



GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

PROVINCIAL EXAMINATION

JUNE 2022

GRADE 10

MATHEMATICS

PAPER 1

TIME: 1 hour

MARKS: 50

5 pages

Stanmorephysics



INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions.
2. This question paper consists of 4 questions.
3. Present your answers according to the instructions of each question.
4. Show ALL calculations, diagrams, graphs et cetera, which were used in determining the answers, clearly.
5. Answers only will NOT necessarily be awarded full marks.
6. Use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
7. Where necessary, answers should be rounded-off to TWO decimal places, unless stated otherwise.
8. Diagrams are NOT necessarily drawn to scale.
9. Number the questions according to the numbering system used in the question paper.
10. Write neatly and legibly.




QUESTION 1

1.1 Given: $A = \frac{1}{\sqrt{3+x}}$ $x \in \{0; 1; 2; 3\}$

For which value(s) of x will the expression A be rational. (1)

1.2 Factorise the following expressions fully:

1.2.1 $2x^2 - 32$  (2)

1.2.2 $6a^2 - b + a(2 - 3b)$ (3)

1.3 Simplify the following completely:

1.3.1 $(x-1)(x^2 + x + 1)$ (2)

1.3.2 $\frac{x+7}{x^2-x-6} - \frac{3}{x-3} + \frac{2}{2x+4}$ (5)

1.3.3 $\frac{4^{x+1} \cdot 9^x}{6^{2x-1}}$ (3)

1.4 If x is an even integer and $x > 1$, arrange the following in ascending order:

$-2^x, 2^x, 2^{-x}, 2^{x^0}, 2^{x^2}$ (2)
[18]



QUESTION 2

2.1 Solve for x :

2.1.1 $\sqrt{ax} = b$ (2)

2.1.2 $3^x + 3^{x-1} = 36$ (3)

2.2 Given: $\frac{x}{3} > \frac{x}{2} + 1$

2.2.1 Solve for x in the inequality. (2)

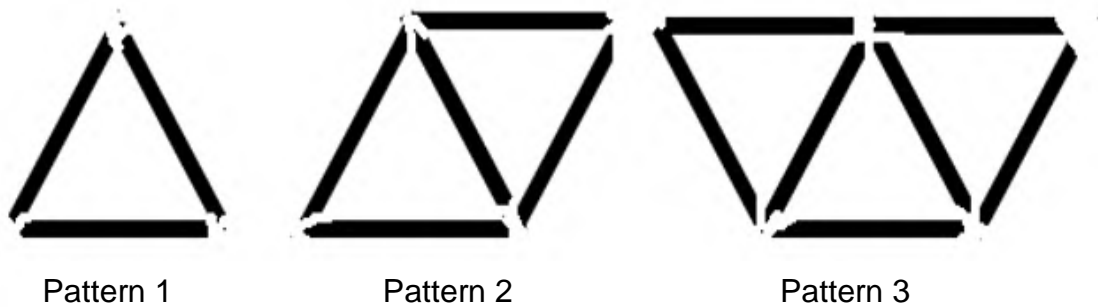
2.2.2 If $x \in \mathbb{Z}$, write down the first two digit number that satisfies the inequality. (1)

2.3 Solve for x and y simultaneously:

$2x + y = 4$ and $3x - y = 11$ (4)
[12]

QUESTION 3

Study the patterns below and answer the questions that follow.



The patterns are the first three terms of a sequence for which the value of the term is given by the number of sticks in the pattern.

3.1 Write down the number of sticks in each of the first five terms of the sequence. (2)

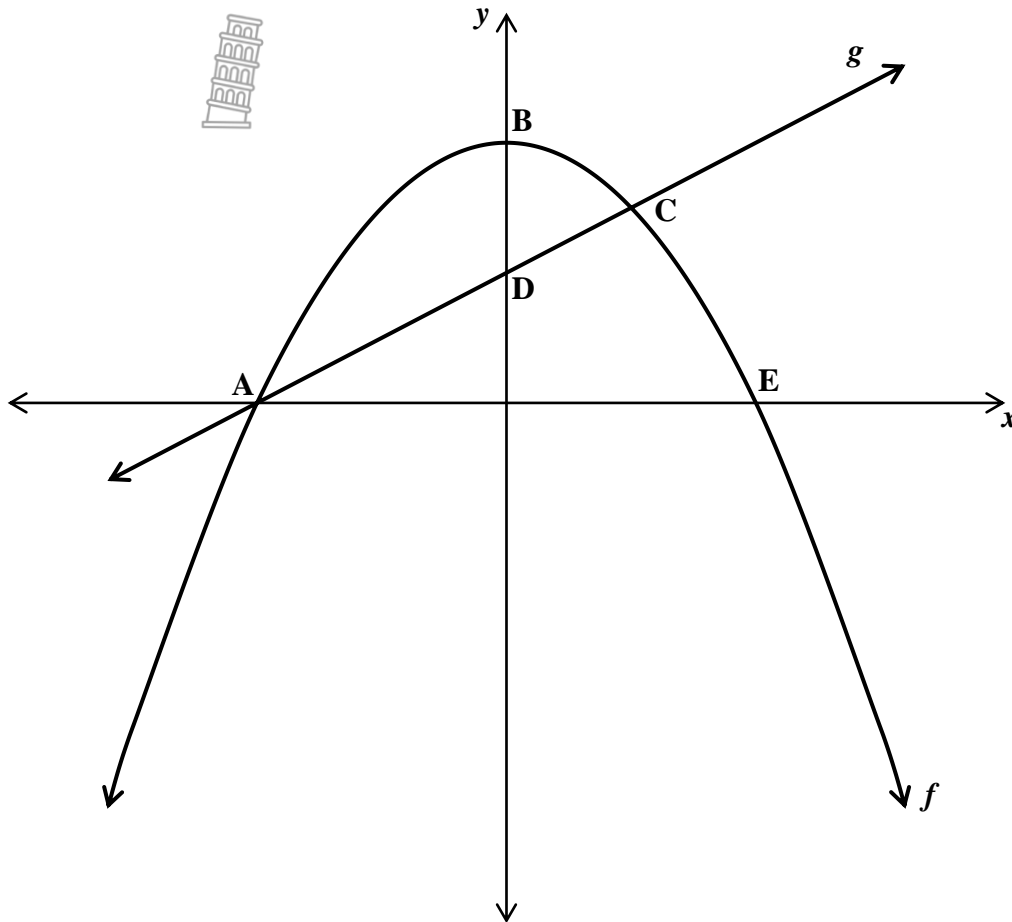
3.2 Write down the general term, T_n of the sequence. (2)

3.3 Solve for T_{131} (2)

[6]

QUESTION 4

The graphs of $f(x) = -x^2 + 4$ and $g(x) = mx + 2$ are sketched. A and E are the x -intercepts of f . B and D are the y -intercepts of f and g respectively. f and g intersect at A and C.



- 4.1 Determine the coordinates of points B and D. (2)
- 4.2 Write down the range of f . (1)
- 4.3 Determine the length of AE. (4)
- 4.4 Calculate the value of m . (2)
- 4.5 Determine the coordinates of A and C, the points of intersection of f and g . (3)
- 4.6 If $k(x) = g(-x)$, determine the values of x such that $f(x) \geq k(x)$. (2)

[14]

TOTAL: 50



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PROVINCIAL EXAMINATION/

PROVINSIALE EKSAMEN

JUNE/JUNIE 2022

GRADE/GRAAD 10

MARKING GUIDELINES/NASIENRIGLYNE

**MATHEMATICS/WISKUNDE
(PAPER/VRAESTEL 1)**


5 pages/bladsye

NOTE/LET WEL

- If a candidate answers a question TWICE, mark only the FIRST attempt./As 'n kandidaat 'n vraag TWEE KEER beantwoord het, merk slegs die EERSTE poging.
- If a candidate crossed out an answer and did not redo it, mark the crossed-out answer./As 'n kandidaat 'n antwoord deurgehaal het en dit nie oorgedoen het nie, merk die deurgehaalde antwoord.
- Consistent accuracy applies to ALL aspects of the marking guidelines./Konsekwente akkuraatheid is van toepassing op ALLE aspekte van die nasienriglyne.
- Assuming values/answers in order to solve a problem is unacceptable./Om waardes/antwoorde te aanvaar om 'n probleem op te los, is onaanvaarbaar.

QUESTION/VRAAG 1				
Q./VR.	Suggested solution/voorgestelde oplossing		Explanation/ Verduideliking	Marks/ Punte
1.1	$x = 1$		✓ 1	(1)
1.2	1.2.1	$2x^2 - 32$ $= 2(x^2 - 16)$ $= 2(x+4)(x-4)$	✓ factorise/faktoriseer ✓ factorise/faktoriseer	(2)
	1.2.2	$6a^2 - b + a(2 - 3b)$ $= 6a^2 - b + 2a - 3ab$ $= 2a(3a + 1) - b(3a + 1)$ OR/OF $= (3a + 1)(2a - b)$ $= 3a(2a - b) + (2a - b)$ $= (2a - b)(3a + 1)$	✓ simplify/vereenvoudig ✓ grouping/groepering ✓ factorise/faktoriseer	(3)
1.3	1.3.1	$(x-1)(x^2 + x + 1)$ $= x^3 - 1$	✓ x^3 ✓ -1	(2)
	1.3.2	$\frac{x+7}{x^2-x-6} - \frac{3}{x-3} + \frac{2}{2x+4}$ $= \frac{x+7}{(x-3)(x+2)} - \frac{3}{x-3} + \frac{2}{2(x+2)}$ $= \frac{x+7}{(x-3)(x+2)} - \frac{3}{x-3} + \frac{1}{x+2}$ $= \frac{x+7-3(x+2)+x-3}{(x-3)(x+2)}$ $= \frac{x+7-3x-6+x-3}{(x-3)(x+2)}$ $= \frac{-x-2}{(x-3)(x+2)}$ $= \frac{-(x+2)}{(x-3)(x+2)}$ $= \frac{-1}{x-3}$	✓ factorise trinomial and/ faktoriseer drieterm en $2x + 4$ ✓ common denominator gemeenskaplike noemer ✓ numerator/teller ✓ simplify numerator/ vereenvoudig die teller ✓ factorise and simplify faktoriseer en vereenvoudig	(5)

If they multiply everything out and answer is incorrect then no marks. As hulle alles vermenigvuldig en antwoord is verkeerd, dan geen punte nie.

	1.3.3	$\frac{4^{x+1} \cdot 9^x}{6^{2x-1}}$ $= \frac{2^{2(x+1)} \cdot 3^{2x}}{(3 \cdot 2)^{2x-1}}$ $= \frac{2^{2x+2} \cdot 3^{2x}}{3^{2x-1} \cdot 2^{2x-1}}$ $= 2^3 \cdot 3$ $= 24$ 	✓ numerator/teller ✓ denominator/noemer ✓ answer/antwoord	(3)
1.4		$-2^x, 2^{-x}, 2^{x^0}, 2^x, 2^{x^2}$	✓✓ all correct/alles reg ✓ one error/een fout	(2)
				[18]

QUESTION/VRAAG 2				
Q./VR.	Suggested solution/Voorgestelde oplossing		Explanation/ Verduideliking	Marks/ Punte
2.1	2.1.1	$\sqrt{ax} = b$ $ax = b^2$ $x = \frac{b^2}{a} ; a \neq 0$	✓ square/vierkant ✓ divide/deel	(2)
	2.1.2	$3^x + 3^{x-1} = 36$ $3^x(1 + 3^{-1}) = 36$ $3^x \left(\frac{4}{3}\right) = 36$ $3^x = 27$ $3^x = 3^3$ $x = 3$	✓ factorise/faktoriseer ✓ simplify isolate/ vereenvoudig isoleer 3^x ✓ answer/antwoord	(3)
2.2	2.2.1	$\frac{x}{3} > \frac{x}{2} + 1$ $2x > 3x + 6$ $-x > 6$ $x < -6$	✓ LCD/KGV ✓ answer/antwoord	(2)
	2.2.2	$x = -10$	✓ answer/antwoord	(1)

2.3	$2x + y = 4$ and/en $3x - y = 11$ $y = 4 - 2x$ $3x - (4 - 2x) = 11$ $3x - 4 + 2x = 11$ $5x = 15$ $x = 3$ $y = 4 - 2(3)$ $y = -2$ ALTERNATIVE/ALTERNATIEF $\text{Eq}_1 + \text{Eq}_2$ $5x = 15$ $x = 3$ $y = -2$	$2x + y = 4$ $3x - y = 11$ $5x = 15$ $x = 3$ $y = -2$ ✓ equation/vergeliking 1 ✓ subs./vervang ✓ x value/x-waarde ✓ y value/y-waarde Adding the two equations: Optel van 2 vergelykings: ✓ 5x ✓ 15 ✓ x value/x-waarde ✓ y value/y-waarde	(4)
			[12]

QUESTION/VRAAG 3			
Q./VR.	Suggested solution/Voorgestelde oplossing	Explanation/Verduideliking	Marks/Punte
3.1	3; 5; 7; 9; 11	9 ✓ 11 ✓	(2)
3.2	$2n + 1$	✓✓ correct answer/korrekte antwoord	(2)
3.3	$4(131) + 1$ $524 + 1$ 525	✓ substitute/vervang 131 ✓ 525	(2)
			[6]



QUESTION/VRAAG 4			
Q.VR.	Suggested solution/Voorgestelde oplossing	Explanation/Verduideliking	Marks/Punte
4.1	B(0;4) D(0;2) <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-left: 10px;"> Answers must be in coordinate form (see question)./ Antwoorde moet in koördinaatvorm wees (sien vraag). </div>	✓ B(0;4) ✓ D(0;2)	(2)
4.2	$y \leq 4$ OR/OF $y \in (-\infty; 4]$	✓	(1)
4.3	$-x^2 + 4 = 0$ $(2 - x)(2 + x) = 0$ $x = 2 \quad x = -2$ AE = $2 - (-2)$ AE = 4	✓ equation/vergelyking = 0 ✓ factors/faktore ✓ Both values of x /albei waardes van x ✓ Answer/Antwoord	(4)
4.4	Using values for A/Gebruik waardes vir A $0 = m(-2) + 2$ $2m = 2$ $m = 1$	✓ sub./vervang ✓ $m = 1$	(2)
4.5	$f(x) = g(x)$ $-x^2 + 4 = x + 2$ $x^2 + x - 2 = 0$ $(x + 2)(x - 1)$ $x = -2 \quad x = +1$ A(-2;0) Sub/vervang $x = 1$ into/in $g(x)$ $y = 1(1) + 2$ $y = 3$ C(1;3)	✓ $f(x) = g(x)$ ✓ Correct x values/Korrekte x -waardes ✓ C(1;3)	(3)
4.6	Using the reflection of the points of intersection in Q.4.5/Gebruik die reflekse van die snypunte in Vr. 4.5. $-1 \leq x \leq 2$	CA from 4.5/CA van 4.5 ✓ correct x values/korrekte x -waardes ✓ inequality/ongelykheid	(2)
			[14]

TOTAL/TOTAAL: 50