



GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

VOORBEREIDENDE EKSAMEN

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WISKUNDE
(Eerste Vraestel)

MEMORANDUM

	VRAAG 1	
1.1		
1.1.1	$x(x-1)=12$ $x^2-x=12$ $x^2-x-12=0$ $(x-4)(x+3)=0$ $x=4$ OF $x=-3$	✓ standaardvorm ✓ beide faktore ✓ albei antwoorde (3)
1.1.2	$2x^2+3=8x$ $2x^2-8x+3=0$ $x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$ $=\frac{8\pm\sqrt{(-8)^2-4(2)(3)}}{2(2)}$ $=\frac{8\pm\sqrt{64-24}}{4}$ $=\frac{8\pm\sqrt{40}}{4}$ $x=3,58$ OF $x=0,42$	✓ standaardvorm ✓ vervang in die korrekte formule ✓ elke x antwoord (4)
1.1.3	$(2x+3)(3-x)>4$ $6x-2x^2+9-3x-4>0$ $-2x^2+3x+5>0$ $2x^2-3x-5<0$ $(2x-5)(x+1)<0$ $-1<x<\frac{5}{2}$	✓ vereenvoudig ✓ standaardvorm $2x^2-3x-5<0$ ✓ faktore ✓ kritieke waardes ✓ ongelykheidsteken (5)
1.1.4	$2^x-5\cdot 2^{x+1}=-144$ $2^x(1-5\cdot 2)=-144$ $2^x(-9)=-144$ $2^x=16$ $2^x=2^4$ $x=4$	✓ gemeenskaplike faktor ✓ vereenvoudig $2^x=2^4$ ✓ antwoord (3)

1.2	$y + 2x - 3 = 0$ (1) $y = x^2 + 2x + 3$ (2) Van (1): $y = -2x + 3$ (3) Vervang (3) in (2): $-2x + 3 = x^2 + 2x + 3$ $x^2 + 4x = 0$ $x(x + 4) = 0$ $x = 0$ of $x = -4$ Vervang $x = 0$ in (3): OF Vervang $x = -4$ in (3): $y = -2(0) + 3$ $y = 3$ $y = -2(-4) + 3$ $y = 11$	✓ $y = -2x + 3$ ✓ gelyk stel van vergelykings $-2x + 3 = x^2 + 2x + 3$ ✓ faktorisering ✓ albei x -waardes ✓ albei y -waardes (5)
[20]		
	VRAAG 2	
2.1	$4a - a - 2 = 6a + 4 - 4a$ $a = 6$	✓ vergelyking ✓ antwoord (2)
2.2 2.2.1		✓ 33 ✓ 96 (2)
2.2.2	45 – Onewe Term 23 ^{ste} term van die onewe ry: $T_{23} = 5 + (23 - 1)(7)$ $T_{23} = 159$	✓ 45 – Onewe Term ✓ verifieer T_{23} ✓ antwoord (3)

2.3	$T_8 = 33 = a + 7d \quad (1)$ $T_{11} = 45 = a + 10d \quad (2)$ Vanuit vergelyking (2): $a + 10d = 45 \quad (2)$ $a + 7d = 33 \quad (1)$ $a = 45 - 10d \quad (3) \quad \text{OF} \quad (2) - (1):$ $3d = 12$ $d = 4$ Vervang (3) in (1): $33 = 45 - 10d + 7d$ $-12 = -3d$ $d = 4$ Vervang in (2) $a = 45 - 10(4)$ $a = 5$ $T_{15} = 5 + 14(4)$ $T_{15} = 61$ OF $T_8 + 3d = T_{11}$ $33 + 3d = 45$ $3d = 12$ $d = 4$ $T_{15} = T_{11} + 4d$ $T_{15} = 45 + 4(4)$ $= 61$	✓ vergelyking 1 ✓ vergelyking 2 ✓ waarde van d ✓ waarde van a ✓ $T_{15} = 61$ ✓ $T_8 + 3d = T_{11}$ ✓ vervanging ✓ waarde van d ✓ $T_{15} = T_{11} + 4d$ ✓ antwoord (5)
2.4	$2a = -4$ $a = -2$ $3a + b = 0$ $3(-2) + b = 0$ $b = 6$ $a + b + c = 6$ $-2 + 6 + c = 6$ $c = 2$ $T_n = -2n^2 + 6n + 2$	✓ tweede verschil ✓ waarde van a ✓ waarde van b ✓ waarde van c (4)

2.5 2.5.1	$3; \frac{3}{2}; \frac{3}{4}; \dots$ $S_{\infty} = \frac{a}{1-r}$ $S_{\infty} = \frac{3}{1-\frac{1}{2}}$ $=6$	✓vervang in die korrekte formule ✓antwoord (2)
2.5.2	$S_n = \frac{a(1-r^n)}{1-r}$ $S_n = \frac{3\left(1-\left(\frac{1}{2}\right)^n\right)}{1-\frac{1}{2}}$ $=6\left(1-\left(\frac{1}{2}\right)^n\right)$	✓vervang in die korrekte formule ✓antwoord (2)
2.5.3	$A-B < \frac{1}{36}$ $6-6\left(1-\left(\frac{1}{2}\right)^n\right) < \frac{1}{36}$ $6\left(1-1+\left(\frac{1}{2}\right)^n\right) < \frac{1}{36}$ $1-1+\left(\frac{1}{2}\right)^n < \frac{1}{216}$ $\left(\frac{1}{2}\right)^n < \frac{1}{216}$ $n > \log_{\frac{1}{2}} \frac{1}{216}$ $n > 7,75$ $\therefore n=8; 9; \dots$	✓faktorisier ✓ $\frac{1}{216}$ ✓ $\left(\frac{1}{2}\right)^n < \frac{1}{216}$ ✓ $\log_{\frac{1}{2}} \frac{1}{216}$ ✓antwoord (5)
		[25]

	VRAAG 3	
3.1	$(1 + i_{eff}) = \left(1 + \frac{i_{nom}}{m}\right)^m$ $(1 + i_{eff}) = \left(1 + \frac{0,06}{4}\right)^4$ $i_{eff} = 1,06 - 1$ $i_{eff} = 6,14\%$	✓ korrekte formule ✓ korrekte vervanging ✓ antwoord (3)
3.2	$P = \frac{x[1 - (1 + i)^{-n}]}{i}$ $P = \frac{2000[1 - (1 + 0,02)^{-24}]}{0,02}$ $= R37\,827,85$ Die gimnasium leen R 37 827,85.	✓ vervang van x in korrekte formule ✓ $n = -24$ ✓ $i = 0,02$ ✓ antwoord (4)
3.3	$F = \frac{x[(1 + i)^n - 1]}{i}$ $200000 = \frac{x\left[\left(1 + \frac{0,0625}{12}\right)^{57} - 1\right]}{\frac{0,0625}{12}}$ $x = \frac{200000 \times \frac{0,0625}{12}}{\left[\left(1 + \frac{0,0625}{12}\right)^{57} - 1\right]}$ $x = 3022,73$ ∴ Die maandelikse paalement is R 3 022,73.	✓ formule ✓ waarde van F ✓ $n = 57$ ✓ $i = \frac{0,0625}{12}$ ✓ x -onderwerp ✓ antwoord (6)
		[13]

4.3	$g(x) = 4 \cdot 2^{x-2+1} - 2$ $g(x) = 4 \cdot 2^{x-1} - 2$ OF $g(x) = 2 \cdot 2^x - 2$ OF $g(x) = 2^{x+1} - 2$	✓antwoord ✓antwoord ✓antwoord
		(1)
		[11]
	VRAAG 5	
5.1		✓3
5.1.1	(3; 4)	✓4
		(2)
5.1.2	$y \geq -4$ OF $y \in [-4; \infty)$	✓kritieke waarde ✓ongelykheidsteken ✓kritieke waarde ✓korrekte hakies
		(2)
5.1.3	(2; 3) (5; 0) $m = \frac{0-3}{5-2}$ $m = -1$	✓vervang met korrekte koördinate ✓antwoord
		(2)
5.1.4	$y = -(-1) + 5$ $y = 6$ $KM = 6$ $y = -(-1-3)^2 + 4$ $y = -12$ $LM = 12$ $KL = 12 + 6$ $= 18$	✓ $KM = 6$ OF $y = 6$ ✓ $LM = 12$ OF $y = -12$ ✓ $KL = 18$
		(3)
5.1.5	$x \in (2; 5)$ OF $2 < x < 5$	✓kritieke waardes ✓korrekte hakies ✓kritieke waardes ✓ongelykheidstekens
		(2)

5.2 5.2.1	$y = \left(\frac{4}{3}\right)^x$ $x = \left(\frac{4}{3}\right)^y$ $y = \log_{\frac{4}{3}} x$ $g(x) = \log_{\frac{4}{3}} x$	✓ omruil van x en y ✓ $g(x) = \log_{\frac{4}{3}} x$ (2)
5.2.2	$h(x) = \left(\frac{4}{3}\right)^{-x}$ $= \left(\frac{3}{4}\right)^x$	✓ $-x$ ✓ antwoord (2)
5.2.3 a)	$x = 0$	✓ antwoord (1)
b)	$0 < x \leq 1$ OF $x \in (0;1]$	✓ kritieke waardes ✓ ongelykheidstekens ✓ kritieke waardes ✓ korrekte hakies (2)
		[18]

	VRAAG 6	
6.1	$f'(x) = \frac{4}{x^2}$ $\therefore x^2 \geq 0$ $\therefore \frac{4}{x^2} > 0$	$\checkmark f'(x) = \frac{4}{x^2}$ $\checkmark x^2 \geq 0$ $\checkmark \frac{4}{x^2} > 0$ (3)
6.2	$m = -4$ <i>Loodregte lyne</i> $m = \frac{1}{4}$ $f'(x) = \frac{4}{x^2}$ $\frac{1}{4} = \frac{4}{x^2}$ $16 = x^2$ $\therefore x = -4 \quad y = -\frac{4}{-4} + 7$ $y = 8$ <i>Vervang</i> $(-4; 8)$ $y = \frac{1}{4}x + c \quad \text{OF} \quad y - 8 = \frac{1}{4}(x + 4)$ $8 = \frac{1}{4}(-4) + c \quad y = \frac{1}{4}x + 9$ $c = 9$ $y = \frac{1}{4}x + 9$	$\checkmark m = \frac{1}{4}$ $\checkmark \frac{1}{4} = \frac{4}{x^2}$ $\checkmark \text{kies } x = -4$ $\checkmark y = 8$ $\checkmark \text{antwoord}$ (5)
		[8]

	VRAAG 7	
7.1 7.1.1	$f(x+h) = 1 - 4(x+h)^2$ $= 1 - 4x^2 - 8xh - 4h^2$ $f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ $= \lim_{h \rightarrow 0} \frac{1 - 4x^2 - 8xh - 4h^2 - (1 - 4x^2)}{h}$ $= \lim_{h \rightarrow 0} \frac{-8xh - 4h^2}{h}$ $= \lim_{h \rightarrow 0} \frac{h(-8x - 4h)}{h}$ $= -8x$	$\checkmark f(x+h) =$ $1 - 4x^2 - 8xh - 4h^2$ $\checkmark$ korrekte vervanging in korrekte formule $\checkmark$ vereenvoudig $(-8xh - 4h^2)$ $\checkmark$ gemeenskaplike faktor h $\checkmark -8x$ (5)
7.1.2	$f'(2) = -8(2)$ $= -16$	$\checkmark$ vervang $x=2$ in $f'(x)$ $\checkmark$ antwoord (2)
7.2 7.2.1	$y = x^2 - 4x + 4$ $\frac{dy}{dx} = 2x - 4$	$\checkmark$ uitbreiding $\checkmark 2x$ $\checkmark -4$ (3)
7.2.2	$f(x) = x^{\frac{2}{3}} + \frac{1}{4}x^{-4}$ $f'(x) = \frac{2}{3}x^{\frac{-1}{3}} - x^{-5}$	$\checkmark x^{\frac{2}{3}}$ $\checkmark \frac{1}{4}x^{-4}$ $\checkmark \frac{2}{3}x^{\frac{-1}{3}}$ $\checkmark -x^{-5}$ (4)
		[14]

	VRAAG 8	
8.1	$f(x) = (x+2)(x-1)(x-3)$ $= x^3 - 2x^2 - 5x + 6$	✓ faktore $(x+2)(x-1)(x-3)$ ✓ produk van enige twee faktore ✓ produk van enige binominaal en drie term $x^3 + x^2 - 2x - 3x^2 - 3x + 6$ (3)
8.2	$f'(x) = 3x^2 - 4x - 5$ $0 = 3x^2 - 4x - 5$ $x = \frac{4 \pm \sqrt{16 + 60}}{6}$ $x = 2,12 \quad \text{OF} \quad x = -0,7$ $y = 8,21 \quad \text{OF} \quad y = -4,06$ $A(-0,79; 8,21) \quad B(2,12; -4,06)$	✓ $f'(x) = 0$ ✓ vervang in kwadratiese formule ✓ x-waardes ✓ y-waardes (4)
8.3	$y = x^3 - 2x^2 - 5x + 6 - (2x)$ $= x^3 - 2x^2 - 7x + 6$ $\frac{dy}{dx} = 3x^2 - 4x - 7$ $= (3x - 7)(x + 1)$ <i>vir maks</i> $0 = (3x - 7)(x + 1)$ $x = \frac{7}{3} \quad \text{OF} \quad x = -1$ $y = (-1)^3 - 2(-1)^2 - 7(-1) + 6$ $PQ = 10$	✓ vereenvoudig $x^3 - 2x^2 - 7x + 6$ ✓ differensiasie ✓ faktore ✓ $\frac{dy}{dx} = 0$ ✓ x-waardes ✓ antwoord (6)
8.4	$f'(x) = 3x^2 - 4x - 5$ $f''(x) = 6x - 4$ $6x - 4 < 0$ $x < \frac{2}{3}$ $k = \frac{2}{3}$	✓ $f''(x)$ ✓ $f''(x) < 0$ ✓ antwoord (3)
		[16]

	VRAAG 9	
9.1	$BC = 50 - 2x$	✓ antwoord (1)
9.2	Oppervlak = $AB \times BC$ $= x(50 - 2x)$ $= 50x - 2x^2$ Maks $A'(x) = 50 - 4x$ $0 = 50 - 4x$ $x = 12,5$	✓ $x(50 - 2x)$ ✓ vereenvoudiging $(50x - 2x^2)$ ✓ differensiasie ✓ antwoord (4)
		[5]
	VRAAG 10	
10.1	1^{ste} keuse 2^{de} keuse Uitkomst $\frac{3}{10}$ P $\frac{2}{9}$ P PP $\frac{2}{10}$ G $\frac{2}{9}$ G PG $\frac{5}{10}$ B $\frac{5}{9}$ B PB $\frac{3}{10}$ P $\frac{3}{9}$ P GP $\frac{2}{10}$ G $\frac{1}{9}$ G GG $\frac{5}{10}$ B $\frac{5}{9}$ B GB $\frac{3}{10}$ P $\frac{3}{9}$ P BP $\frac{2}{10}$ G $\frac{2}{9}$ G BG $\frac{5}{10}$ B $\frac{4}{9}$ B BB	✓ eerste vertakking ✓ $\frac{2}{9}; \frac{2}{9}; \frac{5}{9}$ ✓ $\frac{3}{9}; \frac{1}{9}; \frac{5}{9}$ ✓ $\frac{3}{9}; \frac{2}{9}; \frac{4}{9}$ ✓ al die uitkomst (5)
10.2 10.2.1	$P(B; B) = \frac{5}{10} \times \frac{4}{9}$ $= 0,22 \quad \text{OF} \quad \frac{2}{9}$	✓ $\frac{5}{10} \times \frac{4}{9}$ ✓ antwoord (2)
10.2.2	$P(G; P) = \frac{3}{10} \times \frac{2}{9} + \frac{2}{10} \times \frac{3}{9}$ $= 0,13 \quad \text{OF} \quad \frac{12}{90} \quad \text{OF} \quad \frac{2}{15}$	✓ $\frac{3}{10} \times \frac{2}{9}$ OF $\frac{6}{90}$ ✓ $\frac{2}{10} \times \frac{3}{9}$ OF $\frac{6}{90}$ ✓ antwoord (3)
		[10]

	VRAAG 11	
11.1	Letters : $26 - 6 = 20$ Syfers: $0 - 9 = 10$ $20^4 \times 10^4$ $= 1\,600\,000\,000$	✓ 20^4 ✓ 10^4 ✓ antwoord (3)
11.2 11.2.1	$P'(A) = 1 - P(A)$ $0,45 = 1 - P(A)$ $P(A) = 0,55$ $P(A \text{ of } B) = P(A) + P(B)$ $= 0,55 + 0,35$ $= 0,9$	✓ $P(A)$ ✓ vervang in die korrekte formule ✓ antwoord (3)
11.2.2	$P(A) \times P(B)$ $= 0,55 \times 0,35$ $= 0,1975$ OF $\frac{77}{400}$ $P(A \text{ of } B) = P(A) + P(B) - P(A \cap B)$ $= 0,55 + 0,35 - 0,1975$ $= 0,71$ OF $\frac{283}{400}$ OF $\frac{71}{100}$	✓ $0,55 \times 0,35$ ✓ $0,1975$ OF $\frac{77}{400}$ ✓ vervang in die korrekte formule ✓ antwoord (4)
		[10]
TOTAAL: 150		