



education

Department:
Education
North West Provincial Government
REPUBLIC OF SOUTH AFRICA

PROVINCIAL ASSESSMENT

GRADE 11

MATHEMATICS P1
JUNE 2024

POINTS: 100

TIME: 2 hours

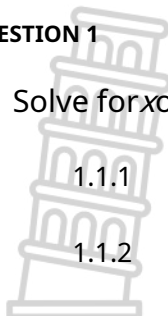
This question paper consists of 6 pages and an answer sheet.

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. This question paper consists of 5 questions.
2. Answer ALL the questions.
3. Number your answers correctly according to the numbering system used in the question paper.
4. An ANSWER SHEET is provided for Question 3.
5. Clearly indicate ALL calculations, diagrams, graphs, etc. used to determine your answers.
6. Full marks will NOT necessarily be awarded to answers only.
7. You may use an approved scientific calculator (non-programmable and non-graphing), unless otherwise stated.
8. If necessary, round answers to TWO decimal places, unless otherwise stated.
9. Diagrams are NOT necessarily drawn to scale.
10. Write neatly and legibly.

QUESTION 1



1.1 Solve for x on :

1.1.1 $(x - 3) = 40$ (3)

1.1.2 $3x^2 - 2x - 4 = 0$ (3)

1.1.3 $\sqrt{x - 3} + 1 = \frac{12}{\sqrt{x - 3}}$ (6)

1.1.4 $2x^2 - 16x - 3 = 0$ (4)

1.1.5 $9x^2 + 9 = 10x$ (6)

1.2 Solve simultaneously for x and y on if:

$x - 3 = 1$

and

$2x^2 - 2x + 9y^2 = 17$ (6)

1.3 The solutions of the equation $ax^2 + bx + c = 0$; $a \neq 0$ is given by:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

1.3.1 Give the values of b and c . (2)

1.3.2 Give ONE value of a for which the roots of the equation will be rational. Motivate your answer. (2)

1.4

Given: $A = \sqrt{\frac{2x^2 - 3}{x + 5}}$

Calculate the value(s) of x for which:

1.4.1 A is non-real (4)

1.4.2 A is undefined (1)

1.5 Determine the value of a if a is the largest integer for which

$500 < 6^{200a}$ (3)

[40]

QUESTION 2

2.1 Simplify and calculate **without using a calculator**:



2.1.1 $\frac{\sqrt{3}}{\sqrt{3}+1}$ (answer with rational denominator) (3)

2.1.2 $\frac{53+5}{125+1}$ (3)

2.1.3 $-5\sqrt{48} + 3\sqrt{27}$ (4)

2.1.4 $\frac{4 \cdot 5 - 2 \cdot 5 + 1}{5 - 1 - 5}$ (4)

2.1.5 $\sqrt{\frac{2^{2020} + 2^{2025}}{33(2)^{2014}}}$ (4)

2.2 Calculate the following **without using a calculator**. Clearly indicate ALL operations.

$1234567893 \times 1234567894 - 1234567895 \times 1234567892$ (3)
[21]

QUESTION 3 (answer on answer sheet)

Given: $h(x) = -4 - \frac{4}{x+2}$

3.1 Determine the equations of the asymptotes of h . (2)

3.2 Determine the coordinates of the x - and y -intercepts of h . (3)

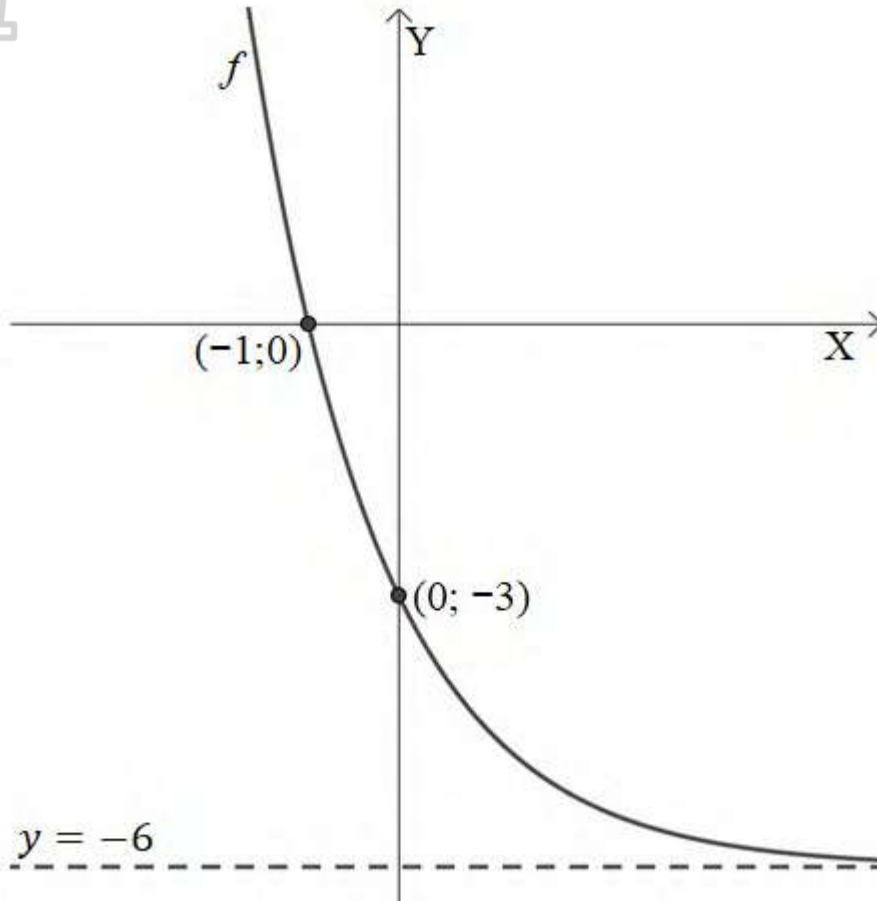
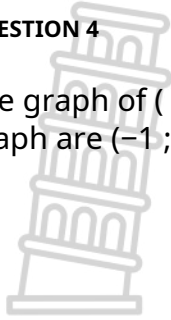
3.3 Sketch the graph of h . Clearly indicate the asymptotes as well as ALL intercepts with the axes. (4)

3.4 Use the graph to determine for which value(s) of x shall

$\frac{-4}{x+2} \geq 4$ (2)
[11]

QUESTION 4

The graph of $f(x) = \frac{a}{x+b} + c$ ($a \neq 0$) is shown in the diagram below. The x - and y -intercepts of the graph are $(-1; 0)$ and $(0; -3)$ respectively. The asymptote of f is $y = -6$.



4.1 Write the range of values of f down. (1)

4.2 Determine the values of a , b and c . (5)

4.3 Determine the value of x if $f(x) = 18$. (4)

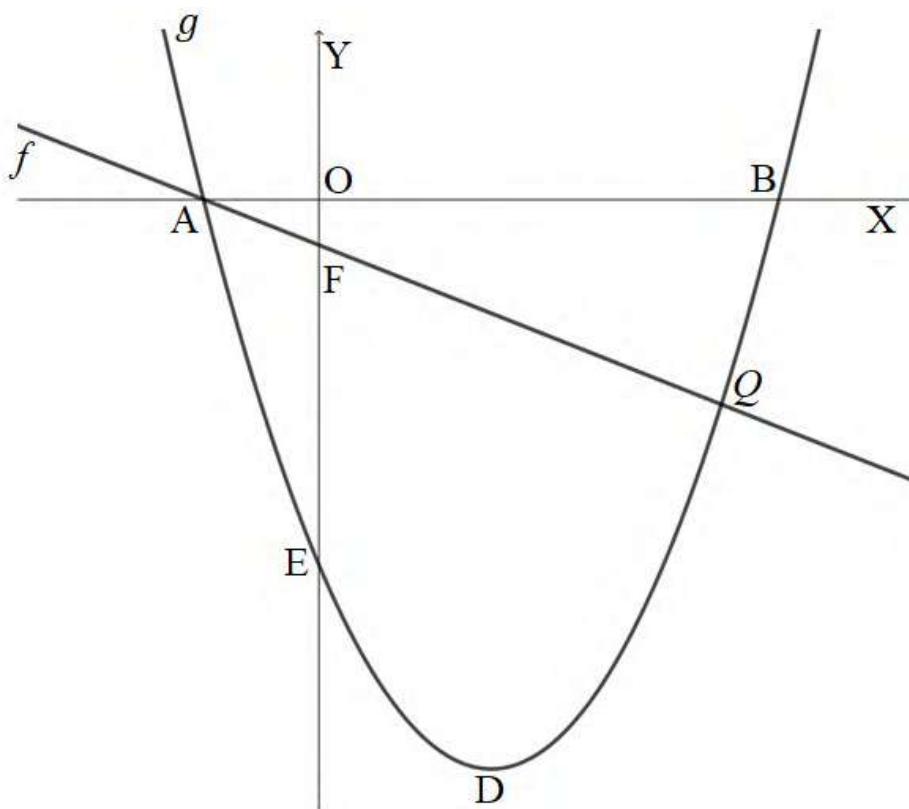
4.4 If g is the mirror image (reflection) of f in the x -axis, write the equation of g down. (2)

[12]

QUESTION 5

The graphs of $f(x) = -x^2 - 2$ and $g(x) = x^2 - 6x - 16$ is outlined below.

- The graphs intersect at A and Q. A
- and B are the x-intercepts of g . D is the
- turning point of g .
- F and E are the y-intercepts of f and g respectively.



5.1 Calculate the length of AB. (3)

5.2 Calculate the coordinates of the turning point, D. (3)

5.3 Calculate the coordinates of Q. (4)

5.4 Use the graphs to determine:

5.4.1 for which value(s) of x is $f(x) > g(x)$ (2)

5.4.2 for which value(s) of x is $f(x) \cdot g(x) \leq 0$ (2)

5.4.3 for which value(s) of k shall $x^2 - 6x + k = 0$ have two unequal, positive roots. (2)

[16]

TOTAL: 100

NAME: _____

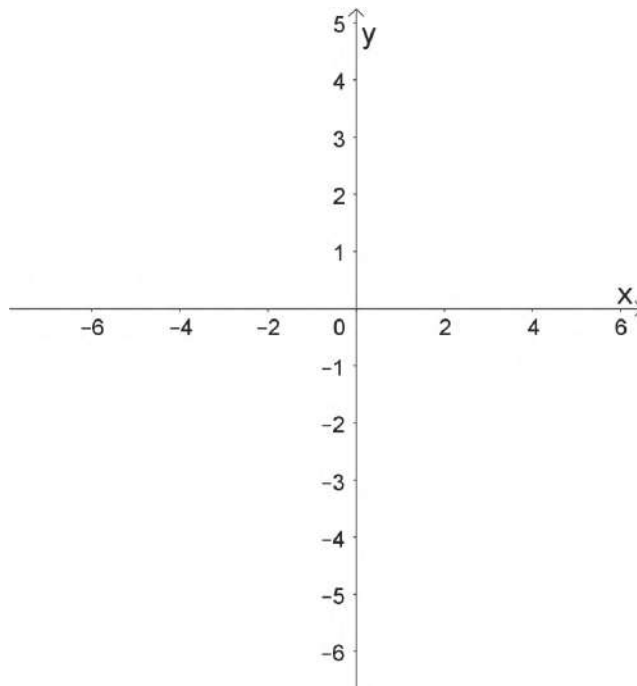
ANSWER SHEET

QUESTION 3

3.1

3.2

3.3



3.4



education

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Education
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REPUBLIC OF SOUTH AFRICA

PROVINCIAL ASSESSMENT
PROVINSIALE ASSESSERING

GRADE 11/GRAAD 11

MATHEMATICS P1/WISKUNDE VI
JUNE/JUNIE 2024
MARKING GUIDELINES/NASIENRIGLYNE

MARKS/PUNTE: 100

These marking guidelines consist of 8 pages.
Hierdie nasienriglyne bestaan uit 8 bladsye.

NOTE:

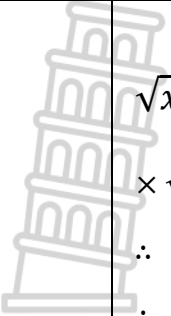
- If a candidate answered a question TWICE, only mark the FIRST attempt.
- Consistent accuracy applies in ALL aspects of the marking memorandum.

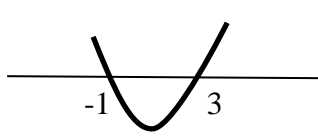
NOTA:

- Indien 'n kandidaat 'n vraag TWEE KEER beantwoord het, word slegs die EERSTE poging nagesien.
- Volgehoue akkuraatheid word DEURGAANS in die memorandum toegepas.

QUESTION/ VRAAG 1

1.1	$x(x - 3) = 40$	
1.1.1	$x^2 - 3x - 40 = 0$ $\therefore (x - 8)(x + 5) = 0$ $\therefore x = 8 \text{ or } \text{ of } x = -5$	✓ std form/ <i>stdvorm</i> ✓ factors/ <i>faktore</i> ✓ both answers/ <i>beide antwe</i> (3)
1.1.2	$3x^2 - 2x - 4 = 0$ $\therefore x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(3)(-4)}}{2(3)}$ $\therefore x = 1,54 \text{ or } \text{ of } -0,87$	✓ subst ✓✓ each answ/ <i>elke antw</i> (3)
1.1.3	$\sqrt{x - 3} + 1 = \frac{12}{\sqrt{x - 3}}$ Let / Laat $\sqrt{x - 3} = k$ $\therefore k + 1 = \frac{12}{k}$ $\times k: k^2 + k = 12$ $\therefore k^2 + k - 12 = 0$ $\therefore (k + 4)(k - 3) = 0$ $\therefore k = -4 \text{ or } \text{ of } k = 3$ $\therefore \sqrt{x - 3} = -4 \text{ or } \text{ of } \sqrt{x - 3} = 3$ no solution/ <i>geen opl</i> or / of $x - 3 = 9$ $x = 12$ OR / OF:	✓ \times LCM/ <i>KGV</i> ✓ factors/ <i>faktore</i> ✓ - 4 & 3 ✓ no sol/ <i>geen opl</i> ✓ square / <i>kwadreeer</i> ✓ $x = 12$

	 $\sqrt{x-3} + 1 = \frac{12}{\sqrt{x-3}}$ $\times \sqrt{x-3}: (\sqrt{x-3})^2 + \sqrt{x-3} = 12$ $\therefore x - 3 + \sqrt{x-3} = 12$ $\therefore \sqrt{x-3} = 15 - x$ $\therefore x - 3 = 225 - 30x + x^2$ $\therefore x^2 - 31x + 228 = 0$ $\therefore (x - 19)(x - 12) = 0$ $\therefore x = 19 \text{ or } \text{ of } x = 12$ <p><i>but/maar</i> $x \neq 19$ (def $\sqrt{\quad}$) \therefore <i>slegs</i> $x = 12$ <i>only</i></p>	<p>✓ \times LCM/KGV</p> <p>✓ isol $\sqrt{\quad}$</p> <p>✓ square/kwadr</p> <p>✓ factors/faktore</p> <p>✓ $x \neq 19$</p> <p>✓ $x = 12$ (6)</p>
1.1.4	$2 - 16x^{-\frac{3}{2}} = 0$ $\therefore x^{-\frac{3}{2}} = \frac{1}{8}$ $\therefore x = (2^{-3})^{-\frac{2}{3}}$ $\therefore x = 2^2 = 4$	<p>✓ $\frac{1}{8}$</p> <p>✓ 2^{-3}</p> <p>✓ $\exp -\frac{2}{3}$</p> <p>✓ $x = 4$ (4)</p>
1.1.5	$9^{2x} + 9 = 10 \cdot 3^{2x}$ $\therefore (3^2)^{2x} + 9 = 10 \cdot 3^{2x}$ <p>Let / Laat $3^{2x} = k$:</p> $\therefore k^2 + 9 = 10k$ $\therefore k^2 - 10k + 9 = 0$ $\therefore (k - 9)(k - 1) = 0$ $\therefore k = 9 \text{ or } \text{ of } k = 1$ $\therefore 3^{2x} = 9 = 3^2 \text{ or } \text{ of } 3^{2x} = 1 = 3^0$ $\therefore 2x = 2 \text{ or } \text{ of } 2x = 0$ $\therefore x = 1 \text{ or } \text{ of } x = 0$	<p>✓ $9 = 3^2$</p> <p>✓ std form</p> <p>✓ factors/faktore</p> <p>✓ both eq/beide vgl</p> <p>✓ $x = 1$</p> <p>✓ $x = 0$ (6)</p>

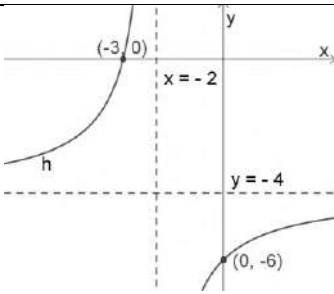
1.2	$x - 3y = 1$ ① $x^2 - 2xy + 9y^2 = 17$ ② from / uit ①: $x = 3y + 1$ subst in ②: $(3y + 1)^2 - 2y(3y + 1) + 9y^2 = 17$ $\therefore 9y^2 + 6y + 1 - 6y^2 - 2y + 9y^2 - 17 = 0$ $\therefore 12y^2 + 4y - 16 = 0$ $\therefore 3y^2 + y - 4 = 0$ $\therefore (3y + 4)(y - 1) = 0$ $\therefore y = -\frac{4}{3}$ or of $y = 1$ if / as $y = -\frac{4}{3}$: $x = 3\left(-\frac{4}{3}\right) + 1 = -3$ if / as $y = 1$: $x = 3(1) + 1 = 4$	✓ x subject/ <i>onderwerp</i> ✓ subst ✓ std form ✓ faktore/ <i>factors</i> ✓ both y -values/ <i>beide y-w</i> ✓ both x -values/ <i>beide x-w</i> (6)
1.3	$-b = 3 \quad \therefore b = -3$	✓ $b = -3$
1.3.1	$-4ac = 16a \quad \therefore c = -4$	✓ $c = -4$ (2)
1.3.2	$a = 1$, $9 + 16(1) = 25 \therefore$ complete square/ <i>volkome vierk</i>	✓ $a = 1$ ✓ comp sq/ <i>volk vierk</i> (2)
1.4.1	$x^2 - 2x - 3 < 0$ $\therefore (x - 3)(x + 1) < 0$  $\therefore -1 < x < 3$	✓ < 0 ✓ factors/ <i>faktore</i> ✓ method & critical values <i>Metode & kritiese waardes</i> ✓ answ/ <i>antw</i> (4)
1.4.2	$x = -5$	✓ answ/ <i>antw</i> (1)
1.5	$n^{500} < 6^{200}$ $\therefore (n^5)^{100} < (6^2)^{100}$ $\therefore n^5 < 6^2$ $\therefore n^5 < 36$ $\therefore n = 2 \quad (2^5 = 32)$	✓ $(\square)^{100}$ or of $^{100}\sqrt{\square}$ ✓ < 36 ✓ $n = 2$ (3) [40]

QUESTION 2

<p>2.1 2.1.1</p>	$\frac{\sqrt{3}}{\sqrt{3}+1} = \frac{\sqrt{3}}{\sqrt{3}+1} \times \frac{\sqrt{3}-1}{\sqrt{3}-1}$ $= \frac{3-\sqrt{3}}{3-1}$ $= \frac{3-\sqrt{3}}{2}$	<p>✓ $\times \frac{\sqrt{3}-1}{\sqrt{3}-1}$</p> <p>✓ $3 - \sqrt{3}$ (numerator/teller)</p> <p>✓ 2 (denominator/noemer)</p> <p>(3)</p>
<p>2.1.2</p>	$\frac{5^{3n+5}}{125^{n+1}} = \frac{5^{3n+5}}{(5^3)^{n+1}}$ $= \frac{5^{3n+5}}{5^{3n+3}}$ $= 5^2 = 25$	<p>✓ $125 = 5^3$</p> <p>✓ exp law / <i>eksp wet</i> $3n+3$</p> <p>✓ 25</p> <p>(3)</p>
<p>2.1.3</p>	$-5\sqrt{48a^8} + 3\sqrt{27a^8}$ $= -5\sqrt{3 \cdot 16a^8} + 3\sqrt{3 \cdot 9a^8}$ $= -5(4a^4)\sqrt{3} + 3(3a^4)\sqrt{3}$ $= -20a^4\sqrt{3} + 9a^4\sqrt{3}$ $= -11a^4\sqrt{3}$	<p>✓ $48 = 16 \cdot 3$ & $27 = 9 \cdot 3$</p> <p>✓ $-20a^4\sqrt{3}$</p> <p>✓ $9a^4\sqrt{3}$</p> <p>✓ $-11a^4\sqrt{3}$</p> <p>(4)</p>
<p>2.1.4</p>	$\frac{4 \cdot 5^x - 2 \cdot 5^{x+1}}{5^{x-1} - 5^x}$ $= \frac{5^x(4 - 2 \cdot 5^1)}{5^x(5^{-1} - 1)}$ $= \frac{(4 - 10)}{(\frac{1}{5} - 1)}$ $= \frac{-6}{-\frac{4}{5}} = -6 \times -\frac{5}{4} = \frac{15}{2}$	<p>✓ $5^x(4 - 2 \cdot 5^1)$</p> <p>✓ $5^x(5^{-1} - 1)$</p> <p>✓ $\frac{1}{5}$</p> <p>✓ $\frac{15}{2}$</p> <p>(4)</p>
<p>2.1.5</p>	$\sqrt{\frac{2^{2020} + 2^{2025}}{33(2^{2014})}}$ $= \sqrt{\frac{2^{2020}(1+2^5)}{33(2^{2014})}}$ $= \sqrt{\frac{2^{2020}(33)}{33(2^{2014})}}$ $= \sqrt{2^6} = 2^3 = 8$	<p>✓ CF/GF</p> <p>✓ 33 cancel/<i>kanselleer</i></p> <p>✓ $\sqrt{2^6}$</p> <p>✓ 8</p> <p>(4)</p>

2.2	<p>Let / Let $1234567892 = k$</p> $\therefore 1234567893 \times 1234567894 - 1234567895 \times 1234567892$ $= (k + 1)(k + 2) - (k + 3)(k)$ $= k^2 + 3k + 2 - k^2 - 3k$ $= 2$ <p>OR / OF</p> <p>Let / Let $1234567893 = n$</p> $\therefore 1234567893 \times 1234567894 - 1234567895 \times 1234567892$ $= n(n + 1) - (n + 2)(n - 1)$ $= n^2 + n - (n^2 + n - 2)$ $= 2$ <p>OR similar subst / OF soortgelyke subst</p>	<p>✓ method/metode</p> <p>✓ subst</p> <p>✓ 2</p> <p>(3)</p> <p>[21]</p>
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QUESTION 3

3.1	$x = -2$ $y = -4$	<p>✓ ✓ each equation / elke vgl</p> <p>(2)</p>
3.2	$h(0) = \frac{-4}{0+2} - 4 = -6 \quad \therefore (0; -6)$ $0 = \frac{-4}{x+2} - 4$ $\therefore 4 = \frac{-4}{x+2}$ $\therefore 4(x + 2) = -4$ $\therefore 4x + 8 = -4$ $\therefore 4x = -12$ $\therefore x = -3 \quad \therefore (-3; 0)$	<p>✓ $y = -6$</p> <p>✓ $y = 0$</p> <p>✓ $x = -3$</p> <p>(3)</p>
3.3		<p>✓ asymptotes/asimptote</p> <p>✓ $(-3; 0)$</p> <p>✓ $(0; -6)$</p> <p>✓ shape/vorm</p> <p>(4)</p>
3.4	$\frac{-4}{x+2} - 4 \geq 0 \quad \therefore -3 \leq x < -2$	<p>✓ interval ✓ notation/notasie</p> <p>(2) [11]</p>

QUESTION 4

4.1	$y > -6; y \in \mathbb{R}$	✓	(1)
4.2	$f(x) = a \cdot b^x - 6$ <i>Subst (0; -3):</i> $\therefore -3 = ab^0 - 6$ $\therefore 3 = a$ $\therefore f(x) = 3b^x - 6$ <i>subst (-1; 0)</i> $\therefore 0 = 3b^{-1} - 6$ $\therefore \frac{6}{3} = \frac{1}{b}$ $\therefore 2b = 1$ $\therefore b = \frac{1}{2}$	✓ $q = -6$ ✓ <i>subst (0; -3)</i> ✓ $a = 3$ ✓ <i>subst (-1; 0)</i> ✓ $b = \frac{1}{2}$	(5)
4.3	$18 = 3\left(\frac{1}{2}\right)^x - 6$ $\therefore 24 = 3\left(\frac{1}{2}\right)^x$ $\therefore 8 = 2^{-x}$ $\therefore 2^3 = 2^{-x}$ $\therefore x = -3$	✓ subst 18 ✓ 8 ✓ exp form/eksp vorm ✓ $x = -3$	(4)
4.4	$-y = 3\left(\frac{1}{2}\right)^x - 6$ $\therefore g(x) = -3\left(\frac{1}{2}\right)^x + 6$ OR/OF $g(x) = -3(2)^{-x} + 6$	✓ $-3\left(\frac{1}{2}\right)^x$ of $-3(2)^{-x}$ ✓ +6	(2) [12]

QUESTION 5

5.1	For A & B: $g(x) = x^2 - 6x - 16 = 0$ $\therefore (x - 8)(x + 2) = 0$ $\therefore x = 8$ or of $x = -2$ $\therefore A(-2; 0)$ & $B(8; 0)$ $\therefore AB = 10$ units eenhede	✓ $g(x) = 0$ ✓ factors/faktore ✓ 10	(3)
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5.2	$x = \frac{-b}{2a} = \frac{-(-6)}{2(1)} = 3 \quad \text{or} \quad x = \frac{8+(-2)}{2} = 3$ $g(3) = (3)^2 - 6(3) - 16$ $= -25 \qquad \qquad \qquad \therefore D(3; -25)$ <p>OR/OF</p> $g(x) = x^2 - 6x + 9 - 9 - 16$ $\therefore g(x) = (x - 3)^2 - 25$ $\therefore D(3; -25)$	✓ $x = 3$ ✓ subst 3 / $g(3)$ ✓ $y = -25$ (3) ✓ compl square/kwdr voltooi ✓ $x = 3$ ✓ $y = -25$ (3)
5.3	For Q : $g(x) = f(x)$ $\therefore x^2 - 6x - 16 = -x - 2$ $\therefore x^2 - 5x - 14 = 0$ $\therefore (x - 7)(x + 2) = 0$ $\therefore x = 7 \text{ or } \text{ of } -2$ for Q: $f(7) = -7 - 2 = -9 \therefore Q(7; -9)$	✓ equating / gelykstel ✓ factors ✓ choose / kies/subst $x = 7$ ✓ $y = -9$ (4)
5.4		
5.4.1	$-2 < x < 7$	✓ interval ✓ notation (2)
5.4.2	$x \geq 8$ or of $x = -2$	✓ $x \geq 8$ ✓ $x = -2$ (2)
5.4.3	$0 < k < 9$	✓ interval ✓ notation (2) [16]
		TOTAL/TOTAAL: 100

MATHEMATICS P1 GR 11

Jun-24

TAXONOMY

Question / Level	1	2	3	4	TOT	ONDERWERP	Real	Expected	
							subtotal	per topic	
1.1.1	3				3	vgl			EQUATIONS & INEQUALITIES
1.1.2	3				3	vgl			
1.1.3			6		6	vgl met wortel, breuk			
1.1.4		4			4	eksp vgl			
1.1.5			6		6	eksp vgl			
1.2		6			6	gelykt vgl			
1.3.1			2		2	formula			
1.3.2			2		2	aard v wortels			
1.4.1			4		4	aard v wortels			
1.4.2	1				1	aard v wortels			
1.5				3	3	eksp inequality	40	40	
2.1.1		3			3	eksp			ALGEBRA
2.1.2		3			3	eksp			
2.1.3		4			4	eksp			
2.1.4		4			4	eksp			
2.1.5				4	4	eksp			
2.2				3	3	algebra	21	20	
3.1	2				2	hyperbola			HYPERBOLA
3.2	3				3	hyperbola			
3.3		4			4	hyperbola			
3.4			2		2	hyperbola	11		
4.1	1				1	eksp f			EXP FUNC
4.2		5			5	eksp f			
4.3		4			4	eksp f			
4.4		2			2	eksp f	12		
5.1		3			3	parab & lyn			PARABOLA & LINE
5.2	3				3	parab & lyn			
5.3			4		4	parab & lyn			
5.4.1			2		2	parab & lyn			
5.4.2				2	2	parab & lyn			
5.4.3				2	2	parab & lyn	16		
								40	
ACTUAL TOT:	16	42	28	14	100		100		
ACTUAL % :	16	42	28	14	100				
EXPECT.%	20%	35%	30%	15%	100%				