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ANNEXURE A:
BELIEFS QUESTIONNAIRE

Dear student and lecturer

Please fill in the questionnaire below by indicating with a cross (X) how you agree / disagree with the given statements. Please be very honest. Participation is voluntary and all answers will be treated anonymously. Do not write your name on the questionnaire. Your participation in this research is appreciated.

Nr	Statements	Disagree strongly	Disagree	Agree	Agree strongly
1.	Lecturers should teach specific methods to solve problems.				
2.	Mathematics is primarily an abstract subject.				
3.	All people are capable of doing mathematics.				
4.	Students can find a method to solve problems without the help of a lecturer.				
5.	A good mathematics lecturer always demonstrates the correct method to solve problems.				
6.	Mathematics is an exact science.				
7.	The best way to teach mathematics is to show students how to solve problems.				
8.	It is essential that students often do drill exercises.				
9.	To be successful in mathematics, a student needs to listen carefully to the lecturers' explanations.				
10.	The correctness of students' responses indicates how well they understand mathematics.				
11.	New mathematics is expanded only by research at university level.				
12.	The most important thing in mathematics is not whether the answer of a problem is correct, but whether the students can explain their answers.				

Nr	Statements	Disagree strongly	Disagree	Agree	Agree strongly
13.	Mathematics problems in a real-life context should be the central focus of the mathematics curriculum.				
14.	Many things in mathematics simply have to be accepted and remembered, there is not really an explanation for it.				
15.	If students struggle to solve problems, it is usually because they don't know the correct rule or cannot remember the formula.				
16.	Students should never leave the mathematics class with a sense of confusion.				
17.	Mathematics can be described best as a set of facts, rules and formulas that students have to learn.				
18.	Mathematics is best taught if students are required to solve problems in a real-life context.				
19.	The role of the mathematics lecturer is to convey knowledge to the student and to test whether it happened.				
20.	Mathematics is a practical structured guide to solve problems in real life.				
21.	Students first have to master basic mathematical facts, rules and procedures before they approach problems in a real-life context.				
22.	In the teaching of mathematics, lecturers should actively guide students to discover concepts.				
23.	If students forget theorems or formulas in a test/exam while they have learned it, it means that they did not do enough exercises.				
24.	If you use a calculator you are not doing mathematics.				
25.	Teachers should encourage students to find different ways to solve problems.				
26.	Some students have a natural talent to do mathematics.				
27.	Lecturers should always be able to answer all the students' questions regarding mathematics.				

Nr	Statements	Disagree strongly	Disagree	Agree	Agree strongly
28.	Students should learn mathematical theorems and formulas until they know them by heart.				
29.	It is important to predict solutions in mathematics before the actual calculations are done.				
30.	Mathematics problems given to students should easily be solved within the scope of the class time.				

ANNEXURE B:
INDEX OF LEARNING STYLES QUESTIONNAIRE (LECTURERS)

**QUESTIONNAIRE ON TEACHING STYLES AS ADAPTED FROM THE
LEARNING STYLE QUESTIONNAIRE OF FELDER & SOLOMAN**

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Dear Colleague

Find attached a questionnaire regarding your preference of teaching method/style. The questionnaire was adapted from the learning style questionnaire of Felder & Soloman (ILS). Will you please be so kind to spend 10 minutes to answer it? Your answers will be treated totally anonymous – don't put your name on the questionnaire. Please indicate the level of teaching you are referring to. If you make use of different teaching styles or methods for the different levels of teaching, complete a questionnaire for each level. Your cooperation will be highly appreciated.

Directions

For each of the 44 questions below, select either “a” or “b” to indicate your preference. Please choose only one answer for each question. If both “a” or “b” seem to apply to you, choose the one that applies more frequently.

1. My students will understand something better if I let them
 - a) try it out.
 - b) think it through.

2. In my teaching I would rather be considered
 - a) realistic.
 - b) innovative.

3. When I think about what I did yesterday, I am most likely to get
 - a) a picture.
 - b) words.
4. In my teaching I tend to focus on
 - a) the detail of the subject, but may be fuzzy about the overall picture.
 - b) the overall structure of the subject, but may be fuzzy about details.
5. When I am teaching something new, I would let my students
 - a) talk about it.
 - b) think about it.
6. As lecturer, I rather teach material
 - a) that deals with facts and real life situations.
 - b) that deals with ideas and theories.
7. I prefer to teach new information using
 - a) pictures, diagrams, graphs or maps.
 - b) written directions or verbal information.
8. I believe that when my students understand
 - a) all the parts, they understand the whole thing.
 - b) the whole thing, they see how the parts fit.
9. In a group discussion working on difficult material, I would expect of a student to
 - a) jump in and contribute ideas.
 - b) sit back and listen.
10. I find it easier
 - a) to teach facts.
 - b) to teach concepts.

11. When I teach from a book with lots of pictures and charts, I expect from my students to
 - a) look over the pictures and charts carefully.
 - b) focus on the written text.
12. When I teach math problems I expect from my students to
 - a) work their way to the solutions one step at a time.
 - b) guess the solutions, but then let them struggle to figure out the steps to get to them.
13. In classes I am teaching
 - a) I usually know many of the students.
 - b) I rarely know any of the students.
14. I prefer to teach
 - a) my students new facts or tell them how to do something.
 - b) something that gives them new ideas to think about.
15. As lecturer I do like to
 - a) put a lot of diagrams on the board.
 - b) spend a lot of time explaining.
16. When I'm analysing problems/something with my students I want them to
 - a) think of incidents and try to put them together to figure out the problems.
 - b) just know what the solutions are when they finish solving them and then think of incidents that demonstrate them.
17. When I give a problem/case study to my students I want them to
 - a) start working on the solution immediately.
 - b) try to fully understand the problem first.
18. I prefer to teach the idea of
 - a) certainty.

- b) theory.
19. In my classes my students will learn best
- a) what they see.
 - b) when talking about it.
20. As lecturer it is more important to me to
- a) lay out the material in clear sequential steps.
 - b) give an overall picture and relate the material to other subjects.
21. I prefer that my students master new material
- a) in a study group.
 - b) alone.
22. My students are more likely to consider me
- a) careful about the details of my work.
 - b) creative about how to do my work.
23. When I give directions to a new place, I prefer to
- a) draw a map.
 - b) write instructions.
24. I teach
- a) at a fairly regular pace. If my students put in their best, they'll have success.
 - b) in fits and starts and at first it may seem that I am totally confused, but then suddenly it all falls into the structure.
25. In my teaching I would rather have my students first
- a) try things out.
 - b) think about how they are going to do it.
26. When I am teaching I like to
- a) clearly say what I mean.
 - b) say things in creative, interesting ways.

27. When I see a diagram or sketch in a text book, I am most likely to
- a) show the picture to the students.
 - b) tell my students what it is about.
28. When teaching a body of information, I am more likely to
- a) focus on details and miss the big picture.
 - b) try to explain the big picture before getting into the details.
29. My students will more easily remember
- a) something they have done.
 - b) something they have thought a lot about.
30. When I give my students a problem to solve, I prefer them to
- a) master one way of doing it.
 - b) come up with new ways of doing it.
31. When I show data to my students, I prefer
- a) charts or graphs
 - b) text summarizing the results.
32. When my students have to write a paper, I expect them to
- a) work on (think about or write) the beginning of the paper and progress forward.
 - b) work on (think about or write) different parts of the paper and then order them.
33. When my students have to work on a group project, I first want them to
- a) have “group brainstorming” where everyone contributes ideas.
 - b) brainstorm individually and then come together as a group to compare ideas.
34. I consider it higher praise to call a student
- a) sensible.
 - b) imaginative.

35. When I meet a new group of students, I am more likely to remember
- a) what they looked like.
 - b) what they said about themselves.
36. When I am teaching a new subject, I prefer to
- a) stay focused on that subject, teaching as much about it as I can.
 - b) try to make connections between that subject and related subjects.
37. As a lecturer I am more likely to be considered
- a) outgoing.
 - b) reserved.
38. I prefer to teach courses that emphasize
- a) concrete material (facts, data).
 - b) abstract material (concepts, theories).
39. For entertainment, I would rather want my students to
- a) watch a television programme about their subject.
 - b) read a book about their subject.
40. Some lecturers start their lectures with an outline of what they will cover. I am of opinion that students can benefit:
- a) somewhat from that.
 - b) very much from that.
41. The idea of study groups where a group of students work together on assignments
- a) appeals to me.
 - b) does not appeal to me.
42. When my students have to do long calculations
- a) I tend to check all the steps.

- b) I find checking their work tiresome and have to force myself to do it.
43. I tend to picture the material I have to teach
- a) easily and fairly accurately.
 - b) with difficulty and without detail.
44. When solving problems, I would like my students to
- a) think of the steps in the solution process.
 - b) think of possible consequences or applications of the solution in a wide range of areas.

ANNEXURE C:

INDEX OF LEARNING STYLE QUESTIONNAIRE (STUDENTS)

Dear Student

The questionnaire below is the learning style questionnaire of Felder and Soloman (ILS) regarding your preference of learning style. Will you please be so kind to spend a few minutes of your time to answer it? Your answer will be treated anonymous – please don't put your name on any paper. Your cooperation will be highly appreciated.

Instructions:

Enter your answers to every question on the answer sheet. Please choose only one answer for each question. If both “a” and “b” seem to apply to you, choose the one that applies more frequently.

1. I understand something better after I
 - a) have tried it out.
 - b) have thought it through.
2. I would rather be considered
 - a) realistic.
 - b) innovative.
3. When I think about what I did yesterday, I am most likely to think of
 - a) a picture.
 - b) words.
4. I tend to
 - a) understand details of a subject but may be fuzzy about its overall structure.
 - b) understand the overall structure but may be fuzzy about details.
5. When I am learning something new, it helps me to
 - a) talk about it.

- b) think about it.
6. If I were a lecturer I would rather teach a course
- a) that deals with facts and real life situations.
 - b) that deals with ideas and theories.
7. I prefer to get new information in
- a) pictures, diagrams, graphs or maps.
 - b) written directions or verbal information.
8. Once I understand
- a) all the parts, I understand the whole.
 - b) the whole, I see how the parts fit in.
9. In a study group working on difficult material, I am more likely to
- a) jump in and contribute ideas.
 - b) sit back and listen.
10. I find it easier
- a) to memorize facts.
 - b) to understand concepts.
11. In a book with lots of pictures and charts, I am likely to
- a) focus on the pictures and charts.
 - b) focus on the written text.
12. When I solve math problems
- a) I usually work my way to the solutions one step at a time.
 - b) I often just see the solutions but then have to struggle to figure out the steps to arrive at a solution.
13. In classes I attended
- a) I got to know many of the students.
 - b) I did not get to know many of the students.

14. In reading *non-fiction*, I prefer
- a) something that teaches me new facts or tells me how to do something.
 - b) something that gives me new ideas to think about.
15. I like lecturers who
- a) explain by using a lot of diagram (sketches, graphs etc.).
 - b) explain a lot, using words.
16. When I'm analysing a story or a novel
- a) think of the incidents and try to put them together to figure out the themes.
 - b) I only know what the themes are when I am finished.
17. When I start a homework problem, I am more likely to
- a) start working on the solution immediately.
 - b) try to fully understand the problem first.
18. I prefer problems with
- a) exact answers.
 - b) open answers.
19. I remember best
- a) what I see.
 - b) what I hear.
20. It is more important to me that a lecturer
- a) lay out the material in clear sequential steps.
 - b) give me an overall picture and relate the material to other subjects.
21. I prefer to study
- a) in a study group.
 - b) alone.

22. I am more likely to be considered
- a) careful about the details of my work.
 - b) creative in my work.
23. When I get directions to a new place, I prefer
- a) a map.
 - b) written instruction.
24. I learn
- a) at a fairly regular pace. If I study hard, I'll "get it".
 - b) in fits and starts. I'll be totally confused and then suddenly it all "clicks".
25. I would rather first
- a) try things out.
 - b) think about how I'm going to do it.
26. When I am reading for enjoyment, I like writers to
- a) clearly say what they mean.
 - b) say things in creative, interesting ways.
27. When I see a diagram or sketch in class, I am most likely to remember
- a) a picture.
 - b) what the teacher said about it.
28. When considering a body of information, I am more likely to
- a) focus on details and miss the big picture.
 - b) try to understand the big picture before getting into the details.
29. I more easily remember
- a) something I have done.
 - b) something I have given a lot of thought.
30. When I have to solve a problem, I prefer to

- a) master one way of doing it.
 - b) come up with new ways of doing it.
31. When someone is showing me data, I prefer
- a) charts or graphs.
 - b) text summarizing the results.
32. When writing a paper, I am more likely to
- a) work on (think about or write) the beginning of the paper and progress forward.
 - b) work on (think about or write) different parts of the paper and then order them.
33. When I have to work on a group project, I first want to
- a) have “group brainstorming” where everyone contributes ideas.
 - b) brainstorm individually and then come together as a group to compare ideas.
34. I consider it high praise to call someone
- a) sensible.
 - b) imaginative.
35. When I meet people at a party I am more likely to remember
- a) what they looked like.
 - b) what they said about themselves.
36. When I am learning a new subject, I prefer to
- a) stay focussed on that subject, learning as much about it as I can.
 - b) try to make connections between that subject and related subjects.
37. I am more likely to be considered
- a) extrovert.
 - b) introvert.

38. I prefer courses that emphasize
- a) concrete facts and data.
 - b) abstract concepts and theories.
39. For entertainment, I would rather
- a) watch television
 - b) read a book.
40. Some teachers start their lectures with an outline of what they will cover. Such outlines are
- a) somewhat helpful to me.
 - b) very helpful to me.
41. The idea of doing homework in groups, with one mark for the entire group
- a) appeals to me.
 - b) do not appeal to me.
42. When I am doing long calculations
- a) I tend to repeat all my steps and check my work carefully.
 - b) I find checking my work tiresome and have to force myself to do it.
43. I tend to picture places I have been
- a) easily and fairly accurately .
 - b) with difficulty and without much detail.
44. When solving problems in a group I would be more likely to
- a) think of the steps in the solution process.
 - b) think of possible consequences or applications of the solution in a wide range of areas.

ANSWER SHEET
FOR THE ILS QUESTIONNAIRE

Q	a	b	Q	a	b	Q	a	b	Q	a	b
1			2			3			4		
5			6			7			8		
9			10			11			12		
13			14			15			16		
17			18			19			20		
21			22			23			24		
25			26			27			28		
29			30			31			32		
33			34			35			36		
37			38			39			40		
41			42			43			44		
Total: sum of X's in each column											
	ACT/REF			SNS/INT			VIS/VRB			SEQ/GLO	
	a	b		a	b		a	b		a	b
(Larger – smaller) + letter of larger											

ANNEXURE D: MEMO

WISN111 (G1A) - Klastoets 1/Class test 1

MEMO

Naam/Name:

Studentenommer/Student number:

Groep / Group:

Tyd / Time: 50 minute / 50 minutes

INSTRUKSIES	INSTRUCTIONS
-------------	--------------

- | | |
|--|---|
| <ul style="list-style-type: none">• Lees eers die vraestel deur voordat u begin om die vrae te antwoord.• Doen die vrae wat u ken en vir u makliker is, eerste.• Beantwoord die vrae op die vraestel in die gegewe ruimtes. Indien die ruimte onvoldoende is, kan u op die agterkant van die vraestel werk. Toon dit net so aan.• Toon alle berekeninge.• Die vraestel moet in pen beantwoord word. Gedeeltes wat in potlood beantwoord is, sal nie nagesien word nie. | <ul style="list-style-type: none">• First read through the paper before you start answering the questions.• First do the questions that you know and those which are easier for you to do.• Answer the questions on the question paper in the given spaces. If the space is too small, you may use the back of the paper. Just indicate it.• Show all calculations.• The question paper has to be answered in pen. Parts answered in pencil will not be marked. |
|--|---|

GEEN SAKREKENAARS!!
NO CALCUTATORS!!

VRAAG 1 QUESTION 1

1.1) Voltooi die volgende:

(1) | 1.1) Complete the following:

(1)

$$|x| = \begin{cases} x & \text{as/if } x \geq 0 \\ -x & \text{as/if } x < 0 \end{cases}$$

1.2) Los die volgende ongelykheid op en gee jou antwoord in intervalnotasie:

(4) | 1.2) Solve the following inequality and give your answer in interval notation: (4)

$$|5x - 2| < 6$$

$$\textcircled{1} \quad 5x - 2 < 6$$

$$5x < 8$$

$$x < \frac{8}{5}$$

$$\textcircled{2} \quad -(5x - 2) < 6$$

$$5x - 2 > -6$$

$$5x > -4$$

$$x > -\frac{4}{5}$$

$$x \in \left(-\frac{4}{5}, \frac{8}{5}\right)$$

1.3) Skets die volgende funksie:

(3) | 1.3) Graph the following function:

(3)

$$p(x) = \frac{2x + |x|}{x}$$

$$\textcircled{1} \quad p(x) = \frac{2x + x}{x} \quad \text{as } x > 0$$

$$= \frac{3x}{x}$$

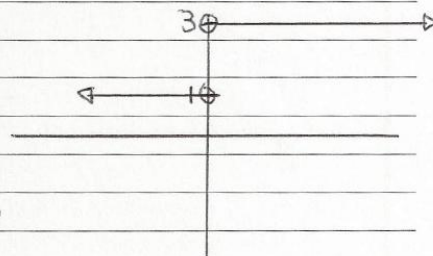
$$= 3$$

$$\textcircled{2} \quad p(x) = \frac{2x - x}{x} \quad \text{as } x < 0$$

$$= \frac{x}{x}$$

$$= 1$$

2



VRAAG 2 QUESTION 2

2.1) Voltooi: (2) | 2.1) Complete: (2)

$$2.1.1) -70^\circ = -70 \left(\frac{\pi}{180} \right) = -\frac{7}{18} \pi \text{ rad}$$

$$2.1.2) \frac{2\pi}{3} = \frac{2\pi}{3} \left(\frac{180}{\pi} \right) = 120^\circ$$

2.2) Bewys die volgende identiteit: (2) | 2.2) Prove the following identity: (2)

$$\cot^2 \theta + \sec^2 \theta = \tan^2 \theta + \csc^2 \theta$$

$$\text{LK: } (\csc^2 \theta - 1) + (\tan^2 \theta + 1) = \csc^2 \theta + \tan^2 \theta = \text{RK}$$

2.3) Vind al die waardes van θ wat die volgende | 2.3) Find all the values of θ which satisfy the following equation: (4) | (4)

$$\csc \theta = -2, \quad \theta \in [0, 2\pi]$$

NB: $\csc \theta$ is \ominus in 3^e en 4^e kwadrant

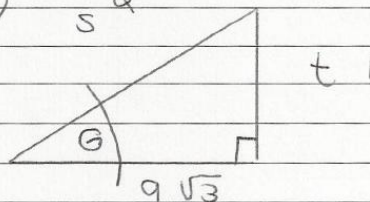
$$\csc \theta = -\frac{2}{1} \left(\frac{5}{t} \right)$$

$$\therefore \theta = \frac{\pi}{6}$$

MAAR:

$$3^\circ \rightarrow \pi + \frac{\pi}{6} = \frac{7\pi}{6}$$

$$4^\circ \rightarrow 2\pi - \frac{\pi}{6} = \frac{11\pi}{6}$$



$$\therefore \theta = \frac{7\pi}{6}, \frac{11\pi}{6}$$

$$4.2.3) g \circ f = \frac{\sqrt{x+1}}{\sqrt{x+1} + 1} \quad (1) \quad 4.2.3) g \circ f = \quad (1)$$

$$g(\sqrt{x+1}) = \frac{\sqrt{x+1}}{\sqrt{x+1} + 1}$$

$$4.2.4) D_{g \circ f} = \quad (3) \quad 4.2.4) D_{g \circ f} = \quad (3)$$

$$\left\{ \begin{array}{l} x \in D_f \text{ en } f(x) \in D_g \\ x \geq -1 \text{ en } \sqrt{x+1} \neq -1 \\ x+1 \neq 1 \end{array} \right\}$$

$$\left\{ x \in \mathbb{R}, x \geq -1 \text{ en } x \neq 0 \right\}$$

VRAAG 5 QUESTION 5

$$5.1) \text{ Los op vir } x : \quad (4) \quad 5.1) \text{ Solve } x : \quad (4)$$

$$\ln(x+1) + \ln(x-1) = 1$$

$$\rightarrow \ln(x+1)(x-1) = 1$$

$$\rightarrow \ln(x^2-1) = 1$$

$$\rightarrow x^2-1 = e$$

$$x^2 = e+1$$

$$x = \sqrt{e+1}$$

SIEN VRAAG 5.2 OP VOLGENDE BLADSY | SEE QUESTION 5.2 ON THE NEXT PAGE

5.2) Bepaal die inverse van $f(x)$
(WYS AL JOU STAPPE!!):

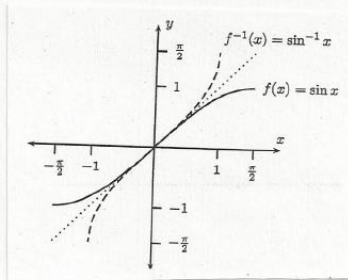
5.2) Determine the inverse of $f(x)$
(3) (SHOW ALL YOUR STEPS!!): (3)

$$f(x) = \frac{x+1}{2x+1}$$

$\textcircled{1} y = \frac{x+1}{2x+1}$ $\textcircled{2} y(2x+1) = x+1$ $2yx + y = x+1$ $2yx - x = 1-y$ $x(2y-1) = 1-y$ $x = \frac{1-y}{2y-1}$ $\therefore f^{-1}(x) = \frac{1-x}{2x-1}$	$\textcircled{1} x = \frac{y+1}{2y+1}$ $\textcircled{2} x(2y+1) = y+1$ $2xy + x = y+1$ $2xy - y = 1-x$ $y(2x-1) = 1-x$ $y = \frac{1-x}{2x-1}$ $f^{-1}(x) = \frac{1-x}{2x-1}$
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VRAAG 6 QUESTION 6

6.1) Skets die inverse van $\sin x, x \in [-1, 1]$. (3) | 6.1) The inverse of $\sin x, x \in [-1, 1]$. (3)



6.2) Vind die waarde van die volgende uitdrukking: (2) | 6.2) Find the value of the following expression: (2)

$\cos \theta = -\frac{1}{\sqrt{2}}$ $\cos^{-1}\left(-\frac{1}{\sqrt{2}}\right)$ $\theta \in [0, \pi]$

$\therefore \theta = \pi - \frac{\pi}{4} = \frac{3\pi}{4}$

TOTAAL: 40

| TOTAL: 40