education

Department:
Education
North West Provincial Government
REPUBLIC OF SOUTH AFRICA

PROVINCIAL ASSESSMENT
PROVINSIALE ASSESSERING

GRADE 11/*GRAAD* 11

MATHEMATICS P1/*WISKUNDE V1*

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.

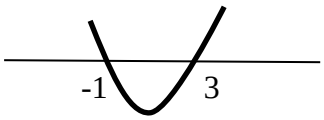
NOTA:

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

	$\sqrt{x-3}+1=\frac{12}{\sqrt{x-3}}$ $\times\sqrt{x-3}$: $\left(\sqrt{x-3}\right)^2+\sqrt{x-3}=12$ $\therefore \quad x-3+\sqrt{x-3}=12$ $\therefore \quad \sqrt{x-3}=15-x$ $\therefore \quad x-3=225-30x+x^2$ $\therefore \quad x^2-31x+228=0$ $\therefore \quad (x-19)(x-12)=0$ $\therefore \quad x=19 \ \ or \mid of \ \ x=12$ $but/maar \ \ x\neq 19$ (def $\sqrt{\square}$) $\therefore$ $slegs\ x=12\ only$	✓ $\times LCM/KGV$ ✓ isol $\sqrt{\square}$ ✓ square/*kwadr* ✓factors/*faktore* ✓ $x\neq 19$ ✓ $x=12$ (6)
1.1.4	$2-16x^{-\frac{3}{2}}=0$ $\therefore \quad x^{-\frac{3}{2}}=\frac{1}{8}$ $\therefore \quad x=(2^{-3})^{-\frac{2}{3}}$ $\therefore \quad x=2^2=4$	✓ $\frac{1}{8}$ ✓ 2^{-3} ✓ exp $-\frac{2}{3}$ ✓ $x=4$ (4)
1.1.5	$9^{2x}+9=10.3^{2x}$ $\therefore (3^2)^{2x}+9=10.3^{2x}$ Let / *Laat* $3^{2x}=k$: $\therefore \quad k^2+9=10k$ $\therefore k^2-10k+9=0$ $\therefore (k-9)(k-1)=0$ $\therefore k=9 \ \ or \mid of \ \ k=1$ $\therefore \ 3^{2x}=9=3^2\ or \mid of \ 3^{2x}=1=3^0$ $\therefore \quad 2x=2 \ or \mid of \ 2x=0$ $\therefore \quad x=1 \ \ or \mid of \ x=0$	✓ $9=3^2$ ✓ std form ✓ factors/*faktore* ✓ both eq/*beide vgl* ✓ $x=1$ ✓ $x=0$ (6)

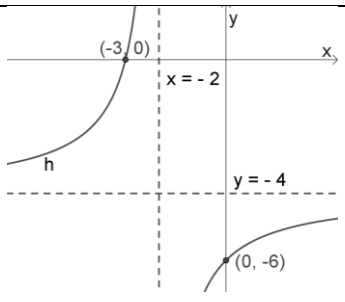
1.2	$x - 3y = 1$ ..... ① $x^2 - 2xy + 9y^2 = 17$ .....② from / *uit* ①: $x = 3y + 1$ subst in ②: $(3y + 1)^2 - 2y(3y + 1) + 9y^2 = 17$ $\therefore 9y^2 + 6y + 1 - 6y^2 - 2y + 9y^2 - 17 = 0$ $\therefore \quad 12y^2 + 4y - 16 = 0$ $\therefore \quad 3y^2 + y - 4 = 0$ $\therefore \quad (3y + 4)(y - 1) =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

QUESTION 2

2.1 2.1.1	$\frac{\sqrt{3}}{\sqrt{3}+1} = \frac{\sqrt{3}}{\sqrt{3}+1} \times \frac{\sqrt{3}-1}{\sqrt{3}-1}$ $= \frac{3-\sqrt{3}}{3-1}$ $= \frac{3-\sqrt{3}}{2}$	✓ $\times \frac{\sqrt{3}-1}{\sqrt{3}-1}$ ✓ $3-\sqrt{3}$ (numerator/teller) ✓ 2 (denominator/noemer) (3)
2.1.2	$\frac{5^{3n+5}}{125^{n+1}} = \frac{5^{3n+5}}{(5^3)^{n+1}}$ $= \frac{5^{3n+5}}{5^{3n+3}}$ $= 5^2 = 25$	✓ $125 = 5^3$ ✓ exp law / *eksp wet 3n+3* ✓ 25 (3)
2.1.3	$-5\sqrt{48a^8} + 3\sqrt{27a^8}$ $= -5\sqrt{3.16a^8} + 3\sqrt{3.9a^8}$ $= -5(4a^4)\sqrt{3} + 3(3a^4)\sqrt{3}$ $= -20a^4\sqrt{3} + 9a^4\sqrt{3}$ $= -11a^4\sqrt{3}$	✓$48 = 16.3$ & $27 = 9.3$ ✓$-20a^4\sqrt{3}$ ✓ $9a^4\sqrt{3}$ ✓$-11a^4\sqrt{3}$ (4)
2.1.4	$\frac{4\cdot 5^x - 2\cdot 5^{x+1}}{5^{x-1} - 5^x}$ $= \frac{5^x(4 - 2\cdot 5^1)}{5^x(5^{-1} - 1)}$ $= \frac{(4-10)}{\left(\frac{1}{5}-1\right)}$ $= \frac{-6}{-\frac{4}{5}} = -6 \times -\frac{5}{4} = \frac{15}{2}$	✓ $5^x(4 - 2\cdot 5^1)$ ✓$5^x(5^{-1} - 1)$ ✓ $\frac{1}{5}$ ✓ $\frac{15}{2}$ (4)
2.1.5	$\sqrt{\frac{2^{2020}+2^{2025}}{33(2^{2014})}}$ $= \sqrt{\frac{2^{2020}(1+2^5)}{33(2^{2014})}}$ $= \sqrt{\frac{2^{2020}(33)}{33(2^{2014})}}$ $= \sqrt{2^6} = 2^3 = 8$	✓ CF/GF ✓ 33 cancel/*kanselleer* ✓ $\sqrt{2^6}$ ✓ 8 (4)

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

QUESTION 3

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

QUESTION 4

4.1	$y > -6\,;\ y \in \mathbb{R}$	✓ (1)
4.2	$f(x) = a.b^x - 6$ $\quad Subst\ (0;-3)$: $\therefore\ -3 = ab^0 - 6$ $\therefore\ \ 3 = a$ $\therefore\ f(x) = 3b^x - 6 \quad subst\ (-1;0)$ $\therefore\ 0\ =\ 3b^{-1} - 6$ $\therefore\ \frac{6}{3} = \frac{1}{b}$ $\therefore 2b = 1$ $\therefore\ b = \frac{1}{2}$	✓ $q = -6$ ✓ $subst\ (0;-3)$ ✓ $a = 3$ ✓ $subst\ (-1;0)$ ✓ $b = \frac{1}{2}$ (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: $g(x) = x^2 - 6x - 16 = 0$ $\therefore\ (x-8)(x+2) = 0$ $\therefore x = 8\ or\ \vert\ of\ x = -2$ $\therefore A(-2;0)\ \ \&\ \ B(8;0)\ \therefore AB = 10\ units \vert eenhede$	✓$g(x) = 0$ ✓ factors/*faktore* ✓ 10 (3)

5.2	$x = \frac{-b}{2a} = \frac{-(-6)}{2(1)} = 3 \quad or \quad x = \frac{8+(-2)}{2} = 3$ $g(3) = (3)^2 - 6(3) - 16$ $= -25 \qquad \therefore D(3;-25)$ OR/OF $g(x) = x^2 - 6x + 9 - 9 - 16$ $\therefore g(x) = (x-3)^2 - 25$ $\therefore D(3;-25)$	✓ x = 3 ✓ subst 3 / $g(3)$ ✓$y = -25$ (3) ✓ compl square/*kwdr voltooi* ✓ x = 3 ✓$y = -25$ (3)
5.3	For Q : $g(x) = f(x)$ $\therefore x^2 - 6x - 16 = -x - 2$ $\therefore x^2 - 5x - 14 = 0$ $\therefore (x-7)(x+2) = 0$ $\therefore x = 7 or \mid of -2$ $for\ Q: f(7) = -7 - 2 = -9 \therefore Q(7;-9)$	✓ 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	$x \geq 8 \quad or \mid of \quad x = -2$	✓ $x \geq 8$ ✓ $x = -2$ (2)
5.4.3	$0 < k < 9$	✓ interval ✓ notation (2) **[16]**
		TOTAL/*TOTAAL*: 100

MATHEMATICS P1 GR 11

Jun-24

TAXONOMY

							Real subtotal	Expected per topic	
Question / Level	**1**	**2**	**3**	**4**	**TOT**	**ONDERWERP**			
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%				