Province of the
EASTERN CAPE
EDUCATION

NASIONALE SENIOR SERTIFIKAAT

GRAAD 11

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WISKUNDE V1
MEMORANDUM

PUNTE: 150

Hierdie memorandum bestaan uit 9 bladsye.

VRAAG 1				
1.1	1.1.1	$2x^2 + 2x = 0$ $2x(x + 1) = 0$ $\therefore x = 0$ or $x = -1$	✓ faktorisering ✓✓ antwoorde	(3)
	1.1.2	$x + 2 = \frac{6}{x}$ $x^2 + 2x - 6 = 0$ $x = \frac{-b \pm \sqrt{b^2-4ac}}{2b}$ $\therefore x = \frac{-2 \pm \sqrt{4+24}}{2}$ $= \frac{-2 \pm \sqrt{28}}{2}$ $= -3{,}6$ or $1{,}65$	✓ standaard vorm ✓ formule ✓ vervanging ✓✓ antwoorde	(5)
	1.1.3	$27^{\frac{2}{3}}.81^{-\frac{1}{2}} = 9^x$ $\therefore (3^3)^{\frac{2}{3}}.(3^4)^{-\frac{1}{2}} = 3^{2x}$ $\therefore 3^2.3^{-2} = 3^{2x}$ $\therefore 3^0 = 3^{2x}$ $\therefore x = 0$	✓ eksponensiale vorm ✓ vereenvoudiging ✓ vereenvoudiging ✓ antwoord	(4)
	1.1.4	$\frac{10}{x-3} \geq 5$ $\therefore \frac{10}{x-3} - 5 \geq 0$ $\therefore \frac{10-5(x-3)}{x-3} \geq 0$ $\therefore \frac{10-5x+15}{x-3} \geq 0$ $\therefore \frac{-5x+25}{x-3} \geq 0$ $\therefore \frac{5(5-x)}{x-3} \geq 0$ $\therefore 3 < x \leq 5$	✓ RHK = 0 ✓ vereenvoudiging ✓ vereenvoudiging ✓ faktorisering van noemer ✓ vir 3 en 5. ✓ korrek ongelykhede	(6)
1.2	1.2.1	✓ ✓ ✓ a = 0; a = 1; a = -1		(3)

	1.2.2	$\frac{a^2 - a^{-2}}{a - a^{-1}} = \frac{a^2 - a^{-½}}{a - \frac{1}{a}} \times \frac{a^2}{a^2}$ $= \frac{a^4 - 1}{a^3 - a}$ $= \frac{(a^3 - 1)(a^2 + 1)}{a(a^3 - 1)}$ $= \frac{a^2 + 1}{a}$	$\frac{a^{-2}(a^4 - 1)}{a^{-1}(a^2 - 1)}$ $= \frac{(a^2 - 1)(a^2 + 1)}{a(a^2 - 1)}$ $= \frac{a^2 + 1}{a}$	✓ vermenigvuldiging met $\frac{a^2}{a^2}$ ✓ produk ✓ faktorisering ✓ antwoord	(4)
1.3	$y - 2x + 1 = 0$ $y = 2x - 1$ (1) Vervang in: $xy = 2y + x^2 + 3x - 10$ $\therefore x(2x - 1) = 2(2x - y) + x^2 + 3x - 10$ $\therefore 2x^2 - x = 4x - 2 + x^2 + 3x - 10$ $\therefore x^2 - 8x + 12 = 0$ $\therefore (x - 6)(x - 2) = 0$ $\therefore x = 6$ of $x = 2$ en $y = 2(6) - 1$ of $y = 2(2) - 1$ $= 12 - 1$ of $= 4 - 1$ $= 11$ $= 3$		✓ maak y die onderwerp van die formule ✓ vervanging ✓ vermenigvuldiging ✓ standaard vorm ✓ faktore ✓ vir beide x-waardes ✓ vir beide y waardes	(7)
				[32]
VRAAG 2				
2.1	$y = -\frac{1}{2}x^2 + 2x + 4\frac{1}{4}$ $= -\frac{1}{2}\left(x^2 - 4x + \frac{17}{4}\right)$ $= -\frac{1}{2}\left(x^2 - 4x + 4 + 6\frac{1}{4} - 4\right)$ $= -\frac{1}{2}(x - 2)^2 + 4\frac{1}{4} + 2$ $= -\frac{1}{2}(x - 2)^2 + 6\frac{1}{4}$		✓ ÷ deur $-\frac{1}{2}$ ✓ optel en aftrek van vierkant ✓ faktoriseer 1st 3 terme tussen hakies ✓ antwoord	(4)
2.2	Maksimum : $a < 0$		✓ maksimum ✓ < 0	(2)
2.3	$6\frac{1}{4}$		✓ antwoord	(1)
2.4	$\sqrt{6\frac{1}{4}} = \sqrt{\frac{25}{4}}$ $= \frac{5}{2}$		✓ $\sqrt{\frac{25}{4}}$ ✓ antwoord	(2)

2.5	$-\frac{1}{2}x^2 + 2x + 4\frac{1}{4} = 0$ $2x^2 - 8x - 17 = 0$ $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$ $= \frac{8 \pm \sqrt{(-8)^2-4(2)(-17)}}{2(2)}$ $= \frac{8 \pm \sqrt{64+36}}{4}$ $= \frac{8 \pm \sqrt{200}}{4}$ $= \frac{8 \pm 14{,}14}{4}$ $= 5{,}5$ or $-1{,}5$ y-snypunt: $x = 0$ $\therefore \quad y = 4\frac{1}{4}$ of $\frac{17}{4}$	✓ vereenvoudiging ✓ formule ✓ vervanging ✓ vereenvoudiging ✓ vir beide waardes van x. ✓ y-waarde	(6)
			[15]
VRAAG 3			
3.1	$T_n = 3.2^{n-1}$		
3.1.1	3; 6; 12; 24	✓✓ een punt vir 2 terme	(2)
3.1.2	Vermenigvuldig vorige term met 2	✓ antwoord	(1)
3.1.3	45	✓ antwoord	(1)
3.1.4	$T_n = 3.2^{n-1}$ $6144 = 3.2^{n-1}$ $2048 = 2^{n-1}$ $2^{11} = 2^{n-1}$ $n - 1 = 11$ $\therefore \quad n = 12$ $\therefore \quad T_{12} = 6144$	✓ verv.. T_n met 6144 ✓ $2048 = 2^{n-1}$ ✓ dieselfde basis ✓ vergelyk eksponente ✓ waarde van n	(5)
3.2.1	8; 20; 38; 62; 92	✓ antwoord	(1)

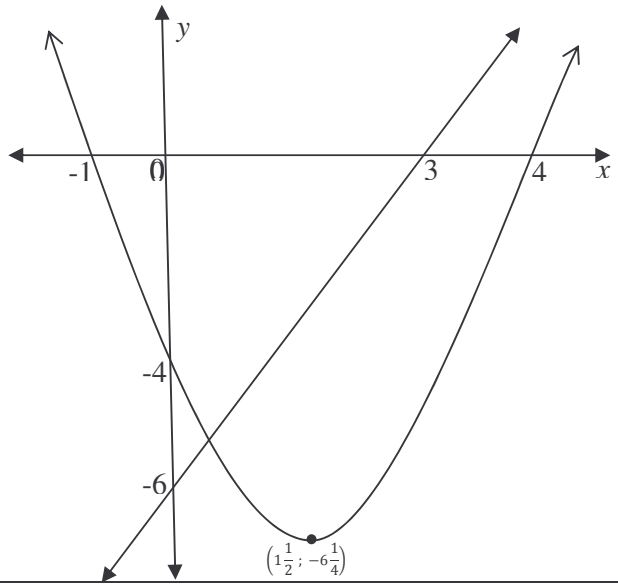
	3.2.2	$T_n = an^2 + bn + c$ $2a = 2^{de}$ verskil $\therefore 2a = 6$ $\therefore a = 3$ $\therefore T_n = 3n^2 + bn + c$ $T_1 : 8 = 3(1)^2 + b(1) + c$ $\therefore b + c = 5$ (1) $T_2: 20 = 3(2)^2 + b(2) + c$ $\therefore 2b + c = 8$ (2) Vanaf (1) $c = 5 - b$ (3) Vervang (3) in (2) $\therefore 8 = 2b + (5 - b)$ $\therefore b = 3$ (4) Vervang (4) in (3) $\therefore c = 5 - 3$ $\therefore c = 2$ $\therefore T_n = 3n^2 + 3n + 2$	✓ waarde van a ✓ vergelyking 1 ✓ vergelyking 2 ✓ c in terme van b ✓ waarde van b ✓ waarde van c ✓ antwoord	(7)
	3.2.3	$T_{20} = 3(20)^2 + 3(20) + 2$ $= 1262$	✓ antwoord	(1)
				[18]

VRAAG 4				
4.1	4.1.1	$A = P(1 - in)$ $= 185\,000[1 - 4(0,2)]$ $= R37\,000$	✓ metode en vervanging ✓ antwoord	(2)
	4.1.2	$A = P(1 - i)^n$ $= 185\,000(1 - 0,2)^4$ $= R75776$	✓ metode en vervanging ✓ antwoord	(2)
4.2	$1 + i_e = \left(1 + \frac{inom}{m}\right)^m$ $1 + i_e = \left(1 + \frac{0,084}{12}\right)^{12}$ $1 + i_e = 1,08731\ldots$ $\therefore$ eff. rate $= 8,73\%$		✓ formule ✓ vervanging ✓ vereenvoudiging ✓ antwoord	(4)
4.3	4.3.1	$A = P(1 - i)^n$ $= 39\,999\left(1 - \frac{0,18}{12}\right)^3$ $= R38\,225,91$	✓ formule ✓ vervanging ✓ antwoord	(2)
	4.3.2	$A = 39\,999\left(1 - \frac{0,18}{15}\right)^5$ $= 37\,087,732$ Geld verloor $= 39\,999 - 37\,087,732$ $= R2\,911,27$	✓ vervanging ✓ vereenvoudiging ✓ antwoord	(3)
4.4	0 — 4 — 10 $A = P(1 + i)^n$ $28470 = P[(1 + 0,008)^{48}][(1 + 0,017225)^{24}]$ $28470 = P(1,008)^{48}(1,017225)^{24}$ $\therefore P = \frac{28470}{(1,008)^{48}(1,017225)^{24}}$ $\therefore P = R12\,890,61$ of $R12\,890,60$		✓ formule ✓ $(1008)^{48}$ ✓ $(1,024)^{24}$ ✓ vereenvoudiging ✓ vereenvoudiging ✓ bedrag belê	(6)
				[19]

VRAAG 5			
5.1	$g(x) = \frac{a}{x-b} + c$ $0 = \frac{a}{0-1} + 2$ $\therefore\ 0 = -a + 2$ $\therefore a = 2$ Vergelyking: $y = \frac{2}{x-1} + 2$	✓ b = 1 ✓ c = 2 ✓ vervanging van (0 ; 0) ✓ a = 2 ✓ vergelyking	(5)
5.2	$g(x) = (x - 1)^2 + q$ $0 = (2{,}5 - 1)^2 + q$ $\therefore q = -\frac{9}{4}$ $\therefore$ Draaipunt$\left(1 ; \frac{9}{4}\right)$	✓ p = 1 ✓ vervanging van (0 ; 0) ✓ q = -4 ✓ antwoord	(4)
5.3	y = 2; vertikale asimptote x = 2, horisontale asimptote	✓✓ antwoorde	(2)
5.4	$h(x) = -(x - 1)^2 + \frac{9}{4}$	✓ antwoord	(1)
			[12]

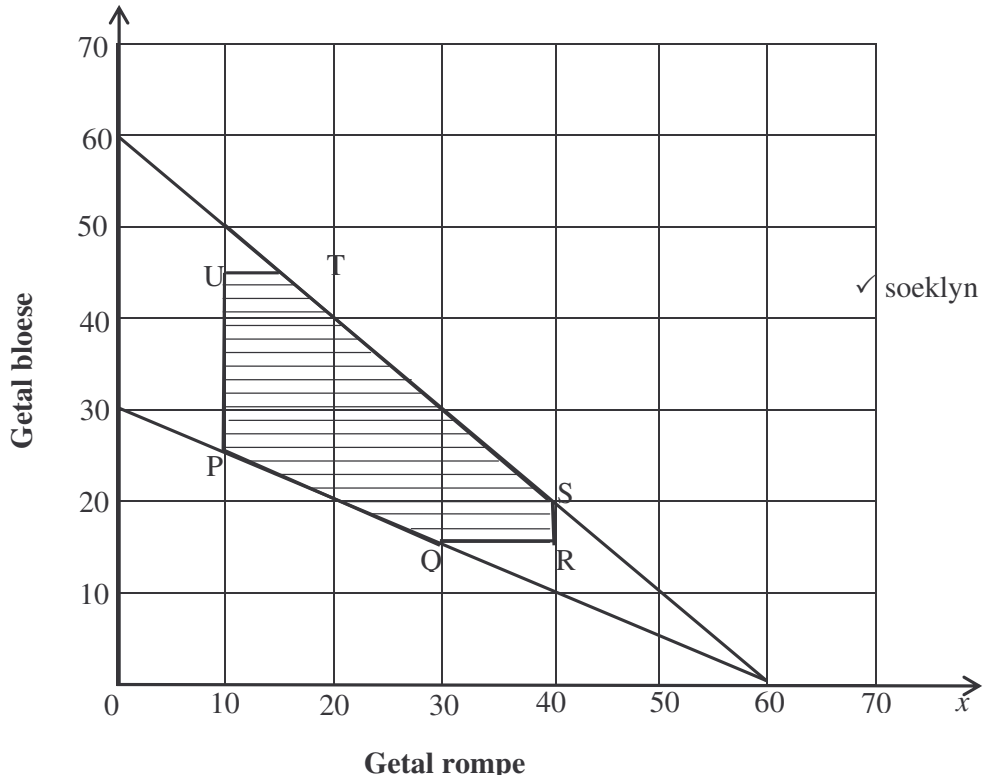
VRAAG 6			
6.1	A = (0 ; 1) omdat $y = a^x$ $= a^0$ $= 1$	✓ A koördinaat ✓ verduideliking	(2)
6.2	Die skets toon 'n grafiek wat verminder.	✓ verduideliking	(1)
6.3	B is die punt $\left(4 ; \frac{1}{16}\right)$. $y = a^x$ $\frac{1}{16} = a^4$ $\left(\frac{1}{2}\right)^4 = a^4$ $\therefore a = \frac{1}{2}$	✓ vervanging ✓ vereenvoudiging ✓ antwoord	(3)
6.4	$y = \left(\frac{1}{2}\right)^{-x}$ $= 2^x$	✓ verandering van x teken ✓ vereenvoudiging van vergelyking	(2)
6.5	(0 ; 1)	✓ x-koördinaat ✓ y-koördinaat	(2)
6.6	Gebied: $(-\infty ; \infty)$ Terrein: $(0 ; \infty)$	✓✓ gebied ✓✓ terrein	(4)
			[14]

VRAAG 7

7.1	7.1.1	$y = a(x + 1)(x - 3) = ax^2 - 2ax - 3a$ vervang (0 ; -6) $-6 = 0 - 0 - 3a$ $\therefore a = 2$ $f(x) = 2x^2 - 4x - 6$ $\therefore a = 2;\ b = -4;\ c = -6$	✓ x- snypunte in faktore ✓ vervang (0 ; -6) ✓ a = 2 ✓ vergelyking ✓ vir beide waardesvan b en c.	(5)
	7.1.2	$PQ = g(x) - f(x)$ $= -x^2 + 5x - 1 - 2x^2 + 4x + 6$ $= -3x^2 + 9x + 5$ PQ maks. as $x = -\frac{b}{2a}$ $= -\frac{9}{-6}$ $= \frac{3}{2}$ $\therefore PQ_{max} = -3\left(\frac{3}{2}\right) + 9\left(\frac{3}{2}\right) + 5$ $= 11\frac{3}{4}$ eenhede	✓ $g(x) - f(x)$ ✓ vereenvoudiging ✓ $-\frac{9}{-6}$ ✓ $\frac{3}{2}$ ✓ vervanging ✓ antwoord	(6)
	7.2.1	$0 = 3m - 6$ $m = \frac{6}{3} = 2$	✓ vervanging van (3;0) ✓ vir m	(2)
	7.2.2			
		✓ -1: x-snypunt t (par) ✓ 4: x-snypunt (par) ✓ 6: y-snypunt (par) ✓✓ koördinate van TP ✓ gladde kurwe	(6)
	7.2.3	Sien grafiek.	✓ x-snypunt (lyn) ✓ y-snypunt (lyn)	(2)
				[21]

VRAAG 8

8.1	✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ P(10 ; 25) Q(30 ; 15) S(40 ; 20) T(15 ; 45)	Twee vir elk korrekte koördinaat.	(8)
8.2	8.2.1 W = 3x + 5y	✓ korrekte vergelyking	(2)
	8.2.2 Gradiënt van soeklyn: $-\frac{3}{5}$ Maksimum by T Vir maksimum wins: 15 rompe & 45 bloese	✓ 15 rompe ✓ 45 bloese	(2)



	8.2.3 Minimum by P 10 rompe 25 bloese Minimum wins = 3(10) + 5(25) = 30 + 125 = R155,00	✓ identifikasie van minimum punt ✓ 10 rompe ✓ 25 bloese ✓ vervanging ✓ antwoord	(5)
8.3	45 bloese en 10 tot 15 rompe	✓ 45 bloese ✓✓10 tot 15 rompe	(3)
			[21]
		TOTAAL:	**150**