff that you learn in class that makes it a bid more difficult.**

Yes mam

**8S68**

1. **How do you feel when you must solve a mathematics problem? Hoe voel jy wanneer jy ‘n wiskunde probleem moet oplos?**

Okay, mam sometimes i feel pinned, before I do my math’s. But when I read the question after and after I get that I can do that question.

2. **What do you do before you start solving a problem? Wat doen jy voordat jy begin om ‘n wiskunde probleem op te los?**

I read four times the I imagen things that are happening on the question mam, then i do the question.

3.. **Explain to me how you solved this problem. Verduidelik vir my hoe jy hierdie probleem opgelos het?**

**T: This is from your test that you did last week. I looked at your test and I have chosen question number 7. The one about the three circles. Now I’m just going to allow you time to look at it, you didn’t try it but I’m sure if we look at it now you will be able to solve it. Let’s quickly see, there are three circles A is the biggest one, B it the middle sized one and C is the smallest one. Then they give the diameter 20 and what do they say here. The smallest circle inside there is the radius of the previous one and the radius of the las tone is diameter of the previous one. Can you remember it?**

Yes mam

**T:Why do you think didnt you try to do it? What did you find difficult?**

Mam i didn’t really understand the question.

**T: Okay, did you read it four times?**

Yes, mam and still it was so confusing.

**T: Was the question the wording confusing to you?**

Yes, the question.

**T: The question itself. Other learners could also not do it but let’s quickly look at this and see if perhaps if we look at it if it will help. What is the diameter of a circle?**

The diameter of a circle is the center, the middle**.**

**T: The middle, that cuts it into two. So, this one's diameter is 20 centimeters. Then they say A is the larger circle, B the middle size and C the smallest. This one is the diameter 20. The smaller circles are draw in such a way that radius of circle A is the radius of circle A is the diameter of circle B. Help me think, what will the diameter of these circles then be? The radius of circle A is the diameter of B**

The radius will be from here to there.

**T: And the legnt? The size?**

10

**T: So, do you agree that the diameter here is 10?**

Yes mam.

**T: And then the radius of circle C is the diameter of that one so it goes 20, 10, 5. Do you think you will be able to do it now?**

Yes, mam i will.

**T: Can you remember the formula of the area of a circle?**

We didn't do that at primary school

**T: didn't you do it in first term or up to now?**
No mam
**T: Does this look familiar? A=pier2. It's also here in front I gave it to you in front what is the radius of this circle?**

2.5

**T: Do you find that because English is not you first langue's that that sometimes hinders you?**

Yes mam

T: Ja, it could be that's why I think it's good if you read four times. And what I teach my students is underline the information that's given or circle it or do something that the information stands out and then it helps you.

4. **Do you think that you have solved this problem correctly? Explain why. Dink jy, jy het hierdie probleem korrek opgelos? Verduidelik waarom**

**Question was left unanswered.**

5. **What do you normally do once you have reached a solution to the problem? Wat doen jy gewoonlik sodra jy 'n probleem opgelos het?**

**T: Say now you have solved this and you have an answer, do you do something.**

Yes mam, I try to do the thing to see if my answer is correct.

**T: Okay that's excellent we can always check the answer because sometimes we see this answer is so big or so small or it doesn't look right, so it's good to check it.**

6. **Do you see yourself as a good problem-solver? Why? Sien jy jouself as 'n goeie probleem oplosser? Hoekom?**

Yes mam.

**T: Okay, give me a reason.**

Because sometimes I can solve big problems that some other kids can't solve.

**T: Are you enjoying the Seth academy?**

Yes mam

**T: And the way the teachers are now doing the math?**

Mam I enjoy it because last time I didn't really understand, because it was my first time in high school.

**8S61**

1. **How do you feel when you must solve a mathematics problem? Hoe voel jy wanneer jy ‘n wiskunde probleem moet oplos?**

Tannie, dit hang af ook hoe die probleem lyk. Ek kyk eers na hom en as hy dan baie moeilik lyk dan begin ek eers bietjie stres oor hom, maar sodra jy hom begin werk en jy agter kom hys nie eintlik so moeilik nie as jy hom nou klaar vereenvoudig het met die eerste stap en hy lyk maklik dan is dit eintlik lekker om hom op te los.

**T: Gebeur dit baie dat dit moeilik lyk, dat jy nie regtig weet hoe nie, maar dan kry jy dit tog reg?**

Baie van die somme lyk vir my moeilik, maar sodra jy eintlik begin eers met die som dan is dit eintlik maklik. Ek doen nie elke dag wiskunde nie, dit hang af watse wiskunde ons die dag gedoen het as ek bietjie sukkel met die wiskunde gaan ek by die huis en ek gaan nog wiskunde doen.

2. **What do you do before you start solving a problem? Wat doen jy voordat jy begin om ‘n wiskunde probleem op te los?**

Ek lees eers die som of die woord som hang af wat dit is, eers ’n paar keer deur en kyk wat kan moontlike antwoorde wees wat naby aan die moontlike antwoord kan wees.

3.. **Explain to me how you solved this problem. Verduidelik vir my hoe jy hierdie probleem opgelos het?**

Ek het eers die totale volume van die kubus uitgewerk, toe het ek begin vat en met elkeen het ek gesê trail en error probeer wat ek eers elke hoogte probeer maal het met vyf. Toe kom ek agter dit gaan heeltemal te min wees daarso is baie wat oor is as jy eers die kubus sin die hoogte vyf vervang en daardie hoogte toe sien ek al twee sin is dan heeltemal te min om daarvan ’n totaal van 80 te kry.

**T: Kan ek jou in die rede val? As jy se te min as jy hierdie twee optel dan kom jy nie naastenby by 80 uit nie.**

Ja, tot ek gesien het dis te veel toe begin ek met tussen die min en te veel begin ek toe kommas uitwerk.

4. **Do you think that you have solved this problem correctly? Explain why. Dink jy, jy het hierdie probleem korrek opgelos? Verduidelik waarom**

Tannie ek dink hy is naastenby reg. Die finale antwoord dink ek hys met punt nul twee of iets te veel dink ek.

5. **What do you normally do once you have reached a solution to the problem? Wat doen jy gewoonlik sodra jy ‘n probleem opgelos het?**

Ek vat gewoonlik die antwoorde, veral as ons nou met x begin werk dan vervang ek eers x in die antwoord in om te kyk of dit tog by die finale antwoord uitkom wat toe reg is.

6. **Do you see yourself as a good problem-solver? Why? Sien jy jouself as ‘n goeie probleem oplosser? Hoekom?**

Tannie ek sal nou nie se ek is een van die bestes nie, maar ek kan redelik goed die probleme oplos as daar vir my gegee word van dit.

**T: Hoekom dink jy kan jy? Wat dink jy het jy?**

Tannie oor die jare soos die onderwysers my al geleer het en ek dan dit by die huis gaan oefen as ek gesukkel het met dit, dan kom ek agter ek kan dit doen. Dan kry ek weer vertroue in myself om dit te doen.

# Grade 9 Learners

**L28**

1. **How do you feel when you have to solve a mathematics problem? Hoe voel jy wanneer jy ‘n wiskunde probleem moet oplos?**

Dit hang af meer watter tipe wiskunde probleem dit is. Met woord somme is ek partykeer bietjie benoud want ek, ek interpreteer dit partykeer verkeerd, maar as ek algebra kry of meetkunde raak ek baie opgewonde want ek weet hoe om dit te doen en ek verstaan dit beter.

2. **What do you do before you start solving a problem? Wat doen jy voordat jy begin om ‘n wiskunde probleem op te los?**

Ek wil eers myself gefokus kry, ontspan ek moet nie benoud voel nie en dan sal ek die vraag begin en hom so twee keer of drie keer deur lees tot ek hom heeltemal verstaan.

**T: Okay en dan maak jy nou ’n plan. Dis gewoonlik die moeilike deel nè, om die plan te maak?**

Ja

3.. **Explain to me how you solved this problem. Verduidelik vir my hoe jy hierdie probleem opgelos het?**

**T: Ek het, wil hê ons moet gesels oor ’n probleem wat jy opgelos het, nee dit is nou die verkeerde ene. Ek wil hê ons moet kyk na die laaste vragie as ek reg kan onthou. Ja, ag ons kan sommer vinnig net vinnig oor hom gesels. Ek en jy kan saam uitwerk hoe hy gedoen moet word. Dit lyk vir my of jy ’n bietjie by hom, met hom gesukkel het.**

Ja.

**T: So kom ons kyk gou-gou saam. Hulle sê daar was ’n groot stuk hout. Ek gaan dit sommer net vinnig in my eie woorde sê en dan toe het hulle hierdie hoekies uitgesny.**

Ja ek het die een ’n bietjie, hy’t my deurmekaar gemaak van hoe ek moet hom moet aanpak. Die woorde die deurmekaar gemaak met hom.

**T: Ja, die woorde kan ’n mens nogal deurmekaarmaak. Die hoeke is uitgesny toe maak hulle ’n boksie. Hoe dink jy moet ons maak om aan die gang te kom. Ons kan maar net praat, net so kortliks praat. As ons ’n boksie maak of as ons dan nou hierdie hoeke uitsny dan maak ons ’n boksie wat, wat vorm hierdie deeltjie wat uitgesny is van die boksie? Is dit sy lengte, sy breedte of sy hoogte?**

Dit hang af waar hy geplaas word maar dit sal deel wees van my breedte en sy lengte.

**T: Kom ons vat, soos hy daar staan vou jy hom op okay? So dis die 5 en die 4 gaan sy lengte en sy breedte wees. Wat gaan hierdie stukkie dan van hom wees? Onthou om ’n boksie te maak het ons lengte maal breedte maal hoogte.**

Sal dit nie die breedte wees nie?

**T: Kyk as jy hom gaan opvou dan gaan hierdie kant gaan die klappie op en op en daai kant gaan op so kan ek jou help? Dit gaan sy hoogte wees. Okay ek wil jou nou nie deurmekaarmaak nie.**

Nee, nee, nee.

**T: As die volume van die boksie dan 60 is wat gaan sy hoogte wees? Die volume is lxbxh**

En sy lengtes is 5 en 4

**T: En daardie**

Dit sal 3

**T: Die hoogte gaan, dis baie mooi, dit gaan 3 wees. So stem jy met my saam dat hierdie is nou 3 en daai is 3 elke hoekie is nou 3?**

Ja

**T: Gaan dit nie nou makliker wees om die oppervlakte te kry nie? Want oppervlakte wat is die formule van oppervlakte?**

Oppervlakte is lxb

**T: Okay nou moet ons net mooi kyk wat is die lengte nè? Hier is nou 4 cm maar daar is 3 aan daai kant en 3 aan daai kant.**

So dit sal 10 cm wees

**T: 10 cm en die breedte, hierso het ons 5 en ons het ook 3**

13

**T: kyk net mooi 5+3+3**

11

**T: 11 En nou is die oppervlakte 10 maal 11 en dit is geluk aan?**

110

**T: 110 vierkante cm. Dis eintlik ’n oulike sommetjie nè?**

Dis baie oulik ek het hom heeltemal verkeerd verstaan.

**T: Hoe het jy dit verstaan?**

Ek het nie lekker uitgefigure waar die kom nie, maar ek het nie gesien dat hierdie kant is wat moet opvou nie, maar dis eintlik baie eenvoudig as ’n mens dit so doen.

**T: Ja as jy nou, maar dis mos altyd so. As iemand vir jou verduidelik dan is dit eenvoudig, maar as jy dit self moet doen dan is dit moeilik.**

Ja**.**

**T: So wat jy het probeer, jy het gesê die oppervlakte is 7 maal 5. Ja ek, ek**

Ek het geen idee wat het ek daar gedoen het nie.

**T: En dit was natuurlik in half ’n toets situasie so dis altyd anders, maar ja hier het jy tog probeer om met die volume te werk, maar jy het 7, 5 en ek weet nie waar het jy 1,71 gekry nie. Maar dis reg ons leer altyd deur ons foute en daar is niks verkeerd om foute te maak nie.**

**4.Do you think that you have solved this problem correctly? Explain why.**

**Dink jy jy het hierdie probleem korrek opgelos? Verduidelik waarom**

**Geen antwoord**

**5.What do you normally do once you have reached a solution to the problem? Wat doen jy gewoonlik sodra jy ‘n probleem opgelos het?**

Ek sal gewoonlik as ek ’n vraag gedoen het, sal ek hom, my hele vraestel weer deurgaan nadat ek die hele vraestel gedoen het om te kyk en dan sal ek elke vraag weer uitwerk van die begin af asof ek nie die eerste keer dit gedoen het nie om te kyk of my antwoord reg is.

**T: Okay dis baie mooi, ons noem dit refleksie. Het jy al van daai word gehoor?**

**6.Do you see yourself as a good problem-solver? Why? Sien jy jouself as ‘n goeie probleemoplosser? Hoekom?**

Ek het altyd gesukkel daarmee, maar ek raak nou beter SETH het ook baie gehelp met daarmee.

**T: Is dit? Dis wonderlik om dit te hoor. Ja en ’n mens hoef nie bang te wees nie nè? Mens leer sekere strategieë of plannetjies aan en baie keer werk dit en as daar nie dadelik ’n plan is nie dan maak ’n mens ’n plan. Dit is al wat ek met jou wil gesels. Ek wil net gou-gou kyk na die res van jou toest. Jy’t die een van die klip het jy baie mooi gedoen dis ook ’n moeilike ene. Die pizza ene het jy bietjie mee gesukkel, maar dis alles okay. Die pomp ene was moeilik nè?**

Ja

**T: Ons gaan nie nou oor hom praat nie en die seeleeu moet ’n mens maar, die een wat afduik na die bodem moet ’n mens ook net mooi uitwerk. Daar is hy, ag is jy in die SETH akademie?**

Ek is op die oomblik in SETH

**T: Van graag 8 af?**

**S17**

1. **How do you feel when you must solve a mathematics problem? Hoe voel jy wanneer jy ‘n wiskunde probleem moet oplos?**

Ek voel ek voel nie angstig of bang of iets nie, ek hoop maar net dat ek dit sal kan regkry. Want ek hou nie daarvan om te sukkel die heeltyd oor en oor te sukkel nie, maar ek stres nie of iets soos dit nie.

2. **What do you do before you start solving a problem? Wat doen jy voordat jy begin om ‘n wiskunde probleem op te los?**

Ek lees hom eers genoeg deur dat ek seker is ek verstaan so as ek hom verstaan dan kan ek eers begin kyk wat hulle van my vra dan moet ek kyk hoe ek daar gaan uitkom en as ek dit uitgewerk het dan toets ek my antwoord of kyk of dit reg is.

3.. **Explain to me how you solved this problem. Verduidelik vir my hoe jy hierdie probleem opgelos het?**

**T: Kom ons kyk na hierdie vragie van die pizza. Ek het na jou toets gekyk en jy het regtig baie mooi, baie mooi geantwoord. Jy skryf duidelik jy doen al jou stappies baie, baie mooi. Ek sien jy het bietjie gesukkel met die een oor die pompe, maar ons gaan nie nou oor hom praat nie, ek wil sommer net met jou gesels oor die pizza ene. Onthou jy nog die pizza? Twee pizza ’s een het ’n deursnee van 30cm die ander een 40. So dis twee groottes en jy moet se watter een is nou die beste. Kan jy vir my verduidelik wat jy gedoen het dis nou al ’n week terug maar ek dink dit sal terug kom. Verduidelik vir my hoe jy by die antwoord uitgekom het, jy het gesê die groter pizza is beter waarde vir geld so ek wil hê vat my net vinnig daardeur.**

Okay so ek het eers die oppervlakte van al twee uitgewerk en toe het ek

**T: Se net gou vir my hoekom het jy 30 deur 2 gedeel en hoekom het jy 40 deur 2 gedeel?**

O, want hulle het die deursnee gegee en as jy die oppervlakte uitwerk soek jy die raduis. So toe werk ek die oppervlakte uit en die oppervlakte het ek gedeel deur die prys van die pizza en dan kry jy hoeveel vierkant ’n cm dit per R was. En dan so kan jy uitwerk watse een duurder of goedkoper was.

**T: Hierso sien ek jy't so bietjie doodgetrek dit lyk of jy hier bietjie deurmekaar geraak het. Hier het jy die R per vierkante cm maar hier bo het jy iets anders. Se vir my hoekom het jy al twee gedoen?**

Ja tannie, ek het toe ek my vraestel weer deurgaan na die tyd toe maak hierdie nie vir my lekker sin nie en toe kyk ek mooi en toe sien ek moes nie se ek dink ek het eers gesê hoeveel cm kwadraat per R en dit moes anders om wees so toe skryf ek net die bo en doen dit oor.

**T: Hoe weet jy dis moes anders om wees, waar het jy dit gesien?**

Dit het, soos ek het gekyk hoeveel dit dan vir een pizza gaan kos toe maak dit nie vir my sin dat 'n pizza soos R17 000 gaan kos nie en toe besef ek, ek moes iewers iets verkeerd doen. Toe gaan ek net weer deur alles.

**T: En hier was ook 'n wenk jy moet werk R per oppervlakte en dis die boonste ene nè? 0.10 10c of 7c per vierkante cm.**

**4.Do you think that you have solved this problem correctly? Explain why.**
**Dink jy jy het hierdie probleem korrek opgelos? Verduidelik waarom**

Ek hoop so, ek weet nie. Ek dink so.

**T: Ja, dit is 100% reg. Dis baie, baie mooi gewees. Ja wiskunde is nogal uitdagend partykeer nè? Ja en soos jy se dis nie lekker om te sukkel nie, maar as jy nou sukkel met 'n probleem hou jy aan, wil jy hom regkry of gee jy op?**

Nee ek gee nie op nie, ek wil graag weet dat ek dit kan doen want as ek dit kan doen met byvoorbeeld huiswerk dan sal ek dit in 'n toets kan doen. Want as ek opgegee het sou ek nooit geleer het hoe om dit te doen nie so dis belangrik vir my om aan te hou tot ek by 'n antwoord kom.

**T: Dit is baie mooi dis 'n baie goeie eienskap. Aanhouer wen. Wat wil jy eendag word?**

Ek weet regtig nog nie.

**T: Iets met wiskunde?**

Ja, wiskunde is vir my iets wat belangrik is in alle velde en ek het nogal gekyk na forensiese wetenskap want ek hou nogal van NW. NW en wiskunde is my gunsteling vakke.

**T: As jy daai vakke het is daar baie deure wat vir jou kan oopgaan. Baie beroepskeuses en so wat jy kan volg.**

**5.What do you normally do once you have reached a solution to the problem? Wat doen jy gewoonlik sodra jy ‘n probleem opgelos het?**

As hy vir my eers reg lyk, as ek gevoel het ek het by die regte antwoord gekom, dan gaan ek eers aan met die toets en dan kan ek na die tyd as ek sien ek het tyd om deur te gaan, gaan ek eers weer deur. So as ek voel die som kan heel moontlik nie reg wees nie dan gaan ek eers weer deur.

**T: Gebeur dit partykeer dat jy ’n antwoord kry wat jy voel oh hoo?**

Ja tannie

**T: Wanneer is dit gewoonlik, wat jy dink hy’s nie reg nie?**

As ek bv. ’n formule moet gebruik, maar ek weet nie watse formule nie of ek het die somme vinnig in my kop gedoen voel ek partykeer ek kon maklik foute maak en as ek nie regtig geweet het wat die som wil hê nie, want partykeer as ek ’n som lees, maar hy maak nog steeds nie vir my sin nie, dan begin ek net goedjies uitwerk. Al weet ek nie of dit moontlik die antwoord kan wees nie en as dit vir my lyk soos iets wat die antwoord kan wees dan soos konsentreer ek meer op daai, maar ek as dink dit kan verkeerd wees dan soos gebruik ek ander goeters ook.

**6.Do you see yourself as a good problem-solver? Why? Sien jy jouself as ‘n goeie probleemoplosser? Hoekom?**

Ek dink nogal so want ek geniet dit ek hou nie daarvan om op te gee nie so dis vir my belangrik en soos dis nie vir my ’n probleem om wiskunde te doen nie want ek hou daarvan en al die antwoorde soos jy kan altyd aan die antwoorde kom, so dis vir my lekker**.**

**T: Ek dink ander kinders gaan jou beny. Want ek dink dis regtig baie moeilik vir kinders wat sukkel wat dit nie kan verstaan nie wat dit maak nie sin nie om net te sukkel ek dink dit moet regtig verskriklik wees.**

**S24**

1. **How do you feel when you must solve a mathematics problem? Hoe voel jy wanneer jy ‘n wiskunde probleem moet oplos?**

Honestly, I don’t actually enjoy it. It’s not, because I know that I have the skills to solve it so when I do it’s not that difficult it’s just know that if I can connect it with something that I know well plus I like the example because the are always realistic so I enjoy it. I really don’t, I don’t have any negative feelings towards it actually.

**T: And do you normally if you struggle a little at first do you keep on trying until you solve it or do you give up easily.**

I keep on trying, I always, like I retrace my steps if I know like if I have a long sum and somewhere through I’m confused I always reread it or redo it so I can understand what I’m doing in my own sense.

2. **What do you do before you start solving a problem? Wat doen jy voordat jy begin om ‘n wiskunde probleem op te los?**

Okay the first thing I do is I just read through it to picture it in my mind so like if they give an example of a boy or something I just imagen it so that I can get a realistic sense to know that like so I can relate to it more and then from there then I can start calculating in terms that Ill understand more.

**T: How many times do you read the problem?**

It depends on the difficulty level but if it’s like a normal answer then I’ll read it between two and three times just to fully understand.

3.. **Explain to me how you solved this problem. Verduidelik vir my hoe jy hierdie probleem opgelos het?**

**T: I want us to look at your test that you did for me the other day and I’ve chosen question 3 the one where the irregular shape rock is placed. I want you to explain to me your reasoning behind it? Please take me through your reasoning. You can read it, of course you can read it because I don’t think you remember and then you just tell me.**

So, I read it the first time and then I looked and then I envisioned my mind how two cylinders one is full of water the next one is the same amount of water but there is just a rock inside so then I worked out how you need to get the volume.

**T: What is significant about the two cylinders?**

The height the change of water the height of the water the change and the rock inside. So, then I looked at it and I worked out if I can work out the volume of the rock in common sense it must mean the original amount of water minus the new amount of water that you call the rock that's there cause that's the additional volume added and I just work it out through the entire process and at a point I got the answers.

**T: Why did you work with volume and perhaps not area?**

I think volume would be the best because it shows the weight and the density and everything about it unlike with area you only get a one perspective kind of thing. But the volume works it out easier for me.

**T: And area is the surface it's normally a flat surface but volume is the space that is occupied by the liquid and the rock.**

**4. Do you think that you have solved this problem correctly? Explain why. Dink jy, jy het hierdie probleem korrek opgelos? Verduidelik waarom**

I think so because then I logically i think it's right.

**T: Yeah, your answer is correct and it's perfectly done. It is 100% correct. I think it's important that you say that one always had to visualize the problem because if you can imagen it then you can do it. You answered your test very, very well. Ja, I don't even want to say more about that I was proud of you.**

Thank you, mam.

**5. What do you normally do once you have reached a solution to the problem? Wat doen jy gewoonlik sodra jy 'n probleem opgelos het?**

If I reach a solution but I'm not a 100% sure I just quickly work it out to see if it does work but if in die end I do get a solution and it works out I'm sort of happy

that like I applied the steps right and everything. I get that moment of relief and happiness and got it.

**T: That eureka hey! Sometimes the answer just looks wrong hey? One has that sense that it doesn't look right and then one can try again.**

**6.Do you see yourself as a good problem-solver? Why? Sien jy jouself as 'n goeie probleemoplosser? Hoekom?**

I do I mean I like solving problems and I always find a way to connect thing like something that I do and I do enjoy solving problems like and I always try to find the root cause of the actual thing that I have to find out so I would say that I am a good problem solver

**T: You've got lots of confidence and I like that. One must be confident to get somewhere in life.**

**L11**

1. **How do you feel when you must solve a mathematics problem? Hoe voel jy wanneer jy ‘n wiskunde probleem moet oplos?**

Die eers gedagte wat in my kop inkom is watse reëls moet ek gebruik om hierdie probleem uit te werk of is daar eintlik ’n probleem of moet ek net twee goed vergelyk.

**T: Voel jy bietjie bang?**

Nooit nie.

**T: Nooit nie, jy’s baie gelukkig. Jy’s die uitsondering, want die meeste kinders is maar bang, raak angstig en paniekerig.**

Ek was nog nie een keer, ek het al van my juffrouens se altyd vir my ek het die as ek die dag wil het ek die potensiaal om wiskunde baie goed te doen, want toe ek in graad 1 was het ek al graad 4 vlak wiskunde sonder om bang te word of foute te maak wiskunde gedoen.

**T: So jy doen goed in jou wiskunde?**

Ja

**T: En jy hou daarvan?**

Ja dis vir my

**T: Dit help, dit help baie.**

2. **What do you do before you start solving a problem? Wat doen jy voordat jy begin om ‘n wiskunde probleem op te los?**

Ek lees as ’n soos die probleem daar staan maak ek lees ek deur wat ek lees ek die vraag seker twee keer deur. Hang af hoe lank hy is as hy net kort is leer ek net twee keer deur, as hy lang is lees ek hom drie keer deur net om veilig te wees en dan merk ek op wat daar is soos as hulle vir my ’n prentjie gee sal ek hom, sal ek hom teken en ek sal al die byskrifte byteken om seker te maak ek het alles en dan, as dit net klomp nommer is soos klomp lengtes en goed dan sal ek dit neerskryf in ’n som om vir my te se okay se nou ek moet xy kwadraat = x, iets in daai lyn xy kwadraat tot die mag 4. Dan sal ek dit als neerskryf en dan moet ek uitvind wat is x en y.

**T: Okay, so jy werk met ’n plan.**

Ja.

**T: Dis baie mooi met selfvertroue.**

3.. **Explain to me how you solved this problem. Verduidelik vir my hoe jy hierdie probleem opgelos het?**

**T: Ek wil hê ons moet kyk na ’n probleem wat jy verlede week vir my in die toetsie gedoen het. Ek wil net kyk of dit nou die regte ene is, ja. Hierdie ene van die klip wat in die silinder geplaas word kan jy hom onthou?**

Ja ek kan hom onthou

**T:Okay dink jy, jy het hom reg gedoen?**

Toe, die oomblik toe ek besef jy moes die een nie die een wat ek toe ek agterkom iets, almal het vir my gesê dat die hoogte is die hoogte van die water en dat die vorm aan die binnekant, ek het vergeet om die klip se lengte af te trek van die hoogte. So dis ’n groot helfte om af te trek van die totaal af. **(Woorde raak weg kan nie hoor nie)**

**T: So hoe, hoe, ek sien jy het dit in een probleem gedoen.**

Ja

**T: Hoe, as jy dit nou weer moet doen, hoe dink jy sal jy dit aanpak? Dink jy dit is een probleem of dalk twee aparte probleme en dan ietsie ekstra wat nog gedoen moet word of hoe dink jy?**

Uhm, ek dink ek sal net eers weer deurlees en dan kyk wat die probleem in die som is ek weet ek het ek, ek het nie die som heeltemal reg uitgewerk hier nie want, ek dink ek sal die som oorlees en dan hierdie keer in plaas van dat ek net ek het my, my brein het onmiddellik gedink omdat daarso staan hoogte toe dink ek wel, dit is die hoogte van die silinder self en toe werk ek net die silinder uit want dit is wat my brein vir my gesê het ek moet doen en toe vergeet ek heeltemal dit kan eerstens dit kon dalk nie die hoogte wees van net die water ek en moes die silinders sin uitwerk en

dis seker hoekom ek met daai geut en dit moet helfte van dit wees en dit is dat die lengte dalk 30, die lengte dalk 30 of 15 cm is en dan sal ek uitwerk of kan of dan sal ek die vorm se omtrek binne uitwerk , oppervlakte binne uitwerk en dan sal ek dit aftrek van die silinder sin af.

**T: Okay, want wat gebeur, hulle wys vir ons nou die, die silinder sonder die klip en dan met die klip. Wat gebeur met die water vlak as jy nou ’n voorwerp binne in sit?**

Hy sal styg.

**T: Dit sal styg so aanvanklik was dit 10 cm hoog en met die klip is dit 13,2**

So dit bedoel seker nou die klip is ’n hoogte is 3, 2

**T: Maar dit gaan oor die volume**

Ja

**T: Onthou dit gaan oor die volume want die volume van die klip verplaas die water op.**

Ja

**T: Okay, so verstaan ek jou dat jy se jy praat van twee goed aftrek?**

Ja

**T: Hoor ek jou reg?**

Ja, dat jy moet uitvind wat is die

**T: Wat ’s die volume nou**

Wat is die volume nou ja en dan wat is die volume voor die tyd

**T: En dan trek jy dit af.**

Ja.

**T: Okay, dis 100% reg. Nogal nie so maklik nie nè?**

Dit is die een wat ek eintlik wat ek, ek dink dit was een wat ek onthou wat nogal bietjie my kop moes krap het.

**T: Want as ek verder kyk het jy heeltemal goed geantwoord. Dit is maar net daai een, dan het jy bietjie gesukkel met die pizza ene**

Ek dink ek het, ek kon iets onthou van die pizza een en dat ek bietjie probleme gehad het.

**T: Maar ag ons gaan nie nou verder oor dit gesels nie. Dit is vir my voldoende.**

**4.Do you think that you have solved this problem correctly? Explain why. Dink jy, jy het hierdie probleem korrek opgelos? Verduidelik waarom**

**Die vraag is deel van vraag 3 beantwoord.**

**5.What do you normally do once you have reached a solution to the problem? Wat doen jy gewoonlik sodra jy 'n probleem opgelos het?**

Ek sal, ek sal eerstens sal kyk uhm, is daar nog 'n manier om hom uit te werk sodat ek kan toets of dit reg is. Ek weet dat ek, dit was al partykeer dat ek te lank gefokus het op 'n som dat ek gestoot was vir tyd dan sal ek dit nie kan doen nie, maar ek weet ook baie keer sal ek hom, sal ek hom ook los en dan sal ek eerste die hele toets deurgaan en dan sal ek hom na die tyd sal ek hulle so merk en dan sal ek gaan kyk okay, ek moet hierdie toets ek moet nou hierdie som moet ek nou weer gaan toets na die tyd so dan werk ek hom uit en dan amper, as ek 'n ander manier kan uitvind hoe om dit te doen wat kom op die regte antwoord dan weet ek dit reg.

**T: Okay en gebeur dit partykeer met jou dat jy na die antwoord kyk en dink dit lyk nie reg nie, dit kan nie wees nie.**

Net as hy heeltemal uit perspektief uit is soos byvoorbeeld as jy met Pithagoras se stelling, jy't jou lengte, jou hoogte is, is 4 cm en jou basis is se nou maar 5 cm en jy kom by 'n antwoord uit van 14 dan kan ek het seker nou, seker nou 'n fout gemaak hierso ek moes seker die ding ek moes seker ek moes seker nou, ek het hier 'n fout iewers gemaak soos ek het dalk byvoorbeeld, ek het die vierkantswortel het ek nie bygesit of iets soos dit nie

**T: Ja, so jy gee tog ag daarop?**

Ja

**T: Jy't reflekteer oor dit wat jy gekry het of dit sin kan maak of dit waar kan wees of nie**

As ek die oomblik sien hys nie reg nie dan sal ek deur al my werk gaan om te kyk of dit reg want ek het die iets verkeerd gedoen hierso.

**T: Ja ek weet mens is baie keer gedruk vir tyd. Dit hang af of jy tyd het, maar as dit ’n gewone som is soos in die klas of n huiswerk som dan kan ’n mens nou mos, maar met hom sit en worstel en so.**

**6. Do you see yourself as a good problem-solver? Why? Sien jy jouself as ‘n goeie probleem oplosser? Hoekom?**

Ja, dit is nie vir my, dit is vir my baie maklik om probleme op te los. Wiskunde probleme en normale probleme, ek kan nie die probleem kan ek in my kop kry en dan kan ek hom uitwerk soos hy daar sit of ek kan hom op papier uitwerk, maar die, soos en nou gesê het partykeer met tyd en dan sal ek bietjie druk en dan sal ek ’n fout of twee, dan sal ek een of twee van die goed uitlos.

**T: Doen jy goed in jou wiskunde?**

Op hierdie stadium doen ek beter, doen ek nogal goed. Ek het nie laasjaar het ek nie sleg gedoen nie, maar ek het swakker gedoen as wat ek in graad 7 gedoen het, want ek onthou tussen die graad, tussen graad 1en 7 het ek nooit onder 90 gekry vir enige toets nie en toe laasjaar het ek bietjie geduik en ek het baie swakker punte gekry. Ek het nie een keer onder ek dink 75 gekry nie, maar dit was nou nie my beste poging gewees om die wiskunde uit te werk nie.

**T: As jy nou terug kyk na gr 8 wat dink jy was vir jou die moeilikste van graad 8 in vergelyking met graad 7.**

Daar was, jy’t ’n groter aantal goed geleer as wat jy gehad het, want in graad 7 in die laerskool het jy bietjie by geleer bietjie bygeleer, so die ander goed was reeds daar gewees so dan fokus jy net op daai klein bietjie by en dan in het dit veroorsaak dat ek nie, dat ek het gewoonlik seker so 2 of 3 dae voor die tyd het ek , het ek klaar al my opsommings aan die begin van die kwartaal klaar, maar as ek een of twee dae voor die tyd dit eers begin en deurgaan, maar nou kom ek nou agter laasjaar dit werk nie meer nie, want jy kry ’n groter aantal goed by soos dit is amper dubbel die werk wat jy laasjaar geleer het so jy moet op al daai fokus en op daai fokus so terwyl jy leer vir ’n ander vak moet jy leer vir wiskunde ook want dit is  dit het nogal baie groot aantal gestyg.

**T: En was dit nie die algebra oorwegend die x en die y goed wat ’n mens maar bietjie pootjie nie?**

Dit het nogal baie met jou kop gespeel. Dit is nou al makliker, maar dit het ’n groot, ek dink dit was ’n dit het nogal baie effek gehad want dit is ’n nuwe konsep wat jy moet leer, want in laerskool het jy geleer dit plus dit maak dit. Nou moet jy uitvind wat maak wat plus dit maak dit so jy , dit speel nogal baie met jou kop rond, maar dit word, as jy net bietjie daarna oplet en jy gaan kyk bietjie mooi daarna dan sal jy dit makliker onthou.

**S1**

1. **How do you feel when you must solve a mathematics problem? Hoe voel jy wanneer jy ‘n wiskunde probleem moet oplos?**

Well depends like if it’s hard them sometimes I don’t get worried but it’s like a challenging so I really try to work hard and get the right answer. I really do like word problems like it encourages you to think outside the box.

**T: Do you become scared or anxious?**

No

**T: No, okay that a good thing. Just to be relaxed and just to take it, take it by storm.**

Yes.

2. **What do you do before you start solving a problem? Wat doen jy voordat jy begin om ‘n wiskunde probleem op te los?**

Okay so I read through all the information that they give us I make sure that I understand it and then I see I try to figure out different ways that I can approach the word problem. Which one is the best and then I go with that one. If it doesn’t work then I try another option to try and solve.

**T: So like trial and error kind of thing?**

Yeah.

**T: Wonderful**

3.. **Explain to me how you solved this problem. Verduidelik vir my hoe jy hierdie probleem opgelos het?**

**T: I want us to look at one of the problems that you did in the test for me the other day. The one about the wood the piece of wood out of which box is made. Can you remember it?**

Yes.

**T: Was it challenging, a bid more difficult or how did you experience it?**

I didn't find it that difficult because I envisioned it as like a box and that would be the height so I already had that length because I know

**T: Let's just go back to the beginning. How, why did you find or how did you find the 3cm or why did you find why did you do this section here, why did you start with that?**

Okay they gave us the volume and volume is equaled to l x b x h and they gave us the length already and the

**T: The length and the breadth or the width 4 and 5**

Yes, and then I the volume was 60 cm cubed so then I divided found out what times 5x4 60cm and 3 would have given you 60cm if you multiplied it by 5 times. So that's how I got the 3 cm then I used it for to calculate the rest of the areas.

**T: I see that you have calculated the areas of each part separately. The answer you got is 103 but it is 110. I see you've got one two three four parts, but how many small parts are there in the figure in the picture.**

One two three four five six, four different areas. Area 1, Area 2

**T: So, what do you think went wrong here? That you didn't get 110 but only103. You said 5x4 I assumed this is the big one?**

Yes.

**T: And then you SAID five, didn't you miss one?**

I'm not sure

**T: Can we look perhaps look at it another way if you know that this is 3 and this is 3, is there perhaps an easier way to do it than splitting up the small areas? This is right I'm just trying to see why it's not a 110.**

Maybe there is something here. Okay three, that's five, 3x5=15 that 30, 30 plus 3 times ...plus 20 (Learner is talking to himself in a soft voice can't hear what he is saying).

**T: Can we perhaps look at it this way?**

Okay

**T: What would the length of the piece of wood be if you know that the height of the box is 3 and this side is 4. What is the length of this side?**

That would give you 10

**T: 10 All right the other side the length of the other side this one is 5 and 3 and 3**

That's 11

**T: That 11, so the area will then be 10 multiplied by 11 which is**

110

**T:110. I. Think it was just a small calculation error. It doesn't really matter what you've done is excellent. That's another way of doing it and I just think ag we not going to waste time on this but I just think it was a calculation error or you missed another piece.**

Mam cause I, Mam I thought the area only involved the outline parts so I didn't add

**T: Ooo, you didn't add them and what was the question, calculate the original area of the piece of wood before anything was cut out. Allright so we always learn from our mistakes to. It's good to make mistakes because we learn.**

**4.Do you think that you have solved this problem correctly? Explain why. Dink jy jy het hierdie probleem korrek opgelos? Verduidelik waarom**

**Question was left unanswered.**

**5.What do you normally do once you have reached a solution to the problem? Wat doen jy gewoonlik sodra jy 'n probleem opgelos het?**

Okay so I check to make sure the answer would work in the situation if it would give the outcome expected. Then after that I would make sure that it works that yeah.

**T: You don't just leave it and carry on to the next one. You always check to see does this answer make sense, can it be, is it impossible, you normally do that?**

Yes

**T: We call it reflection, it's a good thing to do if you know that he answers must be positive and now suddenly you get a negative answer then you know something is wrong**

**6. Do you see yourself as a good problem-solver? Why? Sien jy jouself as 'n goeie probleemoplosser? Hoekom?**

Generally, yes but then there are some word problems that I really struggle with sometimes, but yeah

**T: And do you give up easily or do you keep on until you get it right?**

Yes

**T: Yes, that is excellent, that's the way that you must do.**

**S22**

1. **How do you feel when you must solve a mathematics problem? Hoe voel jy wanneer jy ‘n wiskunde probleem moet oplos?**

Ek is nie gestres nie soos eks baie bly dat ek nie daar is nie soos eks nie baie soos eks nie angstig of enige iets nie, ek as ek die som doen dan raak ek net eers rustig want as ek gestres is kan ek in elk geval niks konsentreer nie. So ek ja, ek is rustig en ek lees die som tot ek hom verstaan en weet wat om te doen en dan doen ek hom

**T: So jy beleef nie regtig die angstigheid wat baie kinders beleef met wiskunde nie**

Nee

**T: Dis wonderlik.**

2. **What do you do before you start solving a problem? Wat doen jy voordat jy begin om ‘n wiskunde probleem op te los?**

Ek lees hom eers en maak seker wat van my gevra word soos wat ek moet doen dat ek nie die verkeerde se nou maar vergelyking opstel of ek ja, ek lees hom soos twee of drie keer deur om seker te maak wat ek moet oplos of wat die probleem is en dan ja dan gaan ek.

**T: Gebruik jy partykeer kleure? Of highlighter of onderstreep of so iets?**

Ja, met vergelykings gebruik ek gewoonlik verskillende kleure penne om verskillende se nou maar vat die verskillende soos 2x en x soos.

**T: Die veranderlikes**

Ja, daarsy

**T: Veral as ’n mens hulle moet optel en aftrek as hulle so baie is kan jy hulle maklik mis en deurmekaar raak.**

3.. **Explain to me how you solved this problem. Verduidelik vir my hoe jy hierdie probleem opgelos het?**

**T: Julle het verlede week hierdie toets vir my geskryf en ek wil graag met jou praat oor vraag 8.**

O jinne ja, hy was moeilik.

**T: Was hy vir jou moeilik?**

Ek het hom nie so lekker.

**T: Jy't goed begin jy't net aan die einde 'n foutjie gemaak. Onthou jy nog die boksie, die karton en dan wil hulle 'n boks maak vertel vir my hoe het jy geredeneer om die hoogte 3 te kry?**

Okay, die volume se, volume is l x b x h en dan die volume wat hulle vir jou gegee het was 60 en dan vul ek net in lengte en breedte is 5 en 4 en h bly, weet jy dan nog nie, en dan so 5x4 is 20h en dan 60 =20h en om die h wat die hoogte is alleen te kry moet jy deel deur 20 aan albei kante en 60 gedeel deur 20 is 3 so die hoogte is 3.

**T: Hoekom dink jy dis nodig om te weet wat die hoogte is?**

Sodat ek kan uit figure hoe soos hoe lank daai blokkie is wat vierkantige blokkie is wat uitgesny is.

**T:Baie slim want die hoogte, die grootte van die blokkie wat uitgesny is, bepaal die hoogte van die boks. Goed, nou wil ek, ek gaan vir jou die pen gee as jy dalk wil uitwerk. Hulle soek eintlik die oppervlakte van die oorspronklike stuk karton of hout. Ek wil hê jy moet bietjie hier kyk, waar jy 5+3 =8 en 4+3=7 gesit het dan gaan jy sien jy weet nou, kyk kry net gou vir my die lengte en die breedte en onthou nou die lengte moet letterlik van daar tot daar en die breedte van bo tot onder.**

Okay, so ooooo nou vang ek wat ek fout gemaak het, ek het net een blokkie bygetel in plaas van net al twee.

**T: Okay so wat is die regte lengte?**

So 6+7=13

**T: Nee, wag wag hierdie een is 4**

O skies, hy is 4 en

**T:en 3**

3 so dis 4+6=10

**T:10 die lengte is dan 10 en dan die breedte**

Die breedte is 5+6=11

**T:Ja, en wat is dan die oppervlakte?**

10x11 is110

**T: Klein foutjie, maar jou baie leerders kon nie verstaan dat hulle eintlik die hoogte nodig het nie so dit is net ’n klein foutjie aan die einde.**

Okay so dis 10x11=110 vierkante cm.

**T: As jy partykeer sukkel met ’n probleem hou jy aan en aan tot hy klaar is of gee jy maklik op?**

Nee, ek probeer soveel as moontlik want ek hou van punte.

**T: Ja, almal hou van punte**

So ek probeer so veel as moontlik om dit uit te werk.

**T: Okay ek wil net gou hier kyk hoe lyk die ander, jy het baie mooi beantwoord. Die een met die pizza het jy bietjie drooggemaak.**

Ja ek het nie geweet wat om hier te doen nie.

**T: Want onthou jy’t die deursnee van die pizza, maar jy moet die oppervlakte uitwerk wat moet jy met die deursnee doen?**

Deur die helde deel.

**T: Verder het jy regtig baie mooi. Ek gaan nou nie regtig oor die ander praat nie.**

**4. Do you think that you have solved this problem correctly? Explain why.**
**Dink jy jy het hierdie probleem korrek opgelos? Verduidelik waarom**

Ek weet regtig nie tannie.

**5.What do you normally do once you have reached a solution to the problem? Wat doen jy gewoonlik sodra jy ‘n probleem opgelos het?**

Ek kyk of dit, of ek toets wel as dit ’n vergelyking is sal ek dit toets maar as ek soos daai 110 het sal ek ook net seker maak my bewerkings is reg. Soos daar het ek dit nie gedoen nie en toe maak ek ’n fout soos met die 7 en 8 so as ek okay nou het ek daaruit geleer nou sal ek met elke som wat ek doen seker net weer deur my berekening, bewerkings gaan en seker maak ek het nie ’n fout gemaak nie dan ja.

**T: Baie keer is dit ook maar die tyd faktor, veral in die eksamen. Was daar genoeg tyd vir julle om my toets te voltooi?**

Ek het dink ek gemaklik klaargemaak ek weet nie, ek dink daar was een of twee in my klas wat tot die einde geskryf het. Ek weet nie of hulle klaargekry het nie, maar ja ek het gemaklik klaar gekry.

**T: Het julle ’n uur of ’n uur en ’n half gehad?**

Uur en ’n half

**T:Okay, okay want dis dink sommetjies. Daar’s maklik bietjie moeiliker en moeilik. Het jy agter gekom?**

Ja

**T: Dit is juis die idee daarmee.**

**6.Do you see yourself as a good problem-solver? Why? Sien jy jouself as ‘n goeie probleemoplosser? Hoekom?**

Ek dink ek is van die beteres in die graad, maar ek is nou nie die beste nie uhm soos dit is soos die moeilikste vir my van wiskunde is die probleem oplossings. Die algebra en meetkunde daai goed is vir my maklik maar om, ek het baie gesukkel veral aan die begin van die jaar of eintlik laas jaar ook om die probleem te identifiseer en dan die vergelyking of wat ook al op te stel en dit uit te werk. Dit is vir my die moeilikste, maar nou soos meneer Koekemoer ook vir ons gesê het jy moet dit meer en meer en meer oefen en dan sal jy dit regkry makliker reg soos nou kry ek dit makliker reg waaroor ek baie bly is.

**T: Oefen jy op ’n gereelde basis?**

Yes, meneer Koekemoer gee vir ons hy gee vir ons woord somme vandat ons gevra het dat ons sukkel met dit so ja.

**T: Wat dink jy is so moeilik van ’n woord probleem?**

Ek dink dis moeilik om woorde in somme om te sit soos dan moet jy eers identifiseer wat gevra word en dit in ’n som sit soos om sit en dan moet jy dit uitwerk. Ek dink dis die moeilikste daar om dit te identifiseer en dan om te sit maar die som uitwerk is maklik, maar om die woorde na somme toe te vat is moeilik.

> **T: Nou gaan ek vir die mooi geleerde naam vir dit gee, ons noem dit Modellering. Die slim mense praat van dit. Dis presies wat jy se, jy vat ’n probleem en jy sit dit om in wiskunde taal en dan kan ons soos jy se, dis maklik om die vergelyking op te los of die grafiek te maak dit is Modellering. So nou het ek weer vandag vir jou iets geleer.**

**L17**

1. **How do you feel when you must solve a mathematics problem? Hoe voel jy wanneer jy ‘n wiskunde probleem moet oplos?**

Relatief gespanne, maar nie te veel nie. Soos as dit nou moeilik is in ’n vraestel of wat ook al.

**T: En sommer elke dag so in die klas?**

Ja.

**T: Okay, so jy, ja dit is maar, dink ek maar ’n natuurlike gevoel.**

2. **What do you do before you start solving a problem? Wat doen jy voordat jy begin om ‘n wiskunde probleem op te los?**

Ek sal die vraag ’n paar keer deeglik probeer deurlees en dan probeer dink wat is die beste manier om dit op te los**.**

**T: Okay, dis ’n goeie manier.**

3.. **Explain to me how you solved this problem. Verduidelik vir my hoe jy hierdie probleem opgelos het?**

**T: Ek het gekyk na jou toets en ek wil hê ons moet gesels oor die pizza probleem. Onthou jy hom of, dis nou ’n week terug so dis al lank gelede. Die probleem gaan oor twee pizzas ’n grote en ’n klein een. Die groot pizza se deursnee is 40 en hy kos soveel en die kleiner een se deursnee is 30 en hy kos minder. Kom ons begin hierso ek wil vir jou vra, jy het die oppervlakte bereken nè? In die oppervlakte van ons neem aan die pizza is sirkel die oppervlak is Pie r kwadraat. Nou die deursnee is 30, maar wat het jy nodig in die formule vir die oppervlakte van ’n sirkel. Het jy die deursnee nodig of die radius?**

Die radius

**T: Okay, die oppervlakte is pie r kwadraat**

Ja hy is ja

**T: Okay, kan jy vir my sê wat is fout**

Ek het die deursnee gevat vir die radius in plaas van die ja

**T: So eintlik in plaas van 20 moes jy**

Ek mos 10 gehad het

**T: En in plaas van 40 moes jy?**

20

**T: 20 Gebruik het en weet jy baie keer is onderwysers, doen hulle juis dit om te kyk want baie kinders en selfs grootmense vergeet om die helfte van die deursnee te vat vir die oppervlakte. Okay, so daai nou weet ons. Toe het hulle gesê ons moet die R per oppervlakte uitwerk, dink jy, jy't dit reg gedoen?**

Ja, ek dink so tannie

**T: Rand wat beteken rand per oppervlakte vir jou? Wat deel jy deur wat?**

Jy deel die oppervlakte deel jy deur R

**T: Hoor mooi, Rand per oppervlakte. Die per, dit is 'n deelsom nè?**

Ja

**T: Watter een kom bo en watter een kom ander as dit R per oppervlakte is?**

O so dan moet jy die Rand, die hoeveelheid op, die hoeveelheid R per een kubieke sentimeter ag vierkante sentimeter uitwerk.

**T: Ja, so watter, watter een kom bo?**

Die R moet dan bo wees.

**T: So wat is dan hierso verkeerd?**

Ja, ek het daai omgeruil.

**T:Hulle moet omgeruil word. Ag dis maar net vir interessantheid ek wil net hoor hoe gesels jy**

Maar ek doen dit altyd in klas

**T: Is dit**

Ja

**T: Onthou nou per, R per oppervlakte. Dis R gedeel deur oppervlakte. Kilometer per uur. Kilometer gedeel duur uur. Verder het jy jou goedjies mooi beantwoord. Jy het hierdie ene van die hout en die boksie wat gesny word het jy 100% reg. Ek was baie trots op jou. By vraag 1 waar jy die waardes moet uitwerk het jy net een foutjie gemaak verder het jy 5 uit die 6 het jy reg en alles is verder 100% reg so ek is baie trots op jou.**

4. **Do you think that you have solved this problem correctly? Explain why. Dink jy, jy het hierdie probleem korrek opgelos? Verduidelik waarom**

Ek dink my metode is reg, maar ek weet nie of die antwoord reg is nie.

5. **What do you normally do once you have reached a solution to the problem? Wat doen jy gewoonlik sodra jy ‘n probleem opgelos het?**

Ek probeer gewoonlik kyk of hy reg is tannie**.**

**T: Hoe doen jy dit?**

Ek gaan gewoonlik terug om nuwe werk en gebruik die inverse daarvan, probeer dit te gebruik.

**T: Okay, ons noem dit refleksie, het jy al die woord gehoor? Jy reflekteer oor dit wat jy gedoen het. Dit is ’n goeie gewoonte om aan te leer. Partykeer is ’n mens antwoord mos baie groot of te, hy lyk te klein of dit lyk net verkeerd, om dan net weer bietjie te kontroleer of dit reg is of nie.**

6. **Do you see yourself as a good problem-solver? Why? Sien jy jouself as ‘n goeie probleemoplosser? Hoekom?**

Nee tannie.

**T: Nie! Hoekom nie? Jy het dan alles hierso so mooi reg behalwe twee foutjies.**

Ja, ek weet nie tannie, dis maar net glo my ek sukkel met dit maar

**T: Waarmee sukkel jy as jy dit in woorde moet skryf?**

Gewoonlik met kleiner goedjies soos dan sal ek die nommers partykeer omdraai of ek sal dit optel inplaas van maal of wat ook al.

**T: O so dis kleiner agterlosige foutjies**

Ja.

**T: Maar die jy, jy, is ek reg as ek se jy verstaan, jy weet wat om te doen, maar jy doen dit partykeer nie 100% reg nie. Maar mens kan daaraan werk nè? Jy kan beter word met dit deur te probeer om mooi akkuraat te werk. Is jy baie haastig van geaardheid? Werk jy vinnig?**

Ja

**T: Dit kan dit ook wees. miskien bietjie impulsief of jy's te haastig of jy is bang jy kry nie klaar nie en dan gaan jy vinnig en dan gewoonlik maak 'n mens foute. Geniet jy die SETH?**

Ek is nie in SETH nie.

**T: O jy is nie by SETH nie, maar jy ek neem aan jy hou van jou wiskunde**

Ja tannie.

**T: Wat wil jy word?**

Ek wil dalk medies gaan doen.

**T: Dan gaan jy hard moet leer nè?**

Ja tannie.

**T: Het jy fisiese wetenskappe, o julle kies nou eers volgende jaar**

My beste vak is lewens en

**T: Okay baie, baie sterkte**

# Grade 10 Learners

**S22**

1. **How do you feel when you must solve a mathematics problem? Hoe voel jy wanneer jy ‘n wiskunde probleem moet oplos?**

Ek voel maar net soos normaal ek,

**T: Is jy bang, raak jy paniekerig?**

Nee

**T: Het jy selfvertroue?**

Ja

**T: Okay, so dis vir jou net gewoonweg?**

Ja

2. **What do you do before you start solving a problem? Wat doen jy voordat jy begin om ‘n wiskunde probleem op te los?**

Ek lees my vraag soos drie keer deur en maak seker dat ek soos die hoof goeters wat ek nodig het om die vraag klaar te maak onderstreep en al daai goed.

**T: Okay en dit werk vir jou?**

Ja dit werk baie goed.

**T: Ek leer ook altyd vir my studente om inligting te onderstreep of te highlight of te omkring dan is dit asof dit uitstaan nè? Dan help dit ’n mens.**

3.. **Explain to me how you solved this problem. Verduidelik vir my hoe jy hierdie probleem opgelos het?**

**T: Ek het gekyk na jou toets ek wil met jou praat oor vraag 8. Ek sien jy skryf sommer net die antwoord neer, maar ek sien ook in jou diagram het jy syfertjies ingeskryf. Verduidelik vir my hoe jy te werk gegaan het.**

Ek kan nie eintlik onthou wat ek

**T: Jy kan hom maar lees of kom ons praat vinnig daaroor. Dit is ’n stuk hout en dan sny hulle vierkantige blokkies uit en dan maak hulle van hierdie stuk hout ’n boksie en die volume van die boks is 60 en jy weet die lengte is, van die boks is 4, die breedte is 5 hoe het jy gedink?**

Ek het gedink oor dit ’n vierkant is, gaan al sy sye mos ewe lank moet wees, so daai gaan 3 wees en daai gaan 3 wees so ek gaan maar die 5 6 moet bytel en by die 4 ook 6.

**T: Maar hoe, sê  net gou vir my hoe, jy sê omdat dit ’n vierkant is**

Gaan al die sye ewe lank moet wees.

**T: Die wat uitgesny word?**

Ja

**T: Okay**

So, 3+3 of 3+

**T: Se eers vir my waar kry jy die 3, jammer ek val jou in die rede. Die volume van die boks is 60 die lengte is 5 en die breedte is 4.**

Uhm

**T: Wat is die volume van ’n boksie, in terme van, wat is die formule?**

Dit is die lengte maal

**T: Maal die breedte maal die**

Hoogte

**T:Okay**

Toe deel ek dit deur 5 en toe deel ek dit weer deur 4 toe kom ek op 3 uit, want 3 maal met 4 maal met 5 is 60

**T: Okay 60, okay. Dan vou hulle dit net op dan is dit ’n boksie. So, die hoogte is 3. Goed toe het jy nou 3, 3, 3 , maar ek wil weet hoe het jy by 110 uitgekom?**

Want ek het my hoogte toe tel ek 3 by 5, 6 by 5 by word daar 3

**T: Toe kry jy 11?**

Toe kry ek 11

**T: Okay, kom ons skryf dit hier neer**

En toe tel e kook 6 by 4 en toe kry ek 10 en 11 maal met 10 is 110

**T: Dis 100% reg. Is jy geneig om altyd net die antwoord te wil skryf?**

Nee, maar ek weet nie

**T: Nie? Want as ek kyk na die res van jou toets, jy skryf eintlik baie min waar ek kan verstaan hoe ja ook nie regtig, selfs hierdie sommetjie wat van die silinder met die klip, dis 100% reg, maar jy't baie min geskryf. Kry jy nie raas as jy nie jou stappe wys nie?**

Ek, nee maar ek weet nie ja

**T: Doen jy dit altyd so?**

Nee ek doen dit nie eintlik baie nie

**T: Dis net vir my baie interessant want, want dit is 100% reg maar hoe het jy byvoorbeeld by hierdie waardes uitgekom vir in 'n toets of eksamen moet 'n mens kan sien hoe jy geredeneer het en hoe jy daarbý uitgekom het.**

Maar ek het hier bo ook goed bygeskryf.

**T: Ja, maar kan jy onthou van die, hierdie som? Die hoogte van hierdie silinder is 10 en as die klip in is in die 13,2. Verduidelik gou vir my hoe, hoe het jy by hierdie 785,4 by die linker een uitgewerk?**

Ek het eers sy volume uitgewerk

**T:Okay**

En toe kry ek dit as sy volume en toe werk ek sy volume uit en toe kry ek dit en toe minus ek

**T: Hoekom minus jy?**

Want ek , want as, want hierso is daar bygetel, het jy die klip se volume bygetel. So as jy hierdie hier aftrek gaan net die klip se volume oorbly.

**T: Daar is hy. Baie slim. Dit is net vir my interessant hoor. Mens kan sien jy het goeie insig om dit so te kan doen. Ek moet byvoorbeeld elke stappie skryf anders raak ek heeltemal deurmekaar. Was die toets vir jou in geheel moeilik?**

Ek dink die laaste vraag was vir my

**T: Hierdie een?**

Nee, nee

**T: Die een van die pompe?**

Ja

**T: Was dit die moeilikste? Maar ons gaan nie nou oor hom gesels nie ek wou net geweet het hoe jy by die ander ene uitgekom het.**

**4.Do you think that you have solved this problem correctly? Explain why. Dink jy jy het hierdie probleem korrek opgelos? Verduidelik waarom**

**Vraag was nie beantwoord nie.**

**5.What do you normally do once you have reached a solution to the problem? Wat doen jy gewoonlik sodra jy 'n probleem opgelos het?**

Ek skryf maar net neer.

**T: Dink jy is dit reg of is dit verkeerd, lyk dit reg**

Ek gaan maar net weer deur, maar gewoonlik gaan, bly ek maar by my eerste keuse

**T: Ja, hulle sê dit is gevaarlik om jou eerste keuse dood te trek en te verander nè? Jou eerste keuse is gewoonlik reg.**

Ja.

**6.Do you see yourself as a good problem-solver? Why? Sien jy jouself as 'n goeie probleemoplosser? Hoekom?**

Ek weet nie

**T: Se ja of nee of**

Ja ek

**T: Kom ons, kom ek vra so, kry jy meeste van die tyd dit reg?**

Ja.

**T: Dat jy suksesvol is?**

Ja.

**T: Dan is jy 'n goeie probleem oplosser en ek wil vir jou vra geniet jy dit om wiskunde probleme op te los of is dit maar net een van daai goed wat jy moet doen?**

Ek hou van dit as dit soos meetkunde en daai goed is en as dit algebra is nie so baie nie, maar ek hou van dit dis vir my nogal lekker.

**T: Ek neem aan jy gaan wiskunde kies volgende jaar?**

Ja

**T: Wat wil jy graag word?**

N siviele ingenieur

**T: Dan het jy goeie wiskunde en fisies nodig.**

Ja

**S24**

1. **How do you feel when you must solve a mathematics problem? Hoe voel jy wanneer jy ‘n wiskunde probleem moet oplos?**

Mam it depends on whether the, I understand the problem, so if i understand it then I feel good but if I don’t then I know it’s scared?

**T: Obvious one gets nervous.**

2. **What do you do before you start solving a problem? Wat doen jy voordat jy begin om ‘n wiskunde probleem op te los?**

I read it first so I can understand and then I list everything they already told me about it so I can start.

**T: And then of course you start thinking hey, and plan because it’s all about the plan.**

3.. **Explain to me how you solved this problem. Verduidelik vir my hoe jy hierdie probleem opgelos het?**

**T: Last year you wrote this test for me. And I want us to talk about this last problem. Now I’m going to give you time to read through it. There is the English and then we, together we’re going to try and see if we can solve it. Can you remember it?**

No mam

**T: It was long ago.**

Okay mam

**T: Let me help, we are going to talk through this together they cut out these square pieces nè?**

Yes mam

**T: They square so they, sides are all the same.**

Yes.

**T: Where do you think should one start?**

Won’t you start by calculating the volume first.

**T: What is the volume of the box you take the pencil then you write.**

Mam isn't it 60 cm cubed?

**T: Why do you need to be able to do this problem? What do you need to know first?**

This box small squares?

**T: Do you agree that those, the length of the squares will be the height of the box?**

Yes

**T: Do you agree with that?**

Yes

**T: All right so you know that one side is 5 cm and the other one is 4 so what will the height be? You can substitute it, what is your formula in terms of length?**

It's length times breadth times height.

**T: Okay.**

So, mam this length is this the length variable?

**T: Ja, that's 5.**

So, this all together with this will be the height.

**T: These, these are the sides that will be folded up. So, of the original box it will just be the 5 times the 4 cm. Because these flaps will come up to form the box so you just need to work with 5 and 4 for the length and width of the box.**

So, isn't it length times breadth?

**T: Say again?**

Isn't it then just length times breadth

**T: Yes, sorry no, no for the box, for the box it will be the height as well**

Okay so mam I already have the length and breadth

**T: Ja, you have 5, 4 and we need the height.**

Yes

**T: Okay but this now equal to 60 so you can put H-as you variable how do you determine**

You substitute this in this

**T: Yes**

And this is

**T: All right what is the value of h?**

Okay you going to divided it by 20 on both sides.

**T: Good**

And then we are going to get H-as **(Can't hear what the learner is saying)**

**T: Good all right I like to put it in remember now you must get the area. We think this is a square but it's not, it's a rectangle. Because this is 5 cm and this is 4 so it can be square. But now we know that this is 3 and this is 3 and this side is**

Sides are all 3**(Can't hear what the learner is saying)**

**T: Ja they're all 3 so how can I determine the area of this pièce of**

Okay, length times breadth

**T: Good**

So, you just going to add 3 and 3 so you add 6 cm to the formula so basically **(Can't hear what the learner is saying)**

**T: Add 6 to 4 ja, which is?**

**(Can't hear what the learner is saying)**... here as well so it's going to be 11cm multiplied by 10 cm

**T: Good**

110

**T: What is the unit?**

Cm squared

**T: Cm squared, excellent. Did you have it correct? Check there down there.**

I **(Can't hear what the learner is saying)** no I didn't. Because I added instead of multiplying

**T: Did you find this problem difficult on that day?**

Yes

**T: Challenging, it makes us think.**

**4.Do you think that you have solved this problem correctly? Explain why.**

**Dink jy, jy het hierdie probleem korrek opgelos? Verduidelik waarom**

**Question was left unanswered**

**5.What do you normally do once you have reached a solution to the problem? Wat doen jy gewoonlik sodra jy 'n probleem opgelos het?**

Mam I check if it's right?

**T: How do you check if it's right?**

Well with x and y then I substitute it into the x or the y variable to see of its right and with problem solving mam I just **(Can't hear what the learner is saying)**

**T: Sometimes we get an idea that the answer is wrong, isn't it?**

Yes mam

**T: It looks too big or too small or it is negative and it should not be negative so then we can always check.**

**6.Do you see yourself as a good problem-solver? Why? Sien jy jouself as 'n goeie probleemoplosser? Hoekom?**

Yes mam

**T: Why? You've got lots of confidence I like it, why?**

Mam because I get most problems solved and sums right mam and I read the question very thoroughly and I understand it.

**T: You don't have a problem with the English?**

No

**T: Good, excellent.**

**L69?**

1. **How do you feel when you must solve a mathematics problem? Hoe voel jy**
   **wanneer jy ‘n wiskunde probleem moet oplos?**

Mam sometimes like now nervous but other times like if I’m right then I am confident

2. **What do you do before you start solving a problem? Wat doen jy voordat jy begin om ‘n wiskunde probleem op te los?**

Mam I read through the question properly and then like I try to see what is the easiest method to do it

**T: Okay**

And then like I follow steps that I’ve learned in class and if it doesn’t work out, then I don’t know, I just do whatever is going to give me an answer that looks correct

**T: okay, ja maths is a challenging subject, isn’t it?**

Yes mam

3.. **Explain to me how you solved this problem. Verduidelik vir my hoe jy hierdie probleem opgelos het?**

**T: Do you mind if I just take a question from somebody else’s test?**

No mam it’s fine

**T: I’ve been talking to everybody about question 8. So maybe we can just but they all worked it now so you going to see what the answers are. We can just talk about this problem we don’t have to solve it**

Yes mam

**T: Can you remember, it’s a long ago in November last year.**

I doubt I finished this question**.**

**T: I’ll go and check if I get to the office to see what you did. Okay, I, we can just talk about it. This is a piece of wood and then they cut out the corners**

Yes mam

**T: They say it’s a square**

Yes.

**T: And then they fold up the sides, these are folded up those are folded up to make a box. Can you imagen that**

Yes

**T: and now they say that the volume of the box is 60 cubic cm do you agree that this will now be the base of the box, the bottom part of the box?**

Yes mam

**T: Those are now folded up so what is the area of this inner part if it is 5 by 4 cm. What is the area of a rectangle? Just look at that light grey one. What is the area of a rectangle?**

Of a quaere or a rectangle?

**T: Rectangle so its 5 by 4 so it's not a square**

Length

**T: Length times**

Breadth

**T: 5 times 4**

Is 20

**T: 20. All right so we know that the base is 20. Can you remember the formula for the volume of a box?**

Length times breadth times height.

**T: Okay, I'm going to give you the pencil**

Yes mam

**T: Are you also left handed?**

Yes mam

**T: Like me? We want to determine the height and the volume is?**

60

**T: 60 All right what is the height?**

**Long silence.**

**T: 3cm**

Yes mam

**T: Excellent, now once we know that these are squares so the all 3 by 3 the four corners. Can you now determine the area of this whole piece of wood before the time?**

Yes mam

**T: Okay work it for me please.**

**Long silence**

**T: It that a 4**

Yes mam

**T: Okay**

**Long silence**

**T: 110 cm Square excellent did this person had it right?**

No

**T: No, most of the learners struggled a little with this one. Because if you look at it now, what do you think is the main thing that you have to realize to be able to solve this problem**

Mam to find out the missing pieces

**T: Yes, and the missing pieces becomes the what of the box? These, the missing pieces cut out it becomes the, this is the, what do you call it?**

Height

**T: Height, if you realize that you have to be able to think 3dimentionlly a little to be able to understand. If you realise that the pieces cut out and you fold it up that's length or size lengths forms the height then you can do it. Then it becomes very, very easy.**

Yes mam

**4.Do you think that you have solved this problem correctly? Explain why.**

**Dink jy jy het hierdie probleem korrek opgelos? Verduidelik waarom**

**Question was left unanswered.**

**5.What do you normally do once you have reached a solution to the problem? Wat doen jy gewoonlik sodra jy 'n probleem opgelos het?**

Mam like if it seems right I carry on until I'm done with my whole exam paper then I check again with my calculator to see if it is going to work out or, otherwise If I don't have time then I just leave it. Like I don't have time to look at it again.

**T: Does it sometimes happen that it seems wrong, the answer?**

Yes mam, then I just like get nervous and I carry on.

**T: Ag shame, maths is a challenging subject.**

**6.Do you see yourself as a good problem-solver? Why? Sien jy jouself as ‘n goeie probleemoplosser? Hoekom?**

Yeah, kind of like I, I’m good at it but in like one question I make a mistake or something it doesn’t feel right to me then like I doubt myself throughout the question paper

**T: Ja, it’s as if you lose confidence**

Yes mam

**T: To some extent.**

**S20**

1. **How do you feel when you must solve a mathematics problem? Hoe voel jy wanneer jy ‘n wiskunde probleem moet oplos?**

Well it depends, like during an exam, if I see like I’m running out of time and I see o my gosh I must solve this problem I start panicking and freaking out but then in the beginning if I have like enough time then I can, I’m pretty calm and ja.

**T: Okay, do you get good marks in mathematics?**

Sometimes mam yeah**.**

**T: Okay**

2. **What do you do before you start solving a problem? Wat doen jy voordat jy begin om ‘n wiskunde probleem op te los?**

Well I read the question and make sure that I understand and then most of the times I draw diagrams to understand the question better so ja.

**T: Do you sometimes make use of colours?**

Ja, I never use colours.

**T: In Geometry?**

No

**T: Because it could also help to mark things that are the same or equal with different colours**

3.. **Explain to me how you solved this problem. Verduidelik vir my hoe jy hierdie probleem opgelos het?**

**T: You did this test for me a long time ago, in November last year. So, it might be a little challenging to tell me. How you were thinking when you were doing this but we are going to give it a try. I’ll explain to you, it’s a piece of wood, can you remember?**

Yeah, i remember this one

**T: Slightly, a piece of wood from which squares sides are cut out and then they make a box. Okay and they give you the volume of the box, they say it's 60 cubic cm they give you the length and the breadth of that inner part and they want you to determine the area of the original pièce of wood. Can you remember?**

Well, **(Can't hear what the learner is saying)** Okay well then first I think I did here I wanted to calculate the area of these squares right here

**T: Okay, how?**

Mam

**T: Look at the inner part they give you that this piece here is 5cm and this one is 4. All right the volume of the box, after cutting this out, the volume of the box is 60, so if you know that this is 5 and this is 4 how can you get the height of the box?**

5cm plus **(Can't hear what the learner is saying)** calculate the origin of the area of the pièce of wood and I have 60

**T: The box's volume is 60, what is the volume of a box?**

Lxbxh

**T: So, the length is**

5cm times 4cm

**T: So, what will the height be?**

3 cm

**T: You are perfectly correct 3cm. Okay I'm going to give you a pencil and then I want you to see is you can determine the area of the box. Once you know that the, do you agree that the height is the length of the sides that has, the sides that have been cut out. Okay see if you can find them, the original length and the original breadth of the original pièce of wood from which this box was cut.**

Did i finish this question?

**T: You did. We will see if your answer is right.**

Okay, so, I must basically just solve this there.

**T: Ja, no all I want you to do now, you've solved it halfway, is what is, what is this original length if this is 3 this is 4 and that is 3**

Isn't it going to be 10?

**T: 10 cm. Okay, and the other side**

Isn't the square 10 cm?

**T: All right, okay what is the area of the original pièce of wood then?**

A hundred cub, no squares per cm

**T: Which numbers do you multiply?**

10 Times 10 length times breadth

**T: Isn't it 11?**

Mam

**T: The other one is5, 5+3+3 is?**

But then if it's a square, how are the lengths different?

**T: They just cut square pieces out.**

O

**T: Its' not a square, it's a rectangle. Ja, that's a good question. So, what is the other length, 5 + 6**

Okay 5 yeah 11

**T: So, 11 times 10 is**

110

**T: 110 Square cm, is your answer correct?**

No

**T: Okay but we not going to look at what you did incorrectly now at this stage.**

**4.Do you think that you have solved this problem correctly? Explain why.**

**Dink jy jy het hierdie probleem korrek opgelos? Verduidelik waarom**

**Geen antwoord**

**5.What do you normally do once you have reached a solution to the problem? Wat doen jy gewoonlik sodra jy 'n probleem opgelos het?**

To a problem?

**T: Yeah, you've solved it now, this is the answer now, before moving on to the next problem, what do you do with your answer?**

I evaluate what I did to get to that answer and I make sure that I followed like I understand why I got this answer

**T: All right. That's good, but it also depends on time in a test or exam then it's a bid challenging.**

6. **Do you see yourself as a good problem-solver? Why? Sien jy jouself as 'n goeie probleemoplosser? Hoekom?**

In a sense mam, but like it depends what kind of problem solving it is. Because like I enjoy solving problems if I understand and know what to do, but if I have to like go through different ways like I don't I don't, I don't so yeah.

**T: Okay, but in general, you think you can do it right?**

Yeah, I think I can

**S25**

1. **How do you feel when you must solve a mathematics problem? Hoe voel jy wanneer jy ‘n wiskunde probleem moet oplos?**

I’m calm and relaxed mam.

**T: Never scared?**

No

**T: You are a lucky girl. So, you have confidence?**

Yes mam

**T: Do you enjoy your math’s?**

Yes mam

**T: And do you get good marks?**

Sometimes mam

**T: Sometimes all right.**

2. **What do you do before you start solving a problem? Wat doen jy voordat jy begin om ‘n wiskunde probleem op te los?**

Well, I read the question critically and then I see if I understand in what other methods there are to solve the question.

3.. **Explain to me how you solved this problem. Verduidelik vir my hoe jy hierdie probleem opgelos het?**

**T: Last year you solved this question for me. Now it’s a long time ago but just to save time we can quickly, I’ll tell you what is going on okay? This is, this was a piece of wood and then they cut out these little squares because they wanted to make a box. All right I see you drew that because you were trying to make sense so you drew the squares in again. Then if these are cut out, do you agree that we can fold it up and make it a box?**

Yes mam

**T: Without a lid. These two pieces fold up and these on the other side up. All right, now the volume of this box is 60 cubic cm and do you agree that this will then be the bottom part of the box?**

Yes

**T: So, it's 5 cm by 4 cm. Now we need to get the length of this side, isn't it?**

Yeah.

**T: Do you agree that that is the height of the box? The pièce that has been cut out will be the height of the box? Can you try and find me the value of the height? What is the formula for the volume of a box? All right, what is the length?**

**(Can't here what the learner is saying)**

**T: and the breadth?**

**(Can't here what the learner is saying)**

**T: Okay the height is?**

**(Can't here what the learner is saying)**

**T: And you had?**

Two

**T: Okay so there was little misunderstanding but that's okay, it didn't count any marks. All right now what's, we know that this is 3**

I see what I did here mam

**T: What did you do write**

**(Can't here what the learner is saying)**

**T: You just made a calculation error. You're reasoning was perfect, 100%. Can you now determine the area of this?**

Box

**T: This original flat piece of wood if you know that these sides cut out are all 3**

**(Can't here what the learner is saying)**

**T: And then that one is?**

So, it's going to be **(Can't here what the learner is saying)**

**T: Yes, that's good. That one is 5 it's on the other side but it's 5**

**(Can't here what the learner is saying)**

**T: So, what is the area? A 110cm squared excellent.**

Thanks mam

**T: Do you think that part is correct with the mistake? It looks like it hey? Because you got 2 so you said 4, 6, 8**

Yes

**T: And ja, that, that answer is correct with the mistake where h 2. Wonderful.**

**4.Do you think that you have solved this problem correctly? Explain why. Dink jy jy het hierdie probleem korrek opgelos? Verduidelik waarom**

**Question was left unanswerd**

**5.What do you normally do once you have reached a solution to the problem? Wat doen jy gewoonlik sodra jy 'n probleem opgelos het?**

I usually just double check it mam but if it's like hard to solve the equation I usually just substitute on both sides and then see if it works out.

**T: Okay, do you sometimes get a feeling that there is something wrong with the answer?**

Yes mam

**T: And what do you do then?**

I start from the beginning and than I do the whole sum, and if I get the same answer then it's right.

**6.Do you see yourself as a good problem-solver? Why? Sien jy jouself as 'n goeie probleemoplosser? Hoekom?**

Yes, mam sometimes

**T: Sometimes why, why do you say sometimes?**

Well mam some problems can are easier to understand that others so this one I solve better that others and then some problems I just don't understand what is going on so then I struggle a lot

**T: How do you feel when you struggle like that you realize that you don't really know how to do it**

Mam I get annoyed and I sometimes tend to skip it and go do thing that I understand

**T: Some we win and some we lose hey? Life is like that.**

**S14**

1. **How do you feel when you must solve a mathematics problem? Hoe voel jy wanneer jy ‘n wiskunde probleem moet oplos?**

Mam i normally feel anxious but when it’s, when it’s an exam I feel anxious but when we do class work I just, I don’t know I feel calm and I feel like I can do it.

2. **What do you do before you start solving a problem? Wat doen jy voordat jy begin om ‘n wiskunde probleem op te los?**

Well first I read the question and then I try to make an image for myself like many when they say calculate the area of a rectangle it’s 6 cm long, then I draw a picture for myself because it’s easier for me to visualize and then write the, the question and then ja. I start from there.

**T: That’s very clever, it works well. It’s always good to visualize something. Because if you can see it you can plan**

3.. **Explain to me how you solved this problem. Verduidelik vir my hoe jy hierdie probleem opgelos het?**

**T: Last year you completed this test for me and I want us to look at question number 8. So, I’m going to, you can read it, there is the English wording and then me and you were going to work through it and see if we can reach a solution.**

Okay.

**T: If you look at that, the question was to determine the original area of the pièce. All right read through it and then we’ll can see if we can solve it together.**

Okay. Must I read aloud?

**T: No, you can read quietly, I’ll wait for you.**
**(Long Silence)**
**T: Okay this is what’s happening: they cut that out hey? And they are all squared so we can assume that they’re the same size.**

Yes

**T: And then when that was cut out they fold it up and they made a box.**

Yes.

**T: Okay, what is the volume of this box?**

They say the volume of the box is 62 squared cm, cubic cm

**T: Cubic cm, all right, so what is the volume of a box? In terms of the formula?**

It is.

**T: You can take the pencil.**

The volume of a box is length times breadth times height.

**T: Times height, okay, so if the volume is 60 and we know that two sides are 5 and 4 cm, can we determine the height of the box?**

I think so it is the height, it's the length which is, the length is 5

**T: Ja.**

And then the breadth is, the breadth is 4 and then multiplied by the height which is unknown which is equal to 60.

**T: Yes, good**

Yes, and then if you multiply that it will give you 20 and then it's 60 and then you're going to because it's a multiplication sign you take it over the 20 and then it's going to give you, you say the thing

**T: The height.**

It's 3 cv

**T: 3cm**

I think

**T: All right, now if we know that the length of which square cut out is 3, will you now be able to determine the area of the original piece of wood**

Yeah, I think I will.

**T: Okay, do it for me please.**

I would say it is 4 because this length is like that I will say its 4 plus 3+4 which is 7 + another 3 which is 10

**T: Yes, excellent, excellent**

And then I want the area, right?

**T: Ja, of the original piece of wood**

The original piece which is square when I put on the square pieces on the side then I would say that 10 multiplied by 10

**T: Look there you must take this side as well. This the original piece of wood is a rectangle. Because if you look this is 5 and 3 and 3**

5 and 3 and 3. O, so that 11

**T: Eleven ja.**

O, so it will be 11 multiplied by 10

**T: which is**

110

**T: And what is the unit of the area**

It is cube square cm

**T: Okay excellent. Was it a challenging one that day that you did it?**

It was very challenging, because I come from other questions which retained me. so I couldn't think and the other thing, I didn't have enough time. So, I was ruching and I could so it. I didn't, the thing is I always work from a picture so at that time I didn't have the, the to visualize I didn't have time to visualize so I just wrote thing I don't know.

**T: Okay, its fine it didn't count marks**.

**4.Do you think that you have solved this problem correctly? Explain why.**

**Dink jy, jy het hierdie probleem korrek opgelos? Verduidelik waarom**

No, I don't think it is.

**5.What do you normally do once you have reached a solution to the problem? Wat doen jy gewoonlik sodra jy 'n probleem opgelos het?**

Once I have solved a problem, I substitute it into, into the variables to see if its corrects and if it works out then I know that it's correct.

**6.Do you see yourself as a good problem-solver? Why? Sien jy jouself as 'n goeie probleem oplosser? Hoekom?**

I really don't know. I don't think I'm a good problem solver.

**T: Why?**

I don't know. It's not that I won't find a solution but I will find a solution after a while I must have time

**T: Time.**

If I have time I don’t think properly but I do find solutions. But I only find them after a while. I work slow through the questions and problem-solving but I will find it but it will just take me time.

> **T: Okay that says a lot. So, if you have enough time you will be a good one if you have little time not necessarily a good one.**

Yeah, I will be confused one.

**L18**

1. **How do you feel when you must solve a mathematics problem? Hoe voel jy wanneer jy ‘n wiskunde probleem moet oplos?**

Well it depends on the problem sometimes I feel calm and just detached and just read through the question and apply the work that I know and sometimes I start to stress when I think if I don’t know the solution or how to get to the solution.

**T: Okay that’s a normal reaction I would say.**

2. **What do you do before you start solving a problem? Wat doen jy voordat jy begin om ‘n wiskunde probleem op te los?**

I make sure that I understand all the facts given to me and what is asked of me of the answer what exactly they want so as not to do more work that is required and waste time.

**T: Okay excellent. Do you have any specific strategy that you follow once you’ve read the question and before you as an attempt to start?**

Not particularly just to make sure I know what is given.

**T: Ja, and know what is asked and I like the comment that you made, without doing unnecessary work, that is true.**

3.. **Explain to me how you solved this problem. Verduidelik vir my hoe jy hierdie probleem opgelos het?**

**T: You did very well in this test that you did for me last year I want us to just talk about, I know it’s a long time ago. It was in November last year. So, I want us to talk about question number 3 and what I want you to do is just to explain to me, after you’ve read through this again and just familiarise yourself with this again your thinking behind the way in which you solved it. It’s the one about the irregular, or stone so let’s say it’s a stone put into a cylinder.**

Right I’d first, I read through the question and then I came to the conclusion, calculate the volume so first I wrote the formula for the volume of a cylinder then I saw in the first image there is a volume and it gave me the height and the radius, so I calculated what the original one was then I saw the stone and I calculated what the

new height was and after I calculated the volume of the new one then I just simply subtracted it from the original one to find, to find the volume of the stone because logic states that if the first one had so many meters or cm and the second one has that many cm the difference will be the volume of the stone.

**T: Excellent, excellent, we call it modelling in maths where you take a real-life situation and you transform it into a mathematics equation or formula of whatever that you can solve to answer the question. Excellent, because if a stone is, something is placed in a cylinder the water level obviously rises as you've just said. Well done.**

4. **Do you think that you have solved this problem correctly? Explain why. Dink jy, jy het hierdie probleem korrek opgelos? Verduidelik waarom**

**Question was left unanswered.**

5. **What do you normally do once you have reached a solution to the problem? Wat doen jy gewoonlik sodra jy 'n probleem opgelos het?**

I usually move on to the next question and at the end of the paper if I still have time left I will go through the ones which I'm not exactly certain of just to double check.

**T: Okay, and does it sometimes happen to you that you just realize that this answer doesn't really make sense I think there is something wrong**

It does.

**T: Do you deal with that immediately or also at the end?**

I usually figure it out at the end when I've gone through it and so I quickly would just try to correct and find the error to correct the answer.

**T: Okay, because sometimes it is a calculation error or something small. If it's homework and you know that you're not working against time do you do it differently?**

Sometimes, sometimes with homework I don't know I'm working against time I will if I'm unsure of anything will just quickly run through the sum again, check for errors, check for any calculational errors or sign errors and then once I'm sure it is completely correct then I'll move on.

**T: Okay, well done**

6. **Do you see yourself as a good problem-solver? Why? Sien jy jouself as 'n goeie probleemoplosser? Hoekom?**

I think I’m not the best, but I’m not that bad I think**.**

**T: Why do you say that? That you’re not, let me rephrase the question do you normally get good, well I assume that you normally get good marks in mathematics am I right?**

Normally

**T: Don’t you think that that makes you a relatively good problem solver?**

Relatively good I think maybe, but there also are times where I make various stupid errors.

**T: That we all do that, we all that do, do that.**

**L13**

1. **How do you feel when you must solve a mathematics problem? Hoe voel jy wanneer jy ‘n wiskunde probleem moet oplos?**

Dit is okay as ek soos begin, maar sodra ek soos ingaan en eks nie heeltemal seker nie dan begin ek bietjie te stres en ja, dan raak dit bietjie moeilik.

**T: En stres jy meer in die eksamen as in die klas of met huiswerk?**

Ja eksamen is baie erger as die huiswerk in die klas.

**T: Dink jy die probleme is moeiliker of wat dink jy is dit?**

Ek dink, as ek gewoonlik na die tyd deur my toets gaan dan sien ek dit was eintlik maklik maar ja dit was maar dieselfde as die huiswerk dit was net ek dink die omstandighede

**T: Eksamen is vreesaanjaend nè?**

Ja.

**T: Beleef jy dit in ander vakke ook of meer in wiskunde?**

Meer in wiskunde, maar daar is van die ander vakke ook.

2. **What do you do before you start solving a problem? Wat doen jy voordat jy begin om ‘n wiskunde probleem op te los?**

Ek lees die som soos mooi deur en kyk wat hulle vra en soos dan soos besluit ek wat ek gaan doen en hoe ek dit gaan oplos.

**T: So jy maak ’n plan, ’n boer maak ’n plan.**

Ja**.**

3.. **Explain to me how you solved this problem. Verduidelik vir my hoe jy hierdie probleem opgelos het?**

**T: Dan wil ek hê ons moet kyk na die probleem in hierdie toets julle het nou die dag toe toets weer geskryf. Was dit vir jou makliker as laas, verlede jaar?**

Ja

**T: Ek gaan net vinnig sê net om tyd te spaar, dit is die twee silinders die linker een se hoogte is 10 cm en die tweede een word ’n klip geplaas dan styg die watervlak tot 13,2 en ons moet die volume van die klip uitwerk.**

Ja.

**T: So kan jy onthou of probeer om vir my te vertel wat hier aangaan?**

Ek het soos eerste met hierdie ene het ek sy volume gaan uitwerk

**T: Yes.**

En dan het ek hierdie een se volume gaan uitwerk ook en dan het ek die, daai van mekaar af geminus en dan die verskil daar tussen gaan dan die klip se volume wees.

**T: Okay, hoekom minus jy die twee volumes?**

Want die water volume is dieselfde en toe nou dat die klip bygesit is die hoeveelheid wat dan gestyg het gaan dan vir ons se hoevele volume is die klip.

**T: Okay, baie slim, klink amper soos fisies nè? Soos wetenskap.**

Ja

**T: Dis baie mooi. Dink jy daar is ’n kort manier om hierdie probleem op te los? In een sommetjie?**

As mens die verskil tussen die hoogte dalk gevat het en net daai volume uitgewerk het in plaas van om dit te gaan minus.

**T: Ja, dis 13,2 en 10 , wat is dan die verskil in volume?**

3,2

**T: 3, 2 En as jy dan die volume van die silinder uitwerk kry jy presies dieselfde antwoord sommer dadelik. Ek het nou die dag gesien van die kinders het dit so gedoen en dit was vir my nogal baie oulik. Maar geen probleem nie, die lang manier is ook reg ons kom presies by dieselfde antwoord uit.**

**4.Do you think that you have solved this problem correctly? Explain why.**

**Dink jy jy het hierdie probleem korrek opgelos? Verduidelik waarom**

**Geen antwoord.**

**5.What do you normally do once you have reached a solution to the problem? Wat doen jy gewoonlik sodra jy ‘n probleem opgelos het?**

Ek gaan gewoonlik deur my stappe en as daar soos ’n omgedraaide is dan gaan kyk ek en dan werk hom uit en kyk of hy dan reg is.

**T: Okay, gebeur dit soms dat jy na die antwoord kyk en dien Joe dit kan nie reg wees nie.**

Ja, partykeer as die antwoorde so bietjie ja

**T: Bietjie weird nè?**

Ja

**T: Of jy’t ’n minus antwoord en jy weet dis onmoontlik, wat doen jy dan?**

Ja, dan gaan ek gewoonlik net eers aan na die ander som toe en dan gaan ek terug en dan probeer ek weer soos kyk hoe ek dit gaan oplos

**T: Okay en in die eksamen? Dan werk ’n ou teen tyd, dan is dit anders. Hoe maak jy dan?**

In die eksamen dan sal ek ook eers aangaan na die ander somme toe en wat soos doen wat ek verstaan en dan sal ek teruggaan na die wat ek so bietjie oor getwyfel het.

**T: Okay**

**6. Do you see yourself as a good problem-solver? Why? Sien jy jouself as ‘n goeie probleem oplosser? Hoekom?**

Ek dink so half, half. Daar’s van die goed ja

**T: Okay, verduidelik vir my meer**

Met die algebra goeters, die nuwe werk wat ons nou doen daarso is so bietjie met wat ek meer sukkel, maar die woord som en daai tipe goeters dis vir my makliker.

**T: Is dit?**

Ja.

**T: Dis gewoonlik anders om by kinders. Woord probleme is moeiliker as die gewone goed. Wat het julle nou in algebra gedoen?**

Ons is besig met faktorisering.

**T: Okay, ja graad 10 in die middel van die jaar en julle het al ’n bietjie trig. gedoen?**

Ja.

**T: Hoe beleef jy dit?**

**Die trig. is okay, dit is beter as die algebra vir my**

**T: Hoekom, hoekom se jy so?**

Ek weet nie, ek verstaan dit beter as die faktorisering ek sukkel bietjie daarmee.

**T: Ja algebra het baie resepsies en reëltjies nè wat jy tog moet half memoriseer en kan doen om die goed reg te kry, trig. het minder, as jy weet wat sin cos en tan is dan kan jy sommer net aangaan.**

Ja.

**S23**

1. **How do you feel when you must solve a mathematics problem? Hoe voel jy wanneer jy ‘n wiskunde probleem moet oplos?**

Baie gemaklik

**T: Altyd?**

Ja, so mens nie die kan oplos nie dan moet ’n mens hom net kyk wat is gegee en watse stappe kan jy doen om die probleem op te los om van ’n ander perspektief af kyk.

**T: Raak jy nooit bietjie angstig of paniekerig nie?**

Partykeer, maar as ’n mens dit kan toepas dan sal ’n mens nie te angstig word nie.

**T: Dink jy dis omdat jy van wiskunde hou en goed doen daarin dat jy so voel?**

Ek hou van wiskunde en ek doen ook goed daarin. Dis een van my beste en lekkerste vakke.

**T: Ek dink dit sê nogal baie nè?**

2. **What do you do before you start solving a problem? Wat doen jy voordat jy begin om ‘n wiskunde probleem op te los?**

Ek lees eerste die vraag heeltemal deur om te sien wat is gegee en dan soek ek, kyk ek wat is gevra en dan begin ek eers kyk en as ek nie op die antwoord kom nie dan sal ek hom weer oor doen en kyk wat was my fout, of was dit ’n teken fout of omskakelings fout.

**T: Okay.**

3.. **Explain to me how you solved this problem. Verduidelik vir my hoe jy hierdie probleem opgelos het?**

**T: In ’n vorige toets het julle mos vir my sommetjies gedoen. Nou die dag weer, maar hierdie is somer verlede jaar sin. Het jy agtergekom dan die vrae eintlik dieselfde is?**

Presies dieselfde

**T: Kon jy dit onthou of het jy dit weer van, asof van nuuts af uitgewerk?**

Ek het dit, ek onthou die vrae, maar ek kan nie onthou hoe het ek dit uitgewerk nie. Ek kan net die vrae onthou, soos hoe is dit gevra en toe weet ek in ’n mate van wat het ek laas gedoen en ook die nuwe goed wat ek geleer het, kon ek toepas in die geval.

**T: Was hierdie toets nou die dag vir jou makliker as verlede jaar?**

Uhm

**T: Makliker gevoel bedoel ek?**

Makliker ja

**T: Hoekom dink jy so?**

Want ons het meer wiskunde al begin doen wat meer probleembaar, waarmee probleme oplos.

**T: Ja, ja dit maak vir my sin. Was dit verlede jaar vir jou baie moeilik of nie regtig nie?**

Nie baie moeilik nie

**T: Okay. Ek wil het ons moet praat oor vraag 3. Die som van die twee silinders waar in die klip is. Jy het hom reggehad. Ek wil hê jy moet vir my probeer verduidelik hoe jy geredeneer het om by die korrekte antwoord uit te kom. Sal jy dit doen?**

Reg. Hulle sê die hoogte van die water in die silindriese houer met ’n radius van 5 cm is gelyk aan 10 cm bereken die volume van ’n klip met ’n onreëlmatige vorm meet en besluit die hoogte nadat hy die klip ingegooi het van die water in die houer styg tot 13,2 cm bereken die volume van die klip in kubieke cm.

**T: Kan ek gou vir jou iets vra? Hoekom styg die watervlak?**

Want omdat daar nog ’n klip is, gaan daar ekstra massa wees van die water.

**T: Dis amper soos as ons in die bad klim nè? Dan styg die watervlak ook. Goed, hoe het jy gedink?**

Toe het ek eerste die oorspronklike volume van die houer bereken

**T: Ja**

Wat 785,4 kubieke cm was

**T: Ja**

En toe het ek die nuwe hoogte gevat nadat die klip bygevoeg is en dit toe volume van die water bereken nadat die klip bygevoeg was wat ’n 1036,73 kubieke cm so dus sal die volume van die klip wees die nuwe volume minus die oorspronklike volume.

**T: Hoekom doen jy dit? Hoekom minus jy die twee volumes?**

Want jy soek die verskil al, want die verskil gaan die klip wees die volume water het konstant gebly, maar die klip met ’n ander volume is bygevoeg.

**T: Dis reg. Dink jy daar is ’n korter manier om daai probleem op te los? Waar jy alles net in een sommetjie kan doen? Dink bietjie vir my daaroor.**

Wat van as ’n mens die hoogte vat nadat die klip bygevoeg was en dit aftrek van die hoogte van die oorspronklike water en dan daardie hoogte gebruik in die formule?

**T: 100% So jy sê vir my 13, 2 minus 10 is 3, 2. Hy’t 3, 2 cm gestyg en dan een, twee, drie dan het jy die antwoord. Nou, in nou die dag se toets het van die kinders dit nogal so gedoen en ek was aangenaam verras want dan is net een probleem in is en dis tjoef-tjaf klaar. Die volgende vraag, baie mooi, baie mooi jy het baie goed gedoen en ek is baie trots op jou.**

**4.Do you think that you have solved this problem correctly? Explain why.**

**Dink jy, jy het hierdie probleem korrek opgelos? Verduidelik waarom**

**Vraag was nie beantwoord nie.**

**5.What do you normally do once you have reached a solution to the problem? Wat doen jy gewoonlik sodra jy ‘n probleem opgelos het?**

In ’n toets of?

**T: Ag oor die algemeen, huiswerk, klaswerk toets, ek weet in ’n toets is dit bietjie anders nè? Okay kom ons vat sommer in die algemeen.**

Dan, in die algemeen dan is dit half algebra somme is soos vergelykings dan sal ek net die x waarde of die waardes gaan invul om te kyk of ek reg gemaal het of as ek klaar ’n antwoord het, sal ek hom net weer gaan toets om seker te maak nadat ek klaar met alles is, net weer vinnig seker maak.

**T: En in ’n kom ons se toets of ’n eksamen?**

Dan doen ek gou eers al die vrae en dan kyk ek dan is ek gewoonlik voor die tyd klaar en dan kyk ek sorgvuldig deur alles om net seker te maak dat ek al my stappe gewys het en ook die regte toepassings gebruik het**.**

**T: Gebeur dit partykeer dat jy ’n antwoord kry en dink dit lyk nie vir my reg nie.**

Ja.

**T: Wat doen jy dan?**

Dan toets en hom en dan sien ek dis dit maal ja,

**T: Okay, okay**

**6.Do you see yourself as a good problem-solver? Why? Sien jy jouself as ‘n goeie probleemoplosser? Hoekom?**

Ek hou van daai algebraïese probleem en probleme ek hou nogal van die waar jy spesifieke onbekendes moet uitwerk dis nogal lekker.

**T: Dink jy, jy doen dit goed? Dink jy, jy doen alles goed? Die meetkunde, het julle al analitiese meetkunde gedoen?**

Nee nog nie net nog

**T: Die meetkunde, trig.?**

Ons het al met rig begin. Ek hou maar van alles, maar algebra is maar my lekkerste

**T: Hart se punt**

Hart se punt

**T:Maar sien jy jou as oor die algemeen as ’n goeie wiskunde probleem oplosser? Ja, nee, miskien, hoekom?**

Ek’s self nie seker nie

**T: Ag waag net ek ken jou mos nie so jy kan maar se.**

Nee, maar ja ek sien myself as ’n probleem oplosser want ek hou van die wiskundige probleme op te los**.**

**T: Hou jy van ’n uitdaging en daai gevoel as jy dit reggekry het**

Dis lekker.

**T: Mens kan dit vir niemand beskryf nie.**

**S12**

1. **How do you feel when you must solve a mathematics problem? Hoe voel jy wanneer jy ‘n wiskunde probleem moet oplos?**

Ek stres aan die begin, maar ja as ek

**T: Altyd**

Ja, hang af of dit ’n moeilike probleem is of nie as ek eers daardeur lees en so min of meer weet wat om te doen. Dan is dit Okay, maar as ek nie weet wat om te doen nie dan begin ek stres.

**T: Dis seker, dis normaal nè? Dis normaal en dan hoop ’n mens maar jy kan ’n plan sien**

Ja.

**T: Wat jy net aan die gang kan kom. Veral as dit punte tel. Ag dis nie lekker nie.**

2. **What do you do before you start solving a problem? Wat doen jy voordat jy begin om ‘n wiskunde probleem op te los?**

Okay ek lees eers deur dit en dan lees ek weer deur en dan sal ek dit probeer soos opsom of uitskryf in wat sin maak om die probleem op te los soos in terme van x en so en.

**T: En as dit byvoorbeeld ’n meetkunde probleem is?**

Dan sal ek eers kyk wat alles gegee is en wat hulle wil hê en kyk wat ek kan maak om by die antwoord uit te kom.

**T: Dis baie slim en werk dit gewoonlik vir jou?**

Ja

**T: Dit doen, dit doen. Dit is goed.**

3.. **Explain to me how you solved this problem. Verduidelik vir my hoe jy hierdie probleem opgelos het?**

**T: Verlede jaar, dis nou baie lank terug, het julle hierdie probleem vir my gedoen, nou ek wil vra jy moet net, ons gaan nou-nou kyk of hy reg is of nie, deur hom lees en dan praat ons saam dan kyk of ons by die antwoord kan uitkom**

Okay.

**T: Lyk hy moeilik?**

Ja tannie,

**T: Okay, ons gaan saampraat. Hierdie hoekies word uitgesny en dan word die kante opgevou en dan maak dit ’n boks wat nou nie ’n deksel het nie. Al wat hulle vir ons gee om mee te begin is die volume van die boks. Stem jy saam dat hierdie kant en hierdie kant gaan op wees en daai kante gaan op wees so eintlik, hierdie gaan die basis van die boksie wees. Wat het ons nodig om die lengte van hierdie sye te kry as ons hierdie oorspronklike hout se oppervlakte wil bepaal. Kom ons begin by die volume. Sê vir my wat is die formule van volume, van ’n boksie.**

Lengte maal breedte maal hoogte.

**T: Mooi. Goed en wat sê hulle is die volume**

60

**T: 60 Goed en dan die lengte en die breedte**

Dis dan daai 5 en 4 saam met

**T: Okay, kan jy vir ons die hoogte uitwerk?**

(Baie sag kan nie hoor wat leerder se nie) ...nou hier so?

**T: 5x4 is?**

20

**T: 20h. Daar is hy, baie mooi. Het jy dit daar gehad?**

Nee.

**T: Dit is nogal ’n moeilike probleem. Goed nou as jy dis nou die hoogte van die boksie nè? So wat weet ons nou van hierdie hoekies?**

Dat hulle 3 cm is

**T: Dat hulle 3 is. Kan jy dan hierdie oppervlakte uitwerk?**

Ja.

**T: Okay doen dit gou-gou vir my asseblief. Dit is nou net ’n gewone reghoekige stuk.**

O Okay so en dan is, o Okay ek het gedog daai is 5 en daai is 4, Okay.

**T: Ek sien ja, maar mens leer altyd en gelukkig het dit nie punte getel nie.**

So dan is hierdie ene 3

**T: Ja**

En hierdie is 5

**T: Ja**

En hierdie is ook 3

**T: Ja, dit gee 5+6**

En hierdie is ook 3

**T: Okay, wat is dan die oppervlakte? Elf maal tien**

Dis 111, nee 110

**T: 110. Daar nie eers ’n rekenaartjie nodig vir dit nie. Wat is die eenheid van die oppervlakte?**

Vierkante cm

**T: Daar is hy. Jy het gekry 180, kan jy sien wat jou fout was? O, ek sien jy’t 5 gevat. 5 en 5 is 10 en 4 is , nee ek weet ook nie jy het 12 maal 15**

Ek het gedink hierdie is 4 en daai is 5

**T: O, en dan gaan dit**

Gedink en toe het ek, ek weet nie wat gedoen nie

**T: Ag dit maak nie saak nie nou het ons bietjie geleer uit ’n fout.**

**4.Do you think that you have solved this problem correctly? Explain why.**

**Dink jy, jy het hierdie probleem korrek opgelos? Verduidelik waarom**

**Geen antwoord**

**5.What do you normally do once you have reached a solution to the problem? Wat doen jy gewoonlik sodra jy ‘n probleem opgelos het?**

Dan sal ek weer na dit gaan kyk en dan die goed wat hulle gegee het in vervang en kyk of die antwoord wat ek gekry het sin maak anders sal ek weer oor probeer , ’n ander manier kry om die antwoord te kry.

6. **Do you see yourself as a good problem-solver? Why? Sien jy jouself as ‘n goeie probleem oplosser? Hoekom?**

Partykeer

**T: Partykeer, hoekom nie altyd nie?**

Want soos ek dink partykeer nie mooi hoe om by die antwoord uit te kom nie, ek maak klein of ek los klein soos ek sien dit op verkeerde manier as wat ek moet en dan kry ek ’n oplossing maar nie ’n regte oplossing nie

**T: Okay, so is jy partykeer impulsief? Gaan jy vinnig om klaar te kry en dan maak jy agterlosige foute?**

Ja, partykeer

**T: Maar gewoonlik rustig?**

Gewoonlik gaan ek rustig ja. Dit hang af hoeveel tyd ons het

**T: Ja, tyd, tyd is die belangrike faktor.**

**L56**

1. **How do you feel when you must solve a mathematics problem? Hoe voel jy wanneer jy ‘n wiskunde probleem moet oplos?**

Dit hang eintlik maar af van die kompleksiteit of die moeilikheidsgraad van die probleem. Normaalweg geniet ek dit nogal om iets op te los as ek hom nie voorheen gesien het nie geniet ek dit veral. Ja dit dis vir my lekker om iets nuuts te sien en te probeer dink en dit te moet doen en so. Nie soveel wanneer dit begin raak by dieselfde ding oor en oor doen nie, maar ja dis, as dit kom by ’n challenge of jy moet dink en maniere moet kry om dit op te los dan is dit lekker.

**T: Kan ek vir jou vra of jy partykeer angstig raak?**

Angs uhm

**T: As hy moeilik lyk byvoorbeeld en jy dink oef, ek weet nou nie regtig wat om hier te doen nie.**

Wel as ek nou by ’n som kom tannie en dis as dit nou sou gebeur en dit gebeur nie regtig met normale skoolvlak wiskunde, met wiskunde olimpiades is daar baie goed wat ek nie weet hoe om te doen nie, maar daai verstaan ek natuurlik, dis bedoel om moeilik te wees, maar met byvoorbeeld ’n wiskunde vraestel gebeur dit nie regtig nie. As daar iets kom wat ek dink ooo flip ek kan nie hierdie doen nie, dan gaan ek maar net aan met die res en dan kom ek terug na hom toe later. Ek begin paniekerig raak dalk as ek sien ek het min tyd oor en ek het nog baie om te doen, maar dit is omtrent al wat my regtig

**T: En dis normaal nè? Die tydsfaktor laat ons bietjie bang raak.**

2. **What do you do before you start solving a problem? Wat doen jy voordat jy begin om ‘n wiskunde probleem op te los?**

Bedoel tannie nou as ek die probleem gelees het en dan wat doen ek dan van daar af?

**T: Ja, dis wat ek bedoel.**

So dan, dan as dit nou, as dit ’n maklike probleem is natuurlik gaan ek net hom doen en klaarkry as dit ’n bietjie moeiliker een is dan sal ek, as dit iets is wat ek dink okay ek weet nou nie regtig  hoe om hierdie te doen nie skryf ek my om al die inligting wat hulle vir my gee neer dat ek dit voor my het en dan soek ek nou wat wil ek hê en dan werk ek hom so terug van okay dis wat ek wil hê, die is wat ek het wat is die pad wat ek nou gaan kry daartoe en dan soek ek maar net so rond. Partykeer maar tref en probeer?

**T: Ja dit is maar baie keer so.**

3.. **Explain to me how you solved this problem. Verduidelik vir my hoe jy hierdie probleem opgelos het?**

**T: Verlede jaar November het julle hierdie toets vir my geskryf. Dis nou baie lank terug so ek weet nie of jy regtig kan onthou nie. Jy’t baie goed gedoen, ek moet jou gelukwens. Onthou jy hierdie van die klip wat in die silinder geplaas word?**

Ek onthou hom ja tannie.

**T:Kan jy vir my verduidelik hoe jou, hoe jou denkwyse was toe jy dit opgelos het, want hy is reg.**

Wel tannie hulle het hulle...

**T: Jy kan vinnig lees, daar is tyd vir dit.**

Wel hulle gee mos hierso vir jou, hulle gee essensieel vir jou die volume voor en na die tyd, doen hulle nie?

**T: Jy kan maar lees. Hulle gee net vir jou die radius van die silinder en die hoogte voor die klip en met die klip.**

Dis essensieel die volume.

**T: Ja.**

Hulle gee vir jou die wat jy nodig het om die uit te werk so jy kan net sowel se hulle het vir jou die volume gegee, maar ja so hulle gee vir jou dit en dan werk jy net die volume voor en na uit en as jy dit van mekaar aftrek dan sal jy mos nou sien wat die verskil in volume is en dit gee vir jou die volume in ’n klim en dis mos inderdaad hoe, wie was dit oorspronklik dit, dit gesien het as ’n manier om volume uit te werk? Ek kan nie onthou wie nie, dit was spesifiek ’n wiskundige.

**T: Ek is nie seker nie. Seker nie Einstein nie nè?**

Dit was ’n, die oorspronklike eureka moment waarvan, waarna hulle verwys waar hy’t in die bad gaan sit en toe hy in die bad sit toe sien hy die water styg op

**T: Ek weet regtig nie.**

Dalk was dit Newton, ek was nie seker nie en toe kom hy agter o okay, so ek klim in, die water styg is dit nie ’n manier om, ag ek dink die dit was iets te doen met volume nie, maar dit was iets in hierdie rigting.

**T: Maar dit was opmerksaam**

Ja, ek het onder andere daaraan gedink toe ek hierdie gesien het, maar ja,

**T: Maar ja. Dit is ’n slim manier nè? Om dit te doen om dit in water te plaas anderste omdat dit so onreëlmatige voorwerp is, hoe anders gaan ’n mens dit doen?**

Ja, natuurlik.

**T: En die laaste gedeelte van die probleem, jy’t die volume van beide silinders nou uitgewerk**

En dan is dit natuurlik net nou die verskil uitwerk tussen die twee en dan as jy die verskil tussen die twee het dan het jy mos die verandering in volume en die verandering in volume is in hierdie geval mos nou ’n klip en die klip is, hulle se hierso die klip is heeltemal in water

**T: Ja, hy is heeltemal in water onder die water gedompel.**

So as hy nou ’n stukkie uitgesteek het dan sou mens nog kon se daar is kanse dat jy daai stuk mis van die klip, maar

**T: Ja, maar hy is heeltemal op die bodem van die silinder.**

**4.Do you think that you have solved this problem correctly? Explain why.**

**Dink jy jy het hierdie probleem korrek opgelos? Verduidelik waarom**

**Vraag was nie beantwoord nie.**

**5.What do you normally do once you have reached a solution to the problem? Wat doen jy gewoonlik sodra jy ‘n probleem opgelos het?**

Uhm

**T: Gaan jy maar net aan na die volgende vraag toe of...**

Weereens dit hang eintlik maar af van die moeilikheids graad en hoe maklik hy is om te toets eintlik as dit iets is wat jy sommer net so vinnig kan sien nee okay nee hierdie maak sin dan sal ’n ou kyk die maak sin of nee dit lyk nie vir my reg nie. En as, normaalweg gaan ek maar aan met die volgende. Moeiliker somme sal ek, sal ek

normaalweg eers net eers kyk okay, maak hierdie sin net vinnig ’n paar double check want dis baie maklik om ’n foutjie te maak iewers langs die pas

**T: Ja veral met ’n ou berekeningkjie nè?**

**6. Do you see yourself as a good problem-solver? Why? Sien jy jouself as ‘n goeie probleemoplosser? Hoekom?**

Ja ek glo so tannie ek, ek is nou nie, ja ek is nou nie ’n prodigy of enige iets nie

**T: Ja, hoekom wat is jou rede vir dit?**

Wel tannie ek, ek glo dat oor die algemeen kry mens nie regtig soveel meer slim mense of mense wat goed is in ’n sekere veld of iets as net ’n geïnteresseer in daai veld. Hulle, ek vind dat as jy hou van iets en jy doen dit meer en dit interesseer jou dan sal jy van nature presteer in die, in die area. So, mens daar is natuurlik mense wat met, wat geneties nie regtig daardie vlak van vermoë het nie, maar daardie mense is maar baie min en dis iets natuurlik heeltemal buite jou beheer. Maar oor die algemeen voel ek dat as iets iemand sleg is met ’n sekere rigting of met ’n sekere ding doen dan is dit eintlik omdat hulle nie vreeslik belangstel in daardie rigting nie en dus nie regtig tyd in sit in dit nie.

**T: Ja, belangstelling se baie nè?**

**Ja tannie**

**T: As dit jou interesseer dan sal jy ekstra moeite daarmee doen.**

## Interview questions for the mathematics teachers

## The focus in the interview is on the SETH learners

1. Do you observe any changes in learners' **attitude** towards mathematics? Explain.
2. Are there changes in the way in which learners' **attempt** to solve a mathematics problem? Give a reason.
3. Do you think that learners' **mathematics anxiety** has changed? Motivate your answer.
4. Do you observe any changes in learners' **problem-solving abilities**? Explain.
5. In which ways do learners **reflect** on the problem-solving process and the answer found? Give a reason.
6. How do you experience the changes in the Mathematics activities on Mondays?

# Teacher 1 (T1)

**1. Sien jy enige veranderinge in leerders se houding teenoor Wiskunde? Verduidelik**

Ja, ek sien definitief ’n verandering. Ek dink aan die begin is dit ook maar, omdat ek hulle nou vir die eerste keer hierdie jaar het ek nou vir hierdie groepie kinders, gee ek nou vir hulle skool, so ek het nie laas jaar met hulle te doen gekry nie en aan die begin is dit maar bietjie half, mens sien hulle is bietjie huiwerig want hulle leer jou nog ken en andersom dan nou, so ek kan sien party het nou meer vrymoedigheid om te kom vrae want soos wat hulle nou aangaan met hulle huiswerk en in die klas dat dit nou die geleentheid om vrae te vra of hulle hand op te steek of So. So hulle neem meer vrymoedigheid en ek kan sien dat soos wat hulle sukses behaal dat hulle meer positief is teenoor wiskunde sodat hulle ook kan sien jis hulle kan ook iets regkry.

**2. Is daar veranderinge in die manier waarop leerders ‘n probleem aanpak? Rede?**

As ek luister na wat my kollegas sê oor hoe die graad 8 was laas jaar en wat ek nou kan waarneem is dat hulle meer gemaklik raak met die verskillende maniere hoe ’n vraag gevra kan word. Hulle word nie heeltemal angsbevange as ’n vraag bietjie ander gevra word as wat hulle sê nou maar in hulle huiswerk oefening mee te doen gekry het nie so ek dink hulle kom wel in die ding in van om woord probleme op te los en so. Ek sit nou maar met die bietjie minder presteerders, die onderpresteerder so maar selfs met hulle kan ek sien hulle bietjie meer selfvertroue om ’n probleem te probeer aanpak selfs al het hulle die vrymoedigheid om ’n vraag te beantwoord selfs al is daar nou die kans dat hulle verkeerd is weet hulle dit gaan nou nie heeltemal, dis nie di einde van die wêreld nie. Ons praat dan nou maar net daaroor en lei hulle op die regte pad.

**3. Dink jy leerders se wiskunde angs het verander? Motiveer**

Ek kan sien dat party net bloot, daar’s meeste, hulle doen meestal hulle huiswerk almal van hulle maar daar is uitsonderings van sekere kinders wat so van tyd tot tyd, want ek kyk elke dag hulle huiswerk, wat van tyd tot tyd nie hulle huiswerk doen nie.

So dit wil vir my voorkom asof dit partykeer is omdat hulle te bang is om te probeer so ek dink dit kan te doen hê met die angs vlakke want dit is maar, jy is maar in ’n groep leerders waar vergelyk met mekaar, maar oor die algemeen lyk hulle angs vlakke vir my beter as sê nou maar aan die begin van die jaar. So ek dink dis ook maar oor hulle gemakliker raak, maar hulle het maar nog steeds daai gewone stres voor ’n toets of so, maar na die tyd sal hulle kom terugvoer gee en sê maar daai som en die som en dit was maklik en so, so ek dink dit raak dan beter as ek self moet se . ek is nie altyd by hulle as hulle toets skryf nie, dis mos maar toets periodes, maar ek dink dit verbeter darem.

4. **Sien jy veranderinge in leerders se vermoë om probleem op te los? Verduidelik.**

Ek moet sê ja, as ek nou vergelyk met aan die begin van die jaar of die eerste en die tweede kwartaal vergelyk soos wat ’n mens aangaan met die sillabus voel dit vir my asof hulle bietjie meer vertroue het om ’n probleem aan te pak terwyl, ek dink nou aan ’n spesifieke kind in my klas wat aan die begin nou maar net, sy doen altyd haar huiswerk, sy werk hard en dan so en dan maar sy’t nie sommer ’n vraag geantwoord of so nie, maar nou sal sy al na my toe kom en dan vir my  vra is dit hoe mens dit doen en dan daai smile op daai gesig as sy as dit nou nie dit is nou reg dit is hoe ons doen dit.

5. **Hoe reflekteer leerders oor die probleemoplossingsproses en antwoord? Verduidelik.**

Party van hulle kan, ek het al opgemerk dat want ek merk mooi deeglik as ons die huiswerk doen op die bord merk ek mooi deeglik saam met hulle, maar dit lyk vir my of hulle partykeer, is daar party kinders wat nie die verband regtig sien nie, hulle het dalk net sê nou maar stap 2 en stap 3 het hulle dalk nou andersom gedoen as ek en dan dink hulle dit heeltemal op ’n ander manier so dit voel partykeer vir my dit wat hulle nou net vir my herhaal en sê hoe hulle dit gedoen het hulle kan nie lekker sien dat dit is eintlik ook presies dit wat ek ook gedoen het, dalk net in ’n ander volgorde nie, maar van die, die meeste van hulle kan wel sê nou maar sien dat daar verskillende maniere is om by ’n antwoord uit te kom en dat hulle sin dieselfde is dalk net in ’n ander volgorde of so aan.

**6. Hoe beleef jy die veranderinge in die wiskunde sessies?**

(Onderwyser het net 2 leerders)

Ek moet se al twee veral die enetjie sy's baie gedrewe en sy reageer ook goed op prysing so sy's al nie sommer 'n vraag beantwoord nie, maar sy's eintlik die een in die klas wat maar meestal die beste doen in toetse en opdragte en so, maar sy is baie bly as sy iets reg het en sy doen altyd haar werk so sy's baie voortvarend kan mens half sê so sy sal heeltyd effort insit en so aan. Die ander een, akademie gewys, gaan sy ook aan sy presteer nie so goed soos die ander SETH leerder nie, maar haar punte tel ook darem op maar sy doen ook darem altyd haar werk.sys bietjie vir my sosiaal pas sy nie lekker in nie, ja, maar sy sit ook heel voor en sy meng nie eintlik met die ander nie en ek kan partykeer sien in haar gesig trek, ja sy lyk heeltyd nie beïndruk met iets nie, maar ja akademie gewys hulle is maar, want hulle is as jy nou vergelyk met die res baie van hulle is maar hier omdat hulle dalk nie die vermoë het nie dis maar oor hulle bietjie lui is en so. Veral die graad 9 seuns maar die twee is al twee dogters en hulle doen hulle werk en hulle wil altyd vooruitweet waaroor gaan 'n toets gaan sodat hulle kan begin voorberei.

# Teacher 2 (T2)

1. **Sien jy enige veranderinge in leerders se houding teenoor Wiskunde? Verduidelik**

   Dit lyk vir my of daar bietjie meer motivering is en ook die kinders se houding teenoor die vak verander. Ek sien nog nie so seer dat dit hulle punte verander nie, hier en daar ja, maar ek voel oor die algemeen is die kinders meer positief. Dis eintlik wat ek geobserveer het.

   **T: Dink jy, dis nou heeltemal 'n ander vraag, maar dink jy hulle is nog daar om hulle nog daar wil wees.**

   Die ouer grade nee, ek het al opgetel van die kinders is afhanklik van die beurs. As dit nie vir die beurs was nie sou hy dalk nie in SETH gewees het nie, maar ek dink stelselmatig begin die kinders se houding teenoor dit verander so ek dink oor 'n jaar of twee behoort ons mooi te kan sê hulle wil in SETH bly.

2. **Is daar veranderinge in die manier waarop leerders 'n wiskunde probleem aanpak? Rede?**

   Ja, dit het definitief verander. Die lees voor die tyd, die verstaan van die probleem dit het definitief verander en ons kinders kry deesdae in die toetse kry hulle meer die moeiliker goed reg en hulle sukkel meer met die procedural stuff so, want ons gee nou nie meer so baie aandag aan die vlak twee goedjies nie so nou moet ons dit weer balanseer so ja daar het definitief 'n groot verandering plaasgevind.

3. **Dink jy leerders se wiskunde angs het verander? Motiveer**

   As gevolg van de SETH beurse nee, dit het ek al opgetel altyd nadat hulle skryf dan vra ek vir hulle hoe was dit ensovoorts dan se hulle hulle stres hulle praat nooit regtig van hoe die vraestel self was nie en toe het ek begin uitvis hoekom hulle so stres toe sê hulle hulle is so bang as hulle swak doen dan verloor hulle hulle SETH beurs en dit is oor die algemeen die Engelse kinders wat dan veral uit die rural gemeenskap uitkom ensovoorts, ensovoorts. Onder ons Afrikaanse kinders is daar nie meer so baie stres nie, maar daar is nog die kinders wat gewoond was aan die laerskool om 90, 95 te kry. As hulle nou toets skryf en hulle eerste toets het niemand in die 90 gekry nie so hulle sit daai druk op hulle self, want hulle wil weer by die 90 uitkom.

4. **Sien jy veranderinge in leerders se vermoë om probleem op te los? Verduidelik.**

   Ja, definitief. Ons groepie SETH leerders se hulle verbaas my elke keer as ons 'n probleem oplos sessie het moet die dan dink ek daar gaan niemand die reg kry nie

en dan van hulle redeneer dit uit met wiskunde wat ek bv. nog nie met hulle gedoen het nie hulle redeneer dit uit baie kreatief so hulle vat daai challenge en hulle pak dit aan en hulle probeer en probeer en probeer.

5. **Hoe reflekteer leerders oor die probleemoplossingsproses en antwoord?**

   **Verduidelik.**

   Min van hulle doen ons is nog nie daar waar ons wil wees met die refleksie nie want as hulle bv. ’n toets skryf dan, hulle kon so maklik gesien het die antwoord is reg of verkeerd net deur bietjie kommer sense te gebruik en hierdie kan nie ’n negatiewe getal wees nie of dit moet ’n getal groter wees as dit of dat so hulle reflekteer nog nie vir my genoeg nie, nog glad nie. Ek dink dit is as gevolg van die SETH sessies in die middae is daar selde genoeg tyd oor om goed te reflekteer.

   **T: Ek wou vir jou vra of dit nie as gevolg van ’n tydsfaktor is nie.**

   In die SETH sessies maar in die toets is dit baie moeilik hulle scan net oppervlakkig weer deur die vraestel en meeste van hulle kry 100%.

6. **Hoe beleef jy die veranderinge in die wiskunde sessies?**

   Kom ek verduidelik dit so, ek word nie ekstra vergoed nie dit is bo op my gewone buitemuurs en nog steeds doen ek dit want dit is lekker.

   **T: Dit se dit alles.**

   So dit is nie vir my ‘n las of ’n burden dis glad nie vir my moeite nie dit is baie werk, maar dit is nie vir my moeite nie.

   **T: Ja, en om goeie unieke uit te dink om hulle sinvol besig te hou is ’n uitdaging, maar jy se jy geniet dit.**

   Ja, dit is baie lekker en daai kinders se ervaring na die tyd en die terugvoer na die tyd is net jy weet ons is op die regte plek, regte pad.

# Teacher 3 (T3)

1. **Sien jy enige veranderinge in leerders se houding teenoor Wiskunde? Verduidelik**

   Spesifiek die SETH kinders, ek gee net vir twee skool, maar mens kan duidelik sien hulle is baie meer ingestel om wiskunde te wil doen. Hulle is baie meer aktief betrokke in die klaskamer vrae vra en is bereid om te sukkel met ’n probleem tot hulle dit regkry so mens kan duidelik sien daar is wel ’n verandering by hulle, by die tweetjies vir wie ek nou klas gee.

   **T: En jou ander leerders soos wat die jare nou gevorder het?**

   Ek het hulle nou nie laas jaar gehad nie, so ek kan nie vergelyk nie, maar hierdie jaar dis baie positief oor wiskunde baie opgewonde, ek sukkel nie regtig met negatiwiteit in die klaskamer nie ek, wat ek wel mee sukkel is om hulle te oorreed dat iets nie altyd moeilik in nie. Dit verg maar net ’n bietjie dink werk partykeer, maar oor die algemeen moet ek sê hierdie jaar se groep is baie goed ingestel, baie positief ingestel teenoor wiskunde.

2. **Is daar veranderinge in die manier waarop leerders ‘n wiskunde probleem aanpak? Rede?**

   Ek sal nie se manier, presiese manier nie, maar hulle is bereid om te sukkel. Hulle is nog baie, kyk is ek dink die kleintjies hulle is nie lus vir algebra nie, ek is by graad 9 so hulle sukkel nog om algebra te gebruik so hulle wil nie met veranderlikes werk altyd nie, maar hulle doen nogal maar as hulle eers daarmee begin dan weet hulle ook nie hoekom hulle dit doen nie so dan raak hulle bietjie deurmekaar, maar mens stelselmatig begin hulle gewoond raak. Ander maniere, ja hulle doen dit maar hulle redeneer dit uit op papier, gebruik mos syfertjies en alles hulle is nie, ek hou altyd van om diagramme te teken byvoorbeeld want dis nou nie altyd gaande daaroor nie, maar sodra daar ’n skets is en ek dwing hulle om ’n skets te maak byvoorbeeld by meetkunde dan begin hulle met kleure werk en hulle vul in en hulle gaan tekere so ek moet se ek gebruik altyd kleur in my vak so hulle hou daarvan om nogal kleur te gebruik en dit help hulle om makliker te verstaan op die ou einde. So ja ek dink dis die een ding ek dan die ander ding is hulle vra baie vrae en ek dink dis ’n goeie plek

om te begin om probleem op te los is om net vrae te vra en net te weet wat aangaan en hoe om hierdie ding te benader en wat van hierdie opsie en hoekom moet dit nie so wees. Veral die een seun vrae nogal baie sulke vrae. Hy vra altyd maar meneer wat van as mens dit so doen as mens van hierdie angle af kom okay dit kan werk en dis partykeer ’n lang pad maar dis moontlik om dit so te doen. Die een dogter is bietjie van ’n skrikkerige kind sy hou daarvan om gestruktureerd te werk stap een stap twee en sodra jy stap 2 en 3 saam meng dan wil sy nou eers weet hoekom kan sy dit nou nie skei en alles nie, maar snaaks genoeg haar manier is altyd anders as my manier om by die antwoord uit te kom totaal en al en dan moet ek nou eers probeer uit redeneer waar kom sy vandaan, maar sy kom altyd dan by die regte antwoord uit so daar is definitief ander maniere ek dink net nie dis altyd ’n groot verskeidenheid van maniere nie, maar hoe hulle dit benader is verskillend

**3. Dink jy leerders se wiskunde angs het verander? Motiveer**

Ek dink dit het verlaag hierdie jaar, omdat ek nou met die kinders sit wat nou remediëring is die onderrig kort fokus ek baie hard daarop om hulle gemaklik te laat voel in die wiskunde klas en hulle net daai selfvertoue te gee maat net, jy kan eintlik hierdie doen en ek dink dit het nogal groot positiewe invloed op hulle gehad op die ou einde so hulle is baie rustiger in die klas hulle sien eintlik kans vir die werk om die werk te doen en dis baie verantwoordelik as ek vir hulle huiswerk gee oor die vakansie meeste van hierdie kinders doen dit op die ou einde en die twee SETH kinders doen dit dan ook so dis daar’s definitief ’n rustigheid ’n groter rustigheid eintlik.

**4. Sien jy veranderinge in leerders se vermoë om probleem op te los? Verduidelik.**

**T: Ek dink jy het dit reeds geantwoord.**

**5. Hoe reflekteer leerders oor die probleemoplossingsproses en antwoord? Verduidelik.**

Ja, definitief, definitief maar wat ek graag in my klaskamer is ek laat hulle verduidelik wat hulle gedoen het. So ek sal se byvoorbeeld Pietpompies dis jou beurt om ’n vraag te beantwoord en dan doen hy dit op sy manier en deur die proses vra ek vir hom maar hoekom doen jy dit, hoekom doen jy dat en as ek dan daai vra vrae het

hulle ’n rede daarvoor hulle kan vir my se maar dit beteken hierdie reëls en die volgende of ek het gesien hierdie kan gebeur daai klas van dinge so daar is definitief ’n refleksie op, en as hulle sien hulle antwoord is verkeerd kan hulle terug gaan en so maar o hier het ek my fout gemaak byvoorbeeld die een meisie is baie goed daarmee sy identifiseer, sy het gou geïdentifiseer sy dat sy vergelykings moet vereenvoudig sy stop altyd in die middel iewers sy sal altyd iewers in die middel stop en nooit die x alleen kry nie, sy sal altyd die koëffisiënt ag die kwosiënt wat vooraan staan sal sy nooit wegvat nie sy sal hom altyd daar los en toe het sy later aan begin besef maar dis ’n roetine ding wat gebeur en toe identifiseer sy dit en toe kon sy dit van daar af regkry. Sy kon sien waar was haar fout gewees, wat is die foute wat sy konstant maak en dan hoe om dit te verander. Sy stop altyd so half in die middel of sy sal byvoorbeeld dit breuk sy sal dit nooit in die eenvoudigste vorm skryf nie. Dis nie omdat sy nie kan nie sy stop net en sy kon self daardie patroon identifiseer op die ou einde. So daar is definitief ’n mate van refleksie in terme van waarneming.

**6. Hoe beleef jy die veranderinge in die wiskunde sessies?**

Dit was aaklig gewees ek het, dit was vir my okay gewees, maar om die kinders deur dit moes te gesit het dis jy sit ’n huiswerk doen of nie huiswerk nie, maar jy sit en somme doen die heeltyd. Nie dieselfde soort nie, maar jy kry ’n bladsy en dan moet jy somme doen en dis maar soos ’n toets wat jy skryf op die ou einde. Nou is dit baie meer interaktief die kinders het die geleentheid om vrae te vra die kinders die geleentheid om self lesse aan te bied ek dink dit is nou tipies waarvan hulle se hierdie is nou ’n learn centred approach wat ons nou daarmee besig is. Die kind is nie **ongeroepe** nie ons as onderwysers is nou die fasiliteerders. Ek moet se ’n groot ding is groepwerk help ongelooflik baie. Om twee of drie bymekaar te sit en saam te kan redeneer en te kan se maar ek se so ek se so hoekom se jy dis so en so van mekaar af te kan leer so dis ’n baie meer waardevol sessie vir my. Ek dink mens oefen iets dalk nie so diep in soos wat mens nou sou gedoen het met die vorige werkskaarste en so of self in die klaskamer en dit  jy doen vyf van dieselfde, jy doen sommer vyf faktorisering of vyf vrae wat gaan oor patrone en alles nie so mens kan se byvoorbeeld in plaas van om tien somme in daai tyd te doen kan mens nou net twee somme doen, maar jy doen daai som het soveel meer diepte. Daar is definitief meer waarde. Om dit so te doen om die kind te laat besef maar ons vat byvoorbeeld ons van ’n rekenkundige rye werk, die konstante verskil wat voor jou veranderlike is

of die getal wat die koëffisiënt wat voor die veranderlike is dis eintlik jou konstante veranderlike verskil die eers te laat besef teen die vyfde som, want hulle moes vyf somme doen begin hulle dit al agter kom in die tweede som. Die eerste som het hulle gesien maar haai hier is dit die tweede som hier is dit weer en hy kon dadelik daai konneksie gemaak het.

# Teacher 4 (T4)

**1.Sien jy enige veranderinge in leerders se houding teenoor Wiskunde? Verduidelik**

Een meisietjie het ek spesifiek wel ’n verandering gesien definitief. Nadat Johan hulle nou daai nuwe metodologie gebruik het met wat hulle daai heeltemal ’n nuwe aanslag het met die wiskunde kon ek definitief sien, want sy was vreeslik negatief en nie lus daarvoor nie en nadat sy blootgestel was aan dit was daar ’n baie groot ommekeer dat sy meer lus was om dit te doen en wat haar punte ook verbeter het, maar eerlikwaar met die ander kinders in die klas kan ek nie ’n sigbare verandering sien in hulle houding as sulks nie.

**T: En jou ander leerders in die klas wat nie in SETH is nie?**

Van die graad nege groep dit is ’n baie sterk groep kinders ek het aan die begin van die jaar baie gespot met hulle hulle het letterlik die eerste dag die hele groep kinders het hulle ingekom, hulle het gesit en nie een van hulle het gesels nie, hulle het almal gesit en vir my gekyk en toe sê ek, hoekom is julle nou so stil. Toe sê al die kinders nee maar juffrou ons wag dat juffrou vir ons moet werk gee, ons wil nou begin werk. So ek was baie vinnig deur die sillabus met daai groepie ook gewees ons kon lekker werk. Ek kon heelwat ekstra doen, ek dink ons het twee ekstra vraestelle deurgewerk met hulle waar met die ander klasse weet ek dink ek het nie eens deur ’n hele enkel vraestel gewerk nie. So ek kon regtig heelwat ekstra werk met hulle doen en hulle punte lyk ook nou vir die eksamen, want ek het nou klaar hulle groep sin gemerk ook, hulle eerste vraestel en dit lyk ook baie goed die algemene kind sin, maar dit is individuele kinders ek dink wat uit goeie huise kom wat ’n wil het om te werk en ek dink hulle het al afsonderlik besef wat is die nut van dit wat hulle nou moet leer so elkeen van hulle afsonderlik werk baie ongelukkig daardie een kind ek dink , hy is die enigste seuntjie die enigste kind wat ek kan nou onthou of hy in die SETH program is nie, maar ek dink amper hy is. Hy is die enigste een wat ek dink ’n bietjie negatief is maar ek dink maar weer dis ’n emosionele ding wat plaasgevind het van jy weet sy eie interne mens kant af nie meer as die program se invloed.

**2. Is daar veranderinge in die manier waarop leerders ‘n wiskunde probleem aanpak? Rede?**

Weereens ek kan eerlikwaar dit nie opmerk nie, want selfs voordat ek heeltemal blootgestel was aan die SETH benadering omdat ek nou mos ’n ingenieur agtergrond het, is my kop al jare terug omgeswaai met die oog op probleemoplossing eerder as net inligting oordra. So ek het voordat ek gesien het hoe die SETH program werk voor ek heeltemal verstaan het waaroor gaan dit selfs het ek my kinders meer met die aanslag aangeleer hoekom mag ek dit doen en dit so geleer. So die meerderheid van die kinders in my klasse jy weet wat ek klas gee het daai, soos daai benadering waar hulle ’n probleem sal aanpak om te sien okay maar watter, wat van dit wat ek geleer het kan ek kan dit nou hier toepas. Hulle dink ’n bietjie weier as ja soos as die algemene kind omdat ek al voor soos ek vra baie en hulle spot my ook want ek vra altyd vir hulle maar okay jy’t nou vir my die antwoord gegee maar hoekom mag jy dit doen en dan moet hulle nou begin dink daaraan.

**3.Dink jy leerders se wiskunde angs het verander? Motiveer**

Ja, die angs vlakke kan ek definitief sê het verlaag. Die paartjies wat wel in die SETH program is hulle is baie kalmer in die klasse hulle voel nie, ja dit sal ek definitief sê, kon ek agterkom angs vlakke is definitief laer

**T: skryf jy dit toe moontlik aan die SETH?**

Ek dink dit het te doen, ek onthou prof. Nuwenhout het in gister se vergadering iets nogals gesê wat ’n klokkie laat afgaan het want daai wat jy selfvertroue opbou soos wat iets is dalk moeilik maar die omgewing waarin dit plaasvind is van so aard dat jy dit sukkel maar tog regkry en dan goed voel daaroor omdat jy dit kon regkry, bou hulle selfvertroue om te probeer sukkel dalk nie reg te kry nie, maar weer te probeer. Ek dink ook nou aan ’n seuntjie en ’n dogtertjie spesifiek wat ek weet ook is in die SETH program is en hulle weet ek definitief hulle , ja hulle angs vlakke ten opsigte van wanneer hulle iets nie kan regkry nie of wanneer hulle sukkel is baie verskillend

van die res van die kinders hulle weet net o dan moet ek net aanhou probeer. Dis nie okay ek het nou van die berg afgeval nie.

**4.Sien jy veranderinge in leerders se vermoë om probleme op te los? Verduidelik.**

Eerlikwaar nog nie daadwerklik nie. Hulle sukkel net soos die ander kinders ook. Hulle vat nog ook steeds net so lank veral in my graad 9 klas so daar's eintlik van die kinders wat nie in die SETH program is wat vinniger die ander kant van die probleem kan raaksien as hulle self, maar hulle is gewillig om te wil leer. Hulle sal dit nie noodwendig self sien nie, maar hulle is gewillig om te wil leer wanneer hulle dit nou nie dadelik regkry nie.

**5.Hoe reflekteer leerders oor die probleemoplossingsproses en antwoord? Verduidelik.**

Nie wat ek persoonlik regtig fasiliteer nie. Ek moet ook weereens eerlikwaar se met die kleintjies omdat ek  die laer persentasie kindertjies het moet ek baie vinnig jy weet en hard fokus of wel vinnig werk en hard fokus op herhaling vir hulle om seker te maak dat hulle kan deurkom so dit baie meer remediëring met die graad agies moet ek eerlikwaar se soos ek fasiliteer geen vorm daarvan behalwe wanneer ons merk, wanneer ek ook vir hulle die spesifiek nou die hoekom vrae vra dan se ek maar hoekom het julle besluit om dit te doen, waar hulle dalk 'n kans kan kry om te dink, maar hulle gee nooit met min wat ek nou kan dink dit sal toevallig wees kere soos wat die klas verloop wanneer hulle self verbaal se nou maar byvoorbeeld terugvoer gee en wanneer hulle ons toetse merk dalk na die tyd. Daar is nie 'n stelsel wat ek fasiliteer in die klasse wat die enigsins toelaat nie.

**T: is jy self betrokke by SETH aktiwiteite?**

Ja, ek die graad 10 voog van die SETH program, ja so jy weet ek pas die graad tiene op

**T: En hulle doen nou Alpha wiskunde**

Ja

**6.Hoe beleef jy die veranderinge in die wiskundesessies?**

Dit verskil regtig noord suid wes en oos van mekaar want daar is enkel kinders, soos daar's byvoorbeeld 'n seun hy is ontsettend emosioneel volwasse ek gee vir hom wetenskap ook in graad 10 hierdie jaar hy is emosioneel ontsettend volwasse kom uit 'n baie sterk, goeie ouerhuis uit. Hy kla nooit nie ,altyd betyds, doen sy huiswerk, werk hard, besef die nut daarvan en hy doen sy ding en ek weet hy is opgewonde oor die meeste van die dinge want hy weet daar is waarde in dit wat hy leer en daar's enkele kinders wat soos hy ook is en wat gelukkig is en wat ook emosioneel volwasse genoeg is om te besef hierdie is nie nou lekker nie, maar ek verstaan die waarde daarvan so ek moet nou deurdruk, maar daar is klop van die Engelse kinders wat hulle dagprogramme is van so aard dat dit bitter, bitter vol is so ek dink dit oorheers in hulle lewe op die ou einde jy weet soos om te se ek moet dit doen en dan direk daarna moet ek dit doen en dan direk daarna moet ek dat doen. Ek dink die werklike besef van die waarde wat hulle daaruit kry gaan verlore in die ding van ek het nou 'n uur en 'n half na twee ure hier sit en iets doen waarmee ek sukkel en wat nie altyd lekker is nie en ek verstaan nie nou die doel daarvan nie so daar is kinders wat daai definitief daai, ek kan nie eers se houding nie, emosies beleef wat dalk beter of die ingesteldheid het daarteen, maar en dan is daar 'n paar seuns wat net besluit het hulle vee hulle self daaraan af hulle gaan dit net glad nie doen nie.

**T: Vind hulle dit moeilik?**

Van die kinders ja, maar hulle probeer tog. Daar is 'n meisietjie ook sy wou juis gehad het dit moet asb. vir haar skoolrapport tel want sy verstaan dit beter as gewone wiskunde.sy verstaan die logika agter dit juis beter so daar's van die dele wat hulle makliker verstaan en van die dele wat vir hulle baie vreemd was want dit baie keer 'n ander benadering en goed wat heeltemal nuut was, niks wet skoolwerk te doen nie,  daar was van die lesse wat hulle baie moeilik gevind het, maar ek het een of twee kinders hoor kla tydens die sessie dat dit nogals moeilik was maar hulle het nog steeds gesit en probeer te minste.

**T: Hoeveel is hulle in graad 10?**

Hulle is nou 27. Ek dink die graad 12 is baie min hulle is minder as10 ek kan net nie presies die getal onthou nie en dan die graad 11 is ook net ŉ klein handjie vol kinders. Die graad tiene is dan nou die eerste bietjie groter groep.

## All objects sorted by creation date

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HU: Individual interviews with Mathematics teachers
File: [C:\Users\22997385\Documents\Scientific Softwa...\Individual interviews with Mathematics teachers.hpr7]
Edited by: Super
Date/Time: 2017-11-08 15:01:17

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Editing period : 31 days
First object created: 2017-08-13 11:45:44 (HU: Individual interviews with Mathematics teachers)
Last object created: 2017-09-13 07:15:44 (Code-Link: ASSO)

(2017-08-13 11:45:44) HU: Individual interviews with Mathematics teachers
(2017-08-14 16:23:57) Primary Doc: P 1: Individual Interviews with Teachers.pdf {70}
(2017-08-14 16:38:46) Code: *maths anxiety {0-1}
(2017-08-14 16:38:46) Code: @maths attitude {0-1}
(2017-08-14 16:38:46) Code: ^changes in maths sessions {0-1}
(2017-08-14 16:38:46) Code: !PS ability {0-1}
(2017-08-14 16:38:46) Code: %PS attempt {1-1}
(2017-08-14 16:38:46) Code: &reflection on PS {1-1}
(2017-08-15 13:24:30) Code: @@confident to ask questions {1-0}
(2017-08-15 13:24:54) Quotation: 1:1 so ek kan sien party het nou m.. (1:557-1:622)
(2017-08-15 13:25:23) Code: @@successful more positive {1-0}
(2017-08-15 13:25:38) Quotation: 1:2 soos wat hulle sukses behaal d.. (1:820-1:951)
(2017-08-15 13:26:25) Code: @@more motivated {2-0}
(2017-08-15 13:26:39) Quotation: 1:3 Dit lyk vir my of daar bietjie.. (3:1432-3:1540)
(2017-08-15 13:26:54) Code: @@more positive attitude {4-0}
(2017-08-15 13:28:12) Quotation: 1:4 die algemeen is die kinders me.. (3:1634-3:1675)
(2017-08-15 13:29:09) Quotation: 1:5 Spesifiek die SETH kinders, ek.. (5:780-5:916)
(2017-08-15 13:29:32) Code: @@actively involved {1-0}
(2017-08-15 13:29:34) Quotation: 1:6 Hulle is baie meer aktief betr.. (5:918-5:1151)
(2017-08-15 13:29:51) Code: @@perseverance with PS {1-0}
(2017-08-15 13:31:03) Quotation: 1:7 meer lus was om dit te doen en.. (8:1985-8:2170)
(2017-08-15 13:32:59) Quotation: 1:8 bietjie meer selfvertroue om '.. (1:1583-1:1836)
(2017-08-15 13:34:07) Code: %%reading problem {1-0}
(2017-08-15 13:34:07) Code: %%understanding the problem {1-0}
(2017-08-15 13:34:19) Quotation: 1:9 Die lees voor die tyd, die ver.. (4:126-4:288)
(2017-08-15 13:34:59) Code: %%preparedness to struggle {1-0}
(2017-08-15 13:35:15) Quotation: 1:10 hulle is bereid om te sukkel. (6:49-6:77)
(2017-08-15 13:36:07) Code: %%use of colours {1-0}
(2017-08-15 13:36:07) Code: %%use of diagrams {1-0}
(2017-08-15 13:36:41) Quotation: 1:11 kleure werk (6:802-6:812)
(2017-08-15 13:36:47) Quotation: 1:12 diagramme (6:615-6:623)
(2017-08-15 13:37:57) Code: %%reasoning about the solution {1-0}
(2017-08-15 13:38:07) Quotation: 1:13 jy't nou vir my die antwoord g.. (10:57-10:162)
(2017-08-15 13:39:08) Code: **scared to try {1-0}
(2017-08-15 13:39:12) Quotation: 1:14 hulle te bang is om te probeer.. (2:143-2:226)
(2017-08-15 13:39:24) Code: **less anxious {4-0}
(2017-08-15 13:39:35) Quotation: 1:15 maar oor die algemeen lyk hull.. (2:304-2:404)
(2017-08-15 13:40:03) Code: **test/exam anxiety {1-0}
(2017-08-15 13:40:07) Quotation: 1:16 gewone stres voor 'n toets of .. (2:495-2:528)
(2017-08-15 13:40:53) Code: **anxiety related to bursary {1-0}
(2017-08-15 13:41:08) Quotation: 1:17 As gevolg van de SETH beurse n.. (4:574-4:628)
(2017-08-15 13:41:50) Quotation: 1:18 Ek dink dit het verlaag hierdi.. (6:2164-6:2200)
(2017-08-15 13:42:11) Quotation: 1:19 Ja, die angs vlakke kan ek def.. (10:225-10:276)
(2017-08-15 13:43:08) Quotation: 1:20 meer vertroue het om 'n proble.. (2:1079-2:1123)
(2017-08-15 13:44:14) Code: !!more confidence to attempt a problem {2-0}
(2017-08-15 13:45:04) Code: !!creative PS strategies {1-0}
(2017-08-15 13:45:24) Quotation: 1:21 hulle redeneer dit uit met wis.. (4:1613-4:1822)

(2017-08-15 13:45:37) Code: !!accept the challenge {1-0}
(2017-08-15 13:46:36) Code: !!willingness to learn {1-0}
(2017-08-15 13:46:39) Quotation: 1:22 maar hulle is gewillig om te w.. (10:1782-10:1866)
(2017-08-15 13:48:25) Code: &&lack reflection abilities {2-0}
(2017-08-15 13:49:20) Code: &&various ways to solve a problem {1-0}
(2017-08-15 13:49:25) Quotation: 1:23 die meeste van hulle kan wel s.. (2:2217-2:2398)
(2017-08-15 13:49:33) Quotation: 1:24 Party van hulle kan, e (2:1590-2:1611)
(2017-08-15 13:49:50) Quotation: 1:25 Min van hulle doen ons is nog .. (4:1915-4:2010)
(2017-08-15 13:50:12) Code: &&lack of time {1-0}
(2017-08-15 13:50:22) Quotation: 1:26 Ek dink dit is as gevolg van d.. (4:2296-4:2407)
(2017-08-15 13:51:07) Quotation: 1:27 a, definitief, definitief maar.. (7:312-7:423)
(2017-08-15 13:52:30) Code: !!few reflection opportunities {1-0}
(2017-08-15 13:52:32) Quotation: 1:28 Nie wat ek persoonlik regtig f.. (11:89-11:988)
(2017-08-15 13:54:54) Code: ^^group work {1-0}
(2017-08-15 13:55:15) Quotation: 1:29 Ek moet se ? groot ding is gro.. (8:232-8:292)
(2017-08-15 13:56:41) Code: ^^loss of value due to time {1-0}
(2017-08-15 13:56:44) Quotation: 1:30 Ek dink die werklike besef van.. (12:73-12:595)
(2017-08-18 18:15:51) Network View: Problem-solving (7)
(2017-08-18 18:19:04) Code: problem-solving {0-6}
(2017-08-18 18:19:40) Code-Link: problem-solving <is associated with> !PS ability
(2017-08-18 18:19:49) Code-Link: problem-solving <is associated with> ^changes in maths sessions
(2017-08-18 18:20:04) Code-Link: problem-solving <is associated with> *maths anxiety
(2017-08-18 18:20:11) Code-Link: problem-solving <is associated with> @maths attitude
(2017-08-18 18:20:21) Code-Link: problem-solving <is associated with> &reflection on PS
(2017-08-18 18:20:30) Code-Link: problem-solving <is associated with> %PS attempt
(2017-09-12 05:25:03) Code: ##more relaxed various forms of questions {1-0}
(2017-09-12 05:25:07) Quotation: 1:31 meer gemaklik raak met die ver.. (1:1149-1:1225)
(2017-09-12 05:25:24) Quotation: 1:32 Hulle word nie heeltemal angsb.. (1:1228-1:1463)
(2017-09-12 05:26:01) Quotation: 1:33 Ek sit nou maar met die bietji.. (1:1465-1:1904)
(2017-09-12 05:27:33) Code: **more relaxed {2-0}
(2017-09-12 05:27:37) Quotation: 1:34 So ek dink dis ook maar oor hu.. (2:406-2:459)
(2017-09-12 05:29:36) Code: **do not see the relationship {1-0}
(2017-09-12 05:29:39) Quotation: 1:35 is daar party kinders wat nie .. (2:1778-2:1835)
(2017-09-12 05:31:05) Code: **prepare for a test in advance {1-0}
(2017-09-12 05:31:19) Quotation: 1:36 maar die twee is al twee dogte.. (3:1109-3:1258)
(2017-09-12 05:31:43) Code: **driven {1-0}
(2017-09-12 05:31:48) Quotation: 1:37 Ek moet se al twee veral die e.. (3:94-3:147)
(2017-09-12 05:33:06) Code: **change in attitude {1-0}
(2017-09-12 05:34:02) Code: ^^SETH bursary {2-0}
(2017-09-12 05:34:07) Quotation: 1:38 Die ouer grade nee, ek het al .. (3:1824-3:2140)
(2017-09-12 05:34:21) Code: **do not want to be in SETH {1-0}
(2017-09-12 05:35:46) Code: **struggle with procedural stuff {1-0}
(2017-09-12 05:35:46) Code: **get difficult things right {1-0}
(2017-09-12 05:35:52) Quotation: 1:39 n die toetse kry hulle meer di.. (4:237-4:509)
(2017-09-12 05:37:59) Quotation: 1:40 As gevolg van de SETH beurse n.. (4:574-4:1347)
(2017-09-12 05:39:33) Code: ^^lower marks than in primary school {1-0}
(2017-09-12 05:40:38) Code: **put pressure on themselves {1-0}
(2017-09-12 05:40:38) Code: **township kids {1-0}
(2017-09-12 05:41:32) Code: &&positive changes in ps ability {1-0}
(2017-09-12 05:41:49) Quotation: 1:41 Ja, definitief. Ons groepie SE.. (4:1436-4:1822)
(2017-09-12 05:42:22) Code: !!try & try {1-0}
(2017-09-12 05:43:32) Code: &&do not reflect enough {1-0}
(2017-09-12 05:43:35) Quotation: 1:42 hulle reflekteer nog nie vir m.. (4:2236-4:2293)
(2017-09-12 05:44:05) Code: &&&lack of time in SETH {1-0}
(2017-09-12 05:44:08) Quotation: 1:43 In die SETH sessies maar in di.. (4:2481-4:2620)
(2017-09-12 05:44:43) Code: &&I enjoy the sessions {1-0}
(2017-09-12 05:44:47) Quotation: 1:44 Kom ek verduidelik dit so, ek .. (5:61-5:199)
(2017-09-12 05:45:49) Code: &&learners enjoy the sessions {1-0}
(2017-09-12 05:45:49) Code: &&on the right track {1-0}
(2017-09-12 05:45:49) Code: &&good feedback {1-0}

(2017-09-12 05:45:55) Quotation: 1:45 Ja, dit is baie lekker en daai.. (5:464-5:606)
(2017-09-12 05:47:13) Code: **more inclined to do Maths {1-0}
(2017-09-12 05:48:06) Code: @@prepared to struggle {1-0}
(2017-09-12 05:48:33) Quotation: 1:46 maar hierdie jaar dis baie pos.. (5:1286-5:1350)
(2017-09-12 05:49:07) Code: @@to convince them that something is not difficult {1-0}
(2017-09-12 05:49:14) Quotation: 1:47 at ek wel mee sukkel is om hul.. (5:1419-5:1671)
(2017-09-12 05:49:59) Code: ##grade 8's do not like algebra {1-0}
(2017-09-12 05:50:03) Quotation: 1:48 hulle is nie lus vir algebra n.. (6:130-6:161)
(2017-09-12 05:51:04) Code: %%enables better understanding {1-0}
(2017-09-12 05:51:07) Quotation: 1:49 en dit help hulle om makliker .. (6:949-6:1005)
(2017-09-12 05:52:11) Code: @@ask many questions {1-0}
(2017-09-12 05:52:11) Code: @@think of various ways to solve {1-0}
(2017-09-12 05:52:14) Quotation: 1:50 hulle vra baie vrae en ek dink.. (6:1066-6:1292)
(2017-09-12 05:53:07) Code: @@correct in the end {1-0}
(2017-09-12 05:53:07) Code: @@different method than mine {1-0}
(2017-09-12 05:53:10) Quotation: 1:51 maar snaaks genoeg haar manier.. (6:1733-6:2100)
(2017-09-12 05:55:06) Quotation: 1:52 baie rustiger in die klas hull.. (6:2529-6:2669)
(2017-09-12 05:55:48) Code: **responsible {1-0}
(2017-09-12 05:56:27) Code: ^^explain what they have done {1-0}
(2017-09-12 05:57:26) Code: ^^go back, identify mistake {1-0}
(2017-09-12 05:57:26) Code: ^^correct mistake {1-0}
(2017-09-12 05:57:30) Quotation: 1:53 en as hulle sien hulle antwoor.. (7:835-7:940)
(2017-09-12 05:58:13) Code: ^^reflection in terms of observation {1-0}
(2017-09-12 05:58:16) Quotation: 1:54 So daar is definitief ? mate v.. (7:1779-7:1845)
(2017-09-12 05:58:54) Code: ^^maths sessions used to be terrible {1-0}
(2017-09-12 05:58:58) Quotation: 1:55 Dit was aaklig gewees ek het, .. (7:1908-7:2231)
(2017-09-12 05:59:18) Code: ^^do sums the whole time {1-0}
(2017-09-12 05:59:53) Code: ^^like a test in the end {1-0}
(2017-09-12 06:00:23) Code: ^^more interactive {1-0}
(2017-09-12 06:00:26) Quotation: 1:56 Nou is dit baie meer interakti.. (7:2233-8:1457)
(2017-09-12 06:01:14) Code: ^^can ask questions {1-0}
(2017-09-12 06:01:14) Code: ^^learner-centred {1-0}
(2017-09-12 06:01:14) Code: ^^learners present a lesson {1-0}
(2017-09-12 06:01:50) Code: ^^teachers as facilitators {1-0}
(2017-09-12 06:01:55) Quotation: 1:57 Die kind is nie ongeroepe nie .. (8:154-8:230)
(2017-09-12 06:02:43) Code: ^^less problems, more in depth {1-0}
(2017-09-12 06:02:47) Quotation: 1:58 Ek dink mens oefen iets dalk n.. (8:486-8:898)
(2017-09-12 06:03:10) Code: @@more value {1-0}
(2017-09-12 06:03:13) Quotation: 1:59 Daar is definitief meer waarde.. (8:900-8:1509)
(2017-09-12 06:04:03) Code: @@make a connection {1-0}
(2017-09-12 06:05:23) Code: ##marks improved {1-0}
(2017-09-12 06:05:23) Code: ##new approach {1-0}
(2017-09-12 06:05:23) Code: ##huge change {1-0}
(2017-09-12 06:05:26) Quotation: 1:60 Een meisietjie het ek spesifie.. (8:1632-8:2170)
(2017-09-12 06:12:06) Code: @@managed to do more {1-0}
(2017-09-12 06:12:06) Code: @@strong group {1-0}
(2017-09-12 06:12:06) Code: @@could work faster {1-0}
(2017-09-12 06:12:09) Quotation: 1:61 Van die graad nege groep dit i.. (9:1-9:1537)
(2017-09-12 06:13:39) Code: ^^think wider {1-0}
(2017-09-12 06:13:39) Code: ^^think of a method to use {1-0}
(2017-09-12 06:13:42) Quotation: 1:62 soos daai benadering waar hull.. (9:2195-9:2340)
(2017-09-12 06:14:15) Code: @@explain why they did something {1-0}
(2017-09-12 06:14:18) Quotation: 1:63 okay jy't nou vir my die antwo.. (10:52-10:162)
(2017-09-12 06:15:54) Code: %%self-confident {1-0}
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(2017-09-12 06:15:54) Code: @@safe environment {1-0}
(2017-09-12 06:15:54) Code: ^^get it right {1-0}
(2017-09-12 06:15:56) Quotation: 1:64 selfvertroue opbou soos wat ie.. (10:647-10:929)
(2017-09-12 06:16:22) Code: &&still struggle like the others {1-0}
(2017-09-12 06:16:26) Quotation: 1:65 Eerlikwaar nog nie daadwerklik.. (10:1410-10:1488)

(2017-09-12 06:16:46) Code: ^^still take long {1-0}
(2017-09-12 06:16:51) Quotation: 1:66 Hulle vat nog ook steeds net s.. (10:1493-10:1530)
(2017-09-12 06:18:03) Code: %%verbal feedback when marking a test {1-0}
(2017-09-12 06:18:06) Quotation: 1:67 hulle self verbaal se nou maar.. (11:795-11:902)
(2017-09-12 06:18:46) Code: %%radical change, north to south {1-0}
(2017-09-12 06:18:51) Quotation: 1:68 Dit verskil regtig noord suid .. (11:1225-11:1275)
(2017-09-12 06:19:58) Code: &&full programmes {1-0}
(2017-09-12 06:20:01) Quotation: 1:69 maar daar is klop van die Enge.. (11:1935-12:71)
(2017-09-12 06:48:25) Code: %%more calmness {1-0}
(2017-09-12 06:48:27) Quotation: 1:70 kinders doen dit dan ook so di.. (7:1-7:92)
(2017-09-12 07:03:27) Code: different order in steps {1-0}
(2017-09-13 07:06:09) Network View: Teachers' interviews (7)
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(2017-09-13 07:07:39) Code: ##motivation {0-1}
(2017-09-13 07:07:39) Code: ##anxiety {0-1}
(2017-09-13 07:07:39) Code: @@problem-solving context {0-1}
(2017-09-13 07:07:39) Code: @problem-solving abilities {0-2}
(2017-09-13 07:07:39) Code: @@problem-solving strategies {0-1}
(2017-09-13 07:07:39) Code: #learners' feelings {0-3}
(2017-09-13 07:14:43) Code-Link: #learners' feelings <is associated with> ##confidence
(2017-09-13 07:14:48) Code-Link: #learners' feelings <is associated with> ##motivation
(2017-09-13 07:15:01) Code-Link: #learners' feelings <is associated with> ##anxiety
(2017-09-13 07:15:38) Code-Link: @problem-solving abilities <is associated with> @@problem-solving context
(2017-09-13 07:15:44) Code-Link: @problem-solving abilities <is associated with> @@problem-solving strategies

## List of all objects

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HU: Questionnaire two of SETH learners
File: [C:\Users\22997385\Documents\Scientific Software\ATLASti\...\Questionnaire two of SETH learners.hpr7]
Edited by: Super
Date/Time: 2017-11-08 15:04:11

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### HU

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Questionnaire two of SETH learners

### Primary Documents

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P 3: Grade 9 questionnaire 2.pdf {24}

### Quotations

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2:1 Nee, die hoeveelheid is genoeg.. (1:1781-1:1810)
2:2 Ja, ek dink 50% van sessies mo.. (3:1901-3:1947)
2:3 Maak nie vir my saak nie, omda.. (5:1875-5:1964)
2:4 Nee, nie regtig nie. (7:1967-7:1986)
2:5 Nee, daar is genoeg sessies va.. (9:2042-9:2149)
2:6 Nee, ek dink as ons meer sessi.. (11:1882-11:1968)
2:7 Nee, ek hou van die tegniese s.. (13:1829-13:1865)
2:8 Nee, ek het baie ander goed om.. (15:1920-15:1958)
2:9 Yes, if they get to teach diff.. (17:1931-17:1984)
2:10 Yes. Well I feel like having o.. (20:173-20:388)
2:11 Yes, I would so that I can und.. (21:2192-21:2244)
2:12 Yes, because I would like to u.. (23:2051-23:2135)
2:13 Yes, Mathematics is important .. (25:2156-25:2254)
2:14 Yes, i feel as if we need to l.. (27:2096-27:2201)
2:15 Yes, I have dropped from 87% t.. (30:173-30:269)
2:16 Yes, I would like môre because.. (31:2461-31:2551)
2:17 No, maths requires loads of th.. (33:1945-33:2097)
2:18 Yes, maybe that will help me. .. (35:2025-35:2121)
2:19 No, because the more formulas .. (37:2248-37:2350)
2:20 Yes, because I want to learn m.. (39:2100-39:2214)
2:21 Yes, because it can be applica.. (41:2447-41:2527)
2:22 Yes. It helps in class when I .. (43:2275-43:2347)
2:23 Yes. They will assist us in cl.. (45:2363-45:2428)
2:24 Yes, because we only have a fe.. (47:2362-47:2411)
2:25 Ja, dis ‘n belangrike bousteen.. (49:2293-49:2372)
2:26 Nee, ons leer nuwe dinge in an.. (51:2037-51:2154)
2:27 Eintlik, ja, as deur meer wisk.. (53:2232-53:2291)
2:28 Nee, hou meer van sessies waar.. (55:1993-55:2057)
2:29 Nee, dankie, ek sal graag meer.. (57:2260-57:2357)
2:30 Nee, daar is ‘n goeie hoeveelh.. (59:2077-59:2165)

2:31 Nee, want ons leer nie juis nu.. (61:1925-61:1995)
2:32 Nee, ek voel dat dit my klaar .. (63:1939-63:1980)
2:33 Nee, ons het baie. (65:1838-65:1855)
2:34 Nee; ons het genoeg wiskunde i.. (67:1879-67:1979)
2:35 Nee, ek is op die oomblik baie.. (69:1887-69:1935)
2:36 Nee, ons het baie wiskunde per.. (71:2049-71:2111)
2:37 Nee, ek dink dit is genoeg ses.. (73:2031-73:2074)
2:38 No, because, yes Math is impor.. (75:1885-75:1950)
2:39 No, I dont like maths. (77:1879-77:1900)
2:40 Die smartboards. (1:849-1:864)
2:41 Smartboards, Plickers (3:898-3:918)
2:42 Smartboards. (5:923-5:934)
2:43 Geen. (Behalwe smartboards) (7:970-7:996)
2:44 Soms kan ons ons fone gebruik .. (9:948-9:1013)
2:45 Die slimbord en die truprojekt.. (11:890-11:957)
2:46 'n smartboard. (13:876-13:889)
2:47 Smartboards (15:927-15:937)
2:48 Calculators. (17:932-17:943)
2:49 Mr. Koekemoer found an App whi.. (19:1295-19:1496)
2:50 Electrical technology like com.. (21:1053-21:1088)
2:51 Smartboards are used. (25:1032-25:1052)
2:52 Projctors, plicker cards, comp.. (27:908-27:956)
2:53 Smartboards - Computer/Project.. (29:1104-29:1157)
2:54 I think the application instal.. (31:1148-31:1247)
2:55 Smartboards - Camera _____.. (33:956-33:994)
2:56 Projectors to display on the b.. (37:1009-37:1091)
2:57 Sometimes we use computers and.. (39:1008-39:1047)
2:58 Smartboards. (41:1160-41:1171)
2:59 Smartboard and the teacher sel.. (43:1089-43:1210)
2:60 Computers and different apps. .. (45:1015-45:1059)
2:61 The whiteboard and projector a.. (47:1107-47:1157)
2:62 Plicker cards asook kano ns pa.. (49:1053-49:1156)
2:63 Ons mag 'n calculator gebruik... (51:977-51:1006)
2:64 Media tegnologie, rekenaar teg.. (53:1051-53:1094)
2:65 Smartboard. (55:978-55:988)
2:66 Ons gebruik partykeer die reke.. (57:1070-57:1139)
2:67 Smartboard - Plicker cards. (59:1085-59:1112)
2:68 Smartboard/Rekenaar. (61:934-61:953)
2:69 Rekenaars/smartboards (63:898-63:918)
2:70 Smartboard, fone, rekenaar. (65:874-65:900)
2:71 Smart board (67:896-67:906)
2:72 Rekenaar, rekenaar muise en ti.. (69:890-69:926)
2:73 Smartboard, rekenaar. (71:958-71:978)
2:74 'n smartboard, foon, rekenaar... (73:1010-73:1039)
2:75 Plica - smartboard (75:914-75:932)
2:76 Smarboard and PC and projector.. (77:863-77:893)
2:77 Ek oefen somme in 'n boek. (1:2033-1:2058)
2:78 Ek lees alles deur en kyk na d.. (3:2169-3:2224)
2:79 Werk deur ou vraestelle. Lees .. (5:2186-5:2232)
2:80 Die woordsomme. (1:620-1:634)
2:81 Lekker (1:430-1:435)
2:82 Die algebra. (1:1300-1:1311)
2:83 Woordsomme. (1:1521-1:1531)
2:84 Baie lekker. (2:166-2:177)

2:85 Dit is vir my die lekkerste se.. (3:430-3:485)
2:86 Die woordsomme (3:669-3:682)
2:87 Dit is definitief die belangri.. (4:1-4:34)
2:88 Die sessies is baie uitdagend .. (5:430-5:470)
2:89 Jy moet moeilike somme doen en.. (5:654-5:708)
2:90 Dit kan makliker wees. (5:1158-5:1179)
2:91 Woordsomme. (5:1615-5:1625)
2:92 Dit is 'n moeilike vak. (6:91-6:113)
2:93 Wiskunde is soms uitdagend, ma.. (7:430-7:548)
2:94 Om woordsomme op te los (7:732-7:754)
2:95 Om meer in groepe te werk. (7:1219-7:1244)
2:96 Om in groepe te werk en oor nu.. (7:1449-7:1497)
2:97 Woordsomme. (7:1707-7:1717)
2:98 Ek gaan leer die wette en meto.. (7:2208-7:2283)
2:99 itdagend, vol nuwe geleenthede.. (8:92-8:160)
2:100 Soms vervelig, maar meeste van.. (9:430-9:487)
2:101 Die groepwerk en speletjie. __.. (9:1517-9:1568)
2:102 Ek skryf die werk oor en dan d.. (9:2371-9:2446)
2:103 Lekker en soms uitdagend (10:91-10:114)
2:104 Langer pouses. (11:1180-11:1193)
2:105 Die algebra. _____ (11:1398-11:1417)
2:106 Die meetkunde. (11:1619-11:1632)
2:107 Ek lees als deur en dan oefen .. (11:2190-11:2246)
2:108 Dit is baie uitdagend partykee.. (12:91-12:156)
2:109 Neutraal, wsikunde is nie sleg.. (13:430-13:464)
2:110 Die meetkunde. (13:648-13:661)
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2:114 Doen al die voorbeelde in die .. (13:2087-13:2125)
2:115 Interessant. (14:166-14:177)
2:116 Dit is baie lekker om wiskunde.. (15:430-15:474)
2:117 Dit is die problem solving wat.. (15:659-15:711)
2:118 Niks, dis lekker net so. (15:1195-15:1218)
2:119 Dit is die lekkerste ooit. (16:91-16:116)
2:120 Boring sometimes it needs crit.. (17:430-17:473)
2:121 Challenging and boring. _____.. (18:166-18:216)
2:122 Well, before the sessions it f.. (19:431-19:700)
2:123 Finding the answers when there.. (19:884-19:1080)
2:124 Problem solving and algebra. (19:2118-19:2145)
2:125 Angles. They are too complicat.. (19:2355-19:2481)
2:126 Trying to think outside the bo.. (21:757-21:838)
2:127 When we learn new ways to coun.. (21:1576-21:1668)
2:128 I don't enjoy them when we do .. (21:1878-21:1942)
2:129 I love the brain teasers. (23:1533-23:1557)
2:130 It is a very challenging subje.. (24:91-24:183)
2:131 Mathematics is a subject I enj.. (25:431-25:511)
2:132 Geometry is the section of Mat.. (25:696-25:817)
2:133 Algebra is most easy to unders.. (25:1595-25:1649)
2:134 Geometry is most difficult for.. (25:1859-25:1906)
2:135 The best; it's a subject which.. (26:420-26:473)
2:136 I think they are helping alot... (27:431-27:460)
2:137 The number sentences. Geometry.. (27:644-27:693)
2:138 I enjoy problem solving. _____.. (27:1485-27:1528)

2:139 I would say that mathematics i.. (28:272-28:420)
2:140 Solving most of the problems t.. (29:737-29:886)
2:141 Tiring - Confusing - Boring (33:433-33:461)
3:1 No, maybe in future time, but .. (2:248-2:285)
3:2 Nee, vraag 1 en 4 is my morive.. (4:1-4:35)
3:3 Yes, because they are fun, the.. (5:2069-5:2253)
3:4 Nee, ek hou nie van wisk nie. (7:2116-7:2144)
3:5 Nee, defnitiefnie. Ek dink so .. (9:2296-9:2477)
3:6 Ja, die sessies help my met my.. (11:2253-11:2330)
3:7 No, they are okay once a month.. (13:1854-13:1947)
3:8 Ja, veral omdag ons moeiliker .. (16:1-16:155)
3:9 No, the sessions are enriching.. (17:2160-17:2272)
3:10 Yes, so that we get more time .. (19:2348-19:2481)
3:11 Ja, maar ook nee, omdat ons al.. (21:2319-21:2398)
3:12 Ja, want dis partykeer lekker .. (23:2020-23:2100)
3:13 'd like to have laptops that w.. (25:2026-25:2131)
3:14 Ohh yes, they give more enligh.. (27:2136-27:2242)
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3:16 Yes, one topic for each maths .. (31:2112-31:2186)
3:17 Yes, I would! Due to the fact .. (33:2440-33:2544)
3:18 Nee, want dit is 'n langtyd wa.. (35:2216-35:2358)
3:19 Yes, only if we do work we hav.. (38:273-38:344)
3:20 Ja, dit is baie belangrik. Die.. (39:2087-39:2205)
3:21 Um I think Im ok with the curr.. (42:248-42:486)
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!!computers {17-4}
!!geogebra {0-1}
!!plicker {11-1}
!!projector {6-1}
!!smart board {25-1}
!!software packages {1-1}
!!stats apps {0-1}
!!time constraints {0-0}
!technology {0-7}
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&&maths in real life {1-0}
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&&read throuh {3-0}
&&study worked examples {2-0}
&maths as subject {0-1}
**most challenging aspects of maths {0-0}
*studying maths {0-1}
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@@angles {1-0}
@@answering questions {0-0}
@@boring {4-0}
@@brain teasers {1-0}
@@challenging {9-0}
@@confusing {1-0}
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@@easier {1-0}
@@enjoyable {9-0}
@@fun {1-0}
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@@geometry {6-0}
@@group work {4-0}
@@helpful {2-0}
@@improves understanding {0-0}
@@individual work {0-0}
@@informative {0-0}
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@@learn the theory {1-0}
@@least enjoyable sessions {0-0}
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@@tiring {0-0}
@@word problems {8-0}
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challenges {0-1}
enjoyment {0-1}
frequency {0-1}
improvement {0-1}
Mathematics {0-2}
Mathematics sessions {0-5}
most important {1-0}
Studying Mathematics {0-0}
Views on Mathematics {0-0}

**Network Views**

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Mathematics (3)
Mathematics sessions (6)

Technology (10)

**Code-Links**

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!!computers <is associated with> !!geogebra
!!computers <is associated with> !!software packages
!!computers <is associated with> !technology
!!smart board <is associated with> !technology
!!stats apps <is associated with> !!computers
!technology <is associated with> !!calculators
!technology <is associated with> !!cell phone
!technology <is associated with> !!plicker
!technology <is associated with> !!projector
Mathematics <is associated with> &maths as subject
Mathematics <is associated with> *studying maths
Mathematics sessions <is associated with> !technology
Mathematics sessions <is associated with> challenges
Mathematics sessions <is associated with> enjoyment
Mathematics sessions <is associated with> frequency
Mathematics sessions <is associated with> improvement

## List of all objects

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Edited by: Super
Date/Time: 2017-11-08 15:03:13

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### HU

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Questionnaires of learners in the SETH Academy October 2016

### Primary Documents

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P 1: 2016_SETH Grade 8 Final.docx {226}
P 2: SETH Gr8.2 (9)1 Finaal.docx {299}

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2:146 Its takes a lot of time. Now t.. (276:276)
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2:150 o get the boring sessions over.. (321:321)
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2:154 Doing practical things, I feel.. (15:15)
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2:163 I enjoy the activities that re.. (96:96)
2:164 he Comair visit, we could unde.. (105:105)
2:165 Our practical sessions, when w.. (114:114)
2:166 think the maths, it's always c.. (123:123)
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2:168 I enjoy it when we get to lear.. (141:141)
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2:170 he excursions, we saw new thin.. (159:159)
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2:180 All the practical things we di.. (250:250)
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2:185 The mathematics because you ca.. (295:295)
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2:188 Excursions because I like walk.. (322:322)
2:189 Practical activities because I.. (331:331)
2:190 The reading sessions. Because .. (25:25)
2:191 . Maths, it's too hard (34:34)
2:192 Doing the mathematics workshee.. (43:43)
2:193 I love all the activities we d.. (52:52)
2:194 Maths worksheets. Reason at qu.. (61:61)
2:195 The ones where we have to sit .. (70:70)
2:196 When we have to sit still and .. (79:79)
2:197 Reading, because the topics we.. (88:88)
2:198 . The ones in the classroom be.. (97:97)
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2:203 am not a good listener so basi.. (142:142)
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2:205 The maths made me dispirited b.. (160:160)
2:206 The reading, the reading mater.. (169:169)
2:207 The space expedition, the peop.. (178:178)
2:208 I enjoyed everything. (187:187)
2:209 The history of mathematics bec.. (196:196)
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2:211 The mathematics, because we do.. (214:214)
2:212 The worksheets are too hard bu.. (223:223)
2:213 The reading because I get the .. (233:233)
2:214 Sessions at the school. It's s.. (242:242)
2:215 The mathematic worksheets, bec.. (251:251)
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2:220 . The mathematics. It takes ti.. (305:305)
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2:223 ath and reading because I get .. (332:332)
2:224 Yes, so I can learn more and e.. (8:8)
2:225 Yes, it exposes us to more rea.. (17:17)
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2:227 . No, I realized it's not some.. (35:35)
2:228 I would still like to be part .. (44:44)
2:229 Definitely. I'd love to remain.. (53:53)
2:230 Yes, I would love to continue .. (62:62)
2:231 Yes, because it is something u.. (71:71)
2:232 would like to remain part of S.. (80:80)
2:233 Maybe, because I didn't enjoy .. (89:89)
2:234 Yes, even though I don't enjoy.. (98:98)
2:235 I really would like to stay in.. (107:107)
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2:239 Yes, I prefer to remain in SET.. (143:143)
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2:241 Yes, it taught me many new thi.. (161:161)
2:242 Yes, we learned many new skill.. (170:170)
2:243 . Yes, I enjoy it very much an.. (179:179)
2:244 Yes, you learn a lot. (188:188)
2:245 Not really, I would rather foc.. (197:197)
2:246 Yes, it provides wonderful opp.. (206:206)
2:247 No, I wanted to do this to hel.. (215:215)
2:248 Yes, it's nice and I want to a.. (224:224)
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2:250 Yes, I definitely want to! It'.. (243:243)
2:251 Yes, I would like to stay apar.. (252:252)
2:252 No, but my parents forced me. (261:261)
2:253 Yes, it's nice and helps us wi.. (270:270)
2:254 Yes, I have learned a lot and .. (279:279)
2:255 Yes, it has improved and is fu.. (288:288)
2:256 es, I know much more about all.. (297:297)
2:257 Yes, I would very much like to.. (306:306)
2:258 Yes, it's nice and we learn a .. (315:315)
2:259 Yes, because I enjoy the excur.. (324:324)
2:260 es, because I enjoy the excurs.. (324:324)
2:261 7. No (333:333)
2:262 Is has shown/taught me differe.. (9:9)
2:263 8. Yes, I improved my marks. (18:18)
2:264 Yes, it teaches me methods of .. (27:27)
2:265 8. Yes, but a little bit. (36:36)
2:266 Not really on my mathematics b.. (45:45)
2:267 Yes, I think it does because e.. (54:54)
2:268 s, it did. Nowadays when I wri.. (63:63)
2:269 o, my performance in school ha.. (72:72)
2:270 . No, my marks dropped anyways.. (81:81)
2:271 Yes, it changed the way I solv.. (90:90)
2:272 Yes, my marks improved because.. (99:99)
2:273 Yes, it made me enjoy maths mo.. (108:108)
2:274 Yes, it did, SETH gave me a ne.. (117:117)
2:275 Yes, I developed a more “matur.. (126:126)
2:276 Not as such. I believe though .. (135:135)
2:277 I find that I can solve mathem.. (144:144)
2:278 Yes, my math has increased lit.. (153:153)
2:279 Yes, it taught me that if I pr.. (162:162)
2:280 My math performance stayed the.. (171:171)
2:281 es, it helped me look at probl.. (180:180)
2:282 Yes, it helped a lot with my p.. (189:189)
2:283 Yes, I think so I have gotten .. (198:198)
2:284 Yes, I have improved a lot wit.. (207:207)
2:285 Yes, it came down because I di.. (216:216)
2:286 Not really. (225:225)
2:287 No, it had no influence on my .. (235:235)
2:288 Yes, I have definitely improve.. (244:244)
2:289 t had no effect on my math per.. (253:253)
2:290 8. No, my marks just stayed th.. (262:262)

2:291 s, SETH took away our study ti.. (271:271)
2:292 es, I have learned to be patie.. (280:280)
2:293 No, it did not improve my mark.. (289:289)
2:294 8. Not really but I feel smart.. (298:298)
2:295 Yes, it taught me to never giv.. (307:307)
2:296 Mathematics no, on the others .. (316:316)
2:297 No, the math didn't help me. I.. (325:325)
2:298 No (334:334)
2:299 . No, the math didn't help me... (325:325)

**Codes**

---

!!adventure {1-0}
!!amazing {2-0}
!!awareness of various careers {1-0}
!!beneficial {1-0}
!!benefit for the future {5-0}
!!better than last year {2-0}
!!bigger picture {1-0}
!!boring {18-0}
!!cut short during exam {1-0}
!!different perspective {1-0}
!!educational {2-0}
!!enjoyable {21-0}
!!enlightening {0-0}
!!exciting {2-0}
!!exposure {1-0}
!!extraordinary {1-0}
!!eye opening {1-0}
!!favourite {1-0}
!!fine {4-0}
!!frustrating {6-0}
!!fun {12-0}
!!good {4-0}
!!great experience {3-0}
!!grow as a person {1-0}
!!improvement {3-1}
!!improvement of lifestyle {1-0}
!!informative {1-0}
!!interaction {1-0}
!!interest in {1-0}
!!interesting {14-0}
!!jobs or careers {4-0}
!!lack of communication {1-0}
!!learned nothing new {2-0}
!!learnt a lot {17-0}
!!life changing {1-0}
!!loved it {1-0}
!!new challenges {2-0}
!!new skills {4-0}
!!nice {12-0}
!!not exciting {1-0}
!!not helpful {2-0}

!!not nice {4-0}
!!not worth the money {1-0}
!!ok {8-0}
!!once a week saves time {1-0}
!!restricted learning time {1-0}
!!self-development {1-0}
!!sleepy {1-0}
!!solve new problems {1-0}
!!think creatively {2-0}
!!tiring {1-0}
!!wide focus {1-0}
## never successful {0-0}
##challenging {20-0}
##difficult {32-0}
##don't like them {1-0}
##expect too much {0-0}
##feel good when successful {2-0}
##feel stupid {1-0}
##good teaching methods {1-0}
##hated them {1-0}
##improved school maths {3-0}
##new solution methods {2-0}
##not fun {2-0}
##positive impact {1-0}
##struggle {2-0}
##taught endurance {3-0}
##think critically {1-0}
##waste of time {0-0}
#mathematics work sheets {33-3}
$$ agriculture session {1-0}
$$all the activities {1-0}
$$building {2-0}
$$business activity {4-0}
$$business plan {1-0}
$$business study {3-0}
$$excursions {15-0}
$$experiments {1-0}
$$financial part {1-0}
$$flight simulation {2-0}
$$group activities {1-0}
$$group work {4-0}
$$ikageng {1-0}
$$insects session {3-0}
$$learning about careers {2-0}
$$Lego {1-0}
$$lively activitiesd {1-0}
$$maths {7-0}
$$medical studies {1-0}
$$meeting new people {1-0}
$$membranes {2-0}
$$music and maths {1-0}
$$physics {2-0}
$$practicals {26-0}
$$session on frogs {4-0}

$$sience topics {2-0}
$$space expedition {1-0}
$$staying involved {0-0}
$$visit the university {5-0}
$$Visit to Comair {8-0}
$$Vredfort Dome {2-0}
$most enjoyable {0-0}
%staying in SETH {0-0}
&&add guidelines {1-0}
&&become a better problem-solver {2-0}
&&can't finish them {1-0}
&&can't make it better/worse {1-0}
&&current school work {1-0}
&&difficult problem after easy one {4-0}
&&discuss answers more {1-0}
&&do more work sheets {1-0}
&&don't know {3-0}
&&easy problem first {4-0}
&&effective enough {1-0}
&&example first {4-0}
&&example to illustrate {1-0}
&&explain better {1-0}
&&faster/shorter questions {3-0}
&&give a hint {1-0}
&&half new work {1-0}
&&half work done {1-0}
&&help to apply the knowledge {1-0}
&&lecture before the time {6-0}
&&less questions {1-0}
&&make it easier {3-0}
&&mark answers before proceeding {1-0}
&&match the level of learners {1-0}
&&more algebra questions {2-0}
&&more challenging questions {2-0}
&&more specific {1-0}
&&more time {2-0}
&&more topics {1-0}
&&more word sums {1-0}
&&music {1-0}
&&one specific question in worksheet {1-0}
&&perfect {1-0}
&&phrased better {6-0}
&&printed larger {1-0}
&&relate to school work {4-0}
&&SETH textbook: worked examples and exercises {1-0}
&&shorter questions {2-0}
&&students do not explain well {1-0}
&&students must help more {1-0}
&&topic per worksheet {1-0}
&improvement of worksheets {0-0}
**academic limit {1-0}
**chemical reactions {1-0}
**communicating with coordinators {1-0}
**end of burauary {1-0}

**excel {1-0}
**giving presentations {1-0}
**hesitant to ask questions {2-0}
**interact with others {5-0}
**keep SETH's name high {1-0}
**learning for a test {2-0}
**learning new things {1-0}
**life skills {1-0}
**listening {2-0}
**long sessions after school {3-0}
**maths {5-0}
**new knowledge and implimenting it {1-0}
**nice places and things to observe {1-0}
**paying attention {1-0}
**people in SETH {1-0}
**reading {4-0}
**schoolwork after seth {2-0}
**solving maths equations {5-0}
**speak Afrikaans {1-0}
**stay awake {9-0}
**staying in SETH {0-0}
**staying interested {1-0}
**staying involved {1-0}
**survive boring sessions {4-0}
**the flashlight {1-0}
**think critically {2-0}
**time management {3-0}
**to keep trying {1-0}
**warm classes {1-0}
**wind generator {1-0}
*challenges {1-0}
@@changed way i see maths {10-0}
@@did not improve {0-0}
@@differs from school {3-0}
@@difficult {1-0}
@@don't know what to do {2-0}
@@dont complete them {2-0}
@@dont think so {1-0}
@@enjoyed maths more {1-0}
@@expect too much of us {1-0}
@@filler sessions {1-0}
@@gives us practice {1-0}
@@good exercise {1-0}
@@good idea {2-0}
@@hassle {1-0}
@@help you think {1-0}
@@helpful with maths at school {2-0}
@@helps with school {1-0}
@@improve marks {7-0}
@@improved {1-0}
@@improved thoughts {1-0}
@@influence performance {3-0}
@@know myself better {1-0}
@@later in school {5-0}

@@less study time {1-0}
@@like maths more {1-0}
@@little bit {1-0}
@@markd dropped {1-0}
@@marks stayed the same {1-0}
@@maths applicable to real-life {1-0}
@@maths improved {5-0}
@@maths stayed the same {4-0}
@@maths went down {4-0}
@@maths went up {1-0}
@@monotonous {1-0}
@@more confidant {1-0}
@@motivated me {1-0}
@@motivating {1-0}
@@never give up {1-0}
@@no {12-0}
@@no correlation with current school maths {2-0}
@@no influence {2-0}
@@no not really {4-0}
@@other subjects improved {5-0}
@@others stayed the same {2-0}
@@positive about maths {1-0}
@@preparing for bigger things {1-0}
@@remained the same {1-0}
@@same {1-0}
@@scared of maths {1-0}
@@solve problems better {10-0}
@@some went up {1-0}
@@stayed the same {3-0}
@@struggled a lot {1-0}
@@students did not help {3-0}
@@subjects stayed the same {1-0}
@@Takes a lot of study time {1-0}
@@teaches methods {1-0}
@@test our knwoledge {1-0}
@@think so {1-0}
@@too long {5-0}
@@too much maths {1-0}
@@try my best {1-0}
@@understand better {6-0}
@@waste of time {1-0}
@@yes {33-0}
@maths performance {1-0}
^^ everyting was enjoyable {3-0}
^^ lessons in the classroom {1-0}
^^ reading sessions {18-0}
^^ too monotonous {1-0}
^^ word development {1-0}
^^beginning of the year sessions {1-0}
^^city planning session {1-0}
^^format of the Worksheets {1-0}
^^group discussions {1-0}
^^just listen {4-0}
^^lego activity {1-0}

^^life skills {2-0}
^^long boring sessions {1-0}
^^mathematic session {1-0}
^^maths {10-0}
^^maths history {1-0}
^^meteorites/meteors session {1-0}
^^no physical activities sessions {1-0}
^^none {2-0}
^^plastic excursion {1-0}
^^presentation activities {1-0}
^^school sessions {1-0}
^^solid works {1-0}
^^space excursion {1-0}
^least enjoyable {0-0}
++accomplish something {1-0}
++awesome {1-0}
++become a better person {1-0}
++broad view of life {1-0}
++broaden horizons {1-0}
++broadens knowledge {2-0}
++career exposure {4-0}
++contributes to life {1-0}
++depends {1-0}
++discover potential {1-0}
++do better in maths {1-0}
++engineering help no {1-0}
++enjoyable {2-0}
++exciting {1-0}
++excursions {1-0}
++exercise strenghts {1-0}
++exposure to reality {1-0}
++focus on sport {1-0}
++fun {4-0}
++future help {7-0}
++gets better {1-0}
++gives advantage {2-0}
++gives exposure {6-0}
++gives oppertunities {1-0}
++good platform {1-0}
++grand oppertunities {2-0}
++great oppertunity {3-0}
++grow as individual {1-0}
++help in long run {2-0}
++help with things we are not fond of {1-0}
++helps financialy {1-0}
++helps with maths {1-0}
++helps with school {1-0}
++high standard knowledge {1-0}
++hows and whys of life {2-0}
++if SETH improves {1-0}
++improved {1-0}
++improves abilities {1-0}
++informative {1-0}
++interesting {1-0}

++know more that others {2-0}
++learn a lot {10-0}
++learn more {2-0}
++learn new things {4-0}
++learned backgrounds {1-0}
++learned new places {1-0}
++link between school and SETH {1-0}
++maby {1-0}
++money worth {1-0}
++more excursions {1-0}
++more experiments {1-0}
++need it someday {1-0}
++new interesting {1-0}
++new methods {1-0}
++new oppertunities {2-0}
++new skills {4-0}
++new wat of thinking {1-0}
++nice {2-0}
++no {8-0}
++no response {1-0}
++not enjoyable {1-0}
++once in a lifetime oppertunity {1-0}
++open possibilities {1-0}
++parents forced {1-0}
++plans for students {1-0}
++repeating {1-0}
++see a lot {1-0}
++shorter and more diversity {1-0}
++something unique {1-0}
++special experience {1-0}
++start boring {1-0}
++stays the same {1-0}
++teaches a lot {1-0}
++time for homework {1-0}
++trying new things {1-0}
++use new skills {1-0}
++yes {40-0}
+remain part of SETH {22-0}
challenges {0-1}
enjoyment {0-1}
experience {0-1}
helps with future {1-0}
improvement {0-0}
involvement {0-2}
performance {0-1}
SETH experience {0-4}
theory sessions {1-0}
to concentrate {1-0}

**Network Views**

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Mathematics worksheets (3)
SETH experience (5)

**Code-Links**

---

!!improvement <is associated with> #mathematics work sheets
#mathematics work sheets <is associated with> experience
#mathematics work sheets <is associated with> involvement
SETH experience <is associated with> challenges
SETH experience <is associated with> enjoyment
SETH experience <is associated with> involvement
SETH experience <is associated with> performance

## List of all objects

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HU: Task-based interviews with learners
File: [C:\Users\22997385\Documents\Scientific Software\ATLASti\...\Task-based interviews with learners.hpr7]
Edited by: Super
Date/Time: 2017-11-08 15:05:11

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### HU

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Task-based interviews with learners

### Primary Documents

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P 1: Task-based interviews with learners_final.pdf {126}
P 2: Interview Tasks.pdf {0}
P 3: Learner S7 solution.pdf {0}

### Quotations

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1:1 Ja, ek dink so. Soos ek gesê h.. (2:1151-2:1287)
1:2 Wel die meneer gee vir ons so .. (2:1449-2:1558)
1:3 Dis net lekker om 'n wiskunde .. (4:130-4:251)
1:4 Ek lees eers die vraag totdat .. (4:376-4:531)
1:5 Dan gewoonlik sal ek aangaan m.. (5:930-5:1195)
1:6 Ek voel net dis vir my baie ma.. (6:339-6:466)
1:7 Ek dink dis albei want as jy ?.. (6:558-6:682)
1:8 Ek voel nogal opgewonde, want .. (7:131-7:316)
1:9 Ek lees mooi deur wat die situ.. (7:625-7:978)
1:10 As jy als vir jouself neerskry.. (8:1795-8:1854)
1:11 Veral in situasies waar jy kan.. (9:1219-9:1297)
1:12 Nogal ja tannie, ek hou baie d.. (9:1558-9:1793)
1:13 Mam sometimes it's scary but t.. (11:130-11:181)
1:14 Mam it's difficult sometimes t.. (11:215-11:291)
1:15 I just read it through. I just.. (11:479-11:529)
1:16 Yes mam, i just feel like it. .. (13:469-13:530)
1:17 Okay, mam sometimes i feel pin.. (14:132-14:270)
1:18 I read four times the I imagen.. (14:393-14:495)
1:19 Because sometimes I can solve .. (16:1009-16:1083)
1:20 Tannie, dit hang af ook hoe di.. (17:131-17:465)
1:21 Ek lees eers die som of die wo.. (17:986-17:1153)
1:22 Ek vat gewoonlik die antwoorde.. (18:253-18:429)
1:23 Tannie ek sal nou nie se ek is.. (18:546-18:680)
1:24 Dit hang af meer watter tipe w.. (19:147-19:419)
1:25 Ek wil eers myself gefokus kry.. (19:542-19:716)
1:26 Nee ek gee nie op nie, ek wil .. (24:1313-24:1597)
1:27 As hy vir my eers reg lyk, as .. (25:424-25:715)
1:28 Ek dink nogal so want ek genie.. (25:1531-25:1792)
1:29 Honestly, I don't actually enj.. (26:129-26:485)

1:30 I keep on trying, I always, li.. (26:615-26:822)
1:31 Okay the first thing I do is I.. (26:945-26:1261)
1:32 I actually do I mean I like so.. (28:369-28:652)
1:33 Die eers gedagte wat in my kop.. (29:126-29:292)
1:34 Ek lees as ? soos die probleem.. (29:963-29:1637)
1:35 Ja, dit is nie vir my, dit is .. (33:314-33:701)
1:36 kay so I read through all the .. (34:629-34:928)
1:37 Okay so I check to make sure t.. (37:135-37:300)
1:38 Generally, yes but then there .. (37:761-37:860)
1:39 Dit hang af van soos die vraag.. (1:146-1:298)
1:40 Jy lees en dan lees jy weer en.. (1:423-1:803)
1:41 Ek dink so, ek weet nie hoe an.. (2:362-2:464)
1:42 Ons moet dan soos 'n getal sin.. (2:703-2:802)
1:43 Wel die meneer gee vir ons so .. (2:1449-2:1581)
1:44 Ek dink dis albei want as jy ?.. (6:558-6:681)
1:45 Ja, ek toets my antwoord ook j.. (9:1096-9:1127)
1:46 Nogal ja tannie, ek hou baie d.. (9:1558-9:1793)
1:47 No mam (12:643-12:648)
1:48 I check it mam. I check it fir.. (12:1127-12:1159)
1:49 And its confusing mam, x is co.. (13:951-13:995)
1:50 Mam i didn't really understand.. (14:1306-14:1349)
1:51 a ek het die een ? bietjie, hy.. (19:1451-19:1580)
1:52 Ek sal gewoonlik as ek 'n vraa.. (21:1249-21:1522)
1:53 Ek het altyd gesukkel daarmee,.. (22:1-22:92)
1:54 Ek voel ek voel nie angstig of.. (23:126-23:335)
1:55 Ek lees hom eers genoeg deur d.. (23:460-23:702)
1:56 Dit het, soos ek het gekyk hoe.. (24:555-24:774)
1:57 If I reach a solution but I'm .. (27:1794-28:116)
1:58 Nooit nie. (29:321-29:330)
1:59 Ek was nog nie een keer, ek he.. (29:459-29:729)
1:60 As ek die oomblik sien hys nie.. (32:2009-32:2146)
1:61 Well depends like if it's real.. (34:128-34:366)
1:62 I didn't find it that difficul.. (35:83-35:226)
1:63 Relatief gespanne, maar nie te.. (43:129-43:227)
1:64 Ek voel maar net soos normaal .. (47:148-47:180)
1:65 Mam it depends on whether the,.. (52:129-52:265)
1:66 Mam sometimes like now nervous.. (56:132-56:215)
1:67 Mam I read through the questio.. (56:339-56:443)
1:68 Well it depends, like during a.. (60:129-60:389)
1:69 I'm calm and relaxed mam. (65:129-65:153)
1:70 Well it actually depends on th.. (73:129-73:381)
1:71 Dit is okay as ek soos begin, .. (76:129-76:283)
1:72 Baie gemaklik (80:129-80:141)
1:73 Ek stres aan die begin, maar j.. (84:129-84:370)
1:74 Ja, hang af of dit 'n moeilike.. (84:178-84:370)
1:75 Dit hang eintlik maar af van d.. (88:129-88:613)
1:76 Wel dit hang af of daar ? volg.. (9:623-9:919)
1:77 Wel tannie ek, ek glo dat oor .. (91:425-91:1148)
1:78 Gewoonlik gaan ek rustig ja. D.. (87:741-87:800)
1:79 Want soos ek dink partykeer ni.. (87:372-87:589)
1:80 Partykeer (87:323-87:331)
1:81 Dan sal ek weer na dit gaan ky.. (87:1-87:208)
1:82 Okay ek lees eers deur dit en .. (84:674-84:848)
1:83 Ja, so mens nie die kan oplos .. (80:155-80:322)

1:84 Ek hou van wiskunde en ek doen.. (80:542-80:631)
1:85 Ek lees eerste die vraag heelt.. (80:788-80:1053)
1:86 Dan, in die algemeen dan is di.. (82:1623-82:1921)
1:87 Dan toets en hom en dan sien e.. (83:113-83:160)
1:88 k hou van daai algebraïese pro.. (83:290-83:420)
1:89 Ons het al met rig begin. Ek h.. (83:590-83:671)
1:90 Ek's self nie seker nie (83:812-83:834)
1:91 Nee, maar ja ek sien myself as.. (83:891-83:992)
1:92 Dan sal ek eers kyk wat alles .. (84:904-84:1017)
1:93 As daar iets kom wat ek dink o.. (88:1118-88:1392)
1:94 So dan, dan as dit nou, as dit.. (89:1-89:532)
1:95 Ek dink so half, half. Daar's .. (78:891-78:935)
1:96 Met die algebra goeters, die n.. (78:972-78:1134)
1:97 Ek gaan gewoonlik deur my stap.. (78:1-78:127)
1:98 a, dan gaan ek gewoonlik net e.. (78:372-78:506)
1:99 In die eksamen dan sal ek ook .. (78:600-78:768)
1:100 Ek lees die som soos mooi deur.. (76:922-76:1045)
1:101 Relatively good I think maybe,.. (75:318-75:410)
1:102 I usually move on to the next .. (74:1072-74:1247)
1:103 I usually figure it out at the.. (74:1465-74:1611)
1:104 I make sure that I understand .. (73:552-73:730)
1:105 Mam i normally feel anxious bu.. (69:129-69:293)
1:106 Well first I read the question.. (69:416-69:707)
1:107 Mam I get annoyed and I someti.. (68:1-68:83)
1:108 I usually just double check it.. (67:525-67:680)
1:109 Well, I read the question crit.. (65:468-65:591)
1:110 n a sense mam, but like it dep.. (63:335-63:568)
1:111 I evaluate what I did to get t.. (63:1-63:116)
1:112 And then like I follow steps t.. (56:455-56:626)
1:113 Mam like if it seems right I c.. (58:1310-58:1563)
1:114 Yes mam, then I just like get .. (59:63-59:114)
1:115 Yeah, kind of like I, I'm good.. (59:274-59:451)
1:116 I read it first so I can under.. (52:418-52:527)
1:117 Ek hou van dit as dit soos mee.. (50:1147-50:1283)
1:118 Ek lees my vraag soos drie kee.. (47:417-47:570)
1:119 Ek probeer gewoonlik kyk of hy.. (45:841-45:885)
1:120 Nee tannie (45:1417-45:1426)
1:121 Ja, ek weet nie tannie, dis ma.. (45:1512-45:1577)
1:122 Gewoonlik met kleiner goedjies.. (46:1-46:130)
1:123 Ek gaan maar net weer deur, ma.. (50:524-50:602)
1:124 Mam I check if it's right? (55:309-55:334)
1:125 Mam because I get most problem.. (55:901-55:1020)
1:126 I start from the beginning and.. (67:811-67:913)

**Codes**

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##algebra is confusing {1-0}
##anxious {1-0}
##calm {1-0}
##confident {1-0}
##depends if I understand the problem {3-0}
##depends on nature of problem {1-0}
##difficult {1-0}

##do not understand {1-0}
##enjoyable {5-0}
##excited {1-0}
##get annoyed {1-0}
##happy {1-0}
##hope I get it right {1-0}
##interesting {1-0}
##it depends {1-0}
##like I normally feel {1-0}
##like Maths {2-0}
##like solving problems {4-0}
##negative emotions {0-1}
##nervous {4-0}
##not enjoyable {1-0}
##not scared/nervous {2-0}
##panic {1-0}
##pinned {1-0}
##positve emotions {0-1}
##relaxed {2-0}
##relief {1-0}
##scared of word problems {1-0}
##scary {2-0}
##stress {5-0}
#emotions during problem-solving {0-2}
#feelings {0-0}
@@algebra is difficult {2-0}
@@challenge {3-0}
@@check the answer {6-0}
@@continue with rest of problems {9-0}
@@decision-making {0-1}
@@do not give up {1-0}
@@do not know {0-0}
@@do not think well {1-0}
@@do not understand {1-0}
@@double check the answer {1-0}
@@draw a picture {2-0}
@@easier {1-0}
@@easy to solve problems {0-0}
@@figure it out @ the end {1-0}
@@focus {1-0}
@@follow the steps learnt in class {1-0}
@@get the sums right {1-0}
@@go back to the problem later {2-0}
@@good problem-solver {16-0}
@@I like algebra the most {1-0}
@@I like geometry {1-0}
@@I like solving equations {1-0}
@@I stick to my first choice {1-0}
@@I struggle with small mistakes {2-0}
@@I try {1-0}
@@imaganitive situation {2-0}
@@interest {1-0}
@@keep on trying {1-0}
@@look for mistake {1-0}

@@make a plan {3-0}
@@make careless mistakes {2-0}
@@make sure I understand {7-0}
@@misunderstood problem {1-0}
@@nature of problem {2-0}
@@not a good PS {1-0}
@@picture in my mind {2-0}
@@planning {0-1}
@@practice hard {1-0}
@@quick {1-0}
@@read {22-0}
@@retrace my steps {4-0}
@@review {1-0}
@@rework the problem {5-0}
@@see what is given {2-0}
@@self-evaluation {0-1}
@@self-monitoring {0-1}
@@self-regulation {0-1}
@@SETH helped me {1-0}
@@skip problems {1-0}
@@sometimes {1-0}
@@substitute the answer in equation {1-0}
@@talent {4-0}
@@test the answer {7-0}
@@think of a plan {1-0}
@@think of rules to use {1-0}
@@time factor {5-0}
@@trial and error {0-0}
@@try another method {1-0}
@@uncertain if I am good at PS {1-0}
@@underline the given {1-0}
@@visualize {1-0}
@@word sums are easy {1-0}
@@words confused me {1-0}
@@write an equation {2-0}
@@write down the given {7-0}
@problem-solving {1-0}
@problem-solving behaviour {0-5}

**Network Views**

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#emotions during problem-solving (3)
@problem-solving behaviour (6)

**Code-Links**

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#emotions during problem-solving <is associated with> ##negative emotions
#emotions during problem-solving <is associated with> ##positve emotions
@problem-solving behaviour <is associated with> @@decision-making
@problem-solving behaviour <is associated with> @@planning
@problem-solving behaviour <is associated with> @@self-evaluation
@problem-solving behaviour <is associated with> @@self-monitoring

@problem-solving behaviour <is associated with> @@self-regulation