



Province of the
EASTERN CAPE
EDUCATION

**NATIONAL
SENIOR CERTIFICATE/
NASIONALE
SENIOR SERTIFIKAAT**

GRADE/*GRAAD* 11

NOVEMBER 2022

**MATHEMATICS P1/*WISKUNDE V1*
MARKING GUIDELINE/*NASIENRIGLYN***

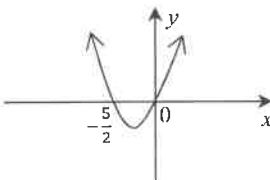
MARKS/*PUNTE*: 150

This marking guideline consists of 18 pages./
Hierdie nasienriglyn bestaan uit 18 bladsye.

NOTE/LET WEL:

- If a candidate answers a question TWICE, mark the FIRST attempt ONLY.
Indien 'n kandidaat 'n vraag TWEE keer beantwoord, merk SLEGS die EERSTE poging.
- Consistent accuracy applies in ALL aspects of the marking guideline.
Volgehoue akkuraatheid geld deurgaans in ALLE aspekte van die nasienriglyn.
- If a candidate crossed out an attempt of a question and did not redo the question, mark the crossed-out attempt.
Indien 'n kandidaat 'n poging vir 'n vraag deurgetrek het en nie die vraag weer beantwoord het nie, merk die poging wat deurgetrek is.
- The mark for substitution is awarded for substitution into the correct formula.
Die punt vir substitusie word toegeken vir substitusie in die korrekte formule.

QUESTION 1/VRAAG 1

1.1.1	$x^2 + 5x - 6 = 0$ $(x+6)(x-1) = 0$ ✓ $\therefore x = -6$ ✓ or / of $x = 1$ ✓	\checkmark factors / faktore $\checkmark \checkmark$ answers / antwoorde	3
1.1.2	$5x^2 + x - 3 = 0$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $= \frac{-1 \pm \sqrt{1^2 - 4(5)(-3)}}{2(5)}$ ✓ sub $= \frac{-1 \pm \sqrt{61}}{10}$ $= 0.68$ or / of -0.88	\checkmark substitution / vervanging $\checkmark \checkmark$ answers / antwoorde	3
1.1.3	$(2x-1)(x+3) \geq -3$ $2x^2 + 5x - 3 \geq -3$ $2x^2 + 5x \geq 0$ ✓ $x(2x+5) \geq 0$ ✓ $\therefore x \leq -\frac{5}{2}$ or / of $x \geq 0$	 $\checkmark 2x^2 + 5x - 3$ \checkmark standard form / standaardvorm \checkmark factors / faktore $\checkmark \checkmark$ answers / antwoorde	5

CV

$$x(2x+5) = 0$$

$$x = 0 \text{ or } -\frac{5}{2}$$

$$x(2x+5) \quad \oplus \quad 0 \quad - \quad 0 \quad \oplus$$

$$x \quad -\frac{5}{2} \quad 0$$

$$x \leq -\frac{5}{2} \text{ or } 0 \leq x$$

<p>1.1.4</p>	$\sqrt{x} - \sqrt{x-5} = 1$ $\sqrt{x} - 1 = \sqrt{x-5} \quad \checkmark$ $(\sqrt{x} - 1)^2 = (\sqrt{x-5})^2 \quad \checkmark$ $x - 2\sqrt{x} + 1 = x - 5 \quad \checkmark$ $6 = 2\sqrt{x} \quad \div 2: \quad 3 = \sqrt{x}$ $(6)^2 = (2\sqrt{x})^2 \quad \quad (3)^2 = (\sqrt{x})^2$ $\therefore 4x = 36 \quad \underline{9 = x} \quad \checkmark$ $x = 9$	$\checkmark \sqrt{x} - 1 = \sqrt{x-5}$ $\checkmark \text{ squaring both sides}$ $\text{kwadreer beide kante}$ $\checkmark x - 5 = x - 2\sqrt{x} + 1$ $\checkmark \text{ answer / antwoord}$ <p style="text-align: right;">(4)</p>
<p>1.2</p>	$2x - y = 1 \quad (1)$ $y^2 - xy = x + 7 \quad (2)$ $y = 2x - 1 \quad \checkmark \quad (3)$ <p>Subst.(3) into 2 / Verv.(3) in (2)</p> $(2x - 1)^2 - x(2x - 1) = x + 7 \quad \checkmark$ $4x^2 - 4x + 1 - 2x^2 + x - x - 7 = 0$ $2x^2 - 4x - 6 = 0$ $x^2 - 2x - 3 = 0 \quad \checkmark$ $(x - 3)(x + 1) = 0 \quad \checkmark$ $\therefore x = 3 \text{ or / of } x = -1 \quad \checkmark$ $y = 2(3) - 1 \text{ or / of } y = 2(-1) - 1 \quad \checkmark$ $\therefore y = 5 \text{ or / of } y = -3 \quad \checkmark$ <p style="text-align: center;">OR/OF</p> $2x - y = 1 \quad (1)$ $y^2 - xy = x + 7 \quad (2)$ $x = \frac{1+y}{2} \quad (3)$ <p>Subst.(3) into 2 / Verv.(3) in (2)</p> $y^2 - y\left(\frac{1+y}{2}\right) = \left(\frac{1+y}{2}\right) + 7$ $2y^2 - y(1+y) = (1+y) + 14$ $2y^2 - y - y^2 = 1 + y + 14$ $y^2 - 2y - 15 = 0$ $(y - 5)(y + 3) = 0$ $\therefore y = 5 \text{ or / of } y = -3$ $x = \frac{1+5}{2} \text{ or / of } x = \frac{1-3}{2}$ $\therefore x = 3 \text{ or / of } x = -1$	$\checkmark y = 2x - 1$ $\checkmark \text{ substitution / vervanging}$ $\checkmark \text{ standard form / standaardvorm}$ $\checkmark \text{ factors / faktore}$ $\checkmark \text{ both x-values / beide x-waardes}$ $\checkmark \text{ both y-values / beide y-waardes}$ $\checkmark x = \frac{1+y}{2}$ $\checkmark \text{ substitution / vervanging}$ $\checkmark \text{ standard form / standaardvorm}$ $\checkmark \text{ factors / faktore}$ $\checkmark \text{ both y-values / beide y-waardes}$ $\checkmark \text{ both x-values / beide x-waardes}$ <p style="text-align: right;">(6)</p>

4

6

<p>1.3</p> <p>$\hat{C} = 90^\circ$ (angle in a semi-circle) ✓^S (hoek in halve sirkel)</p> <p>∴ By Pythagoras's Theorem Stelling van Pythagoras:</p> $AB^2 = AC^2 + BC^2$ $= (x+3)^2 + (5-x)^2$ $= x^2 + 6x + 9 + 25 - 10x + x^2$ $= \underline{2x^2 - 4x + 34}$ $= 2(x^2 - 2x + 17)$ $= 2(x^2 - 2x + 1 - 1 + 17)$ $= 2(x-1)^2 + 32$ <p>∴ $x = 1$</p> <p style="text-align: center;">OR/OF</p> <p>AB is minimum when AB^2 is minimum</p> $AB^2 = (x+3)^2 + (5-x)^2$ $= x^2 + 6x + 9 + 25 - 10x + x^2$ $= 2x^2 - 4x + 34$ <p>AB^2 is minimum at / AB^2 is 'n minimum by:</p> $x = -\frac{b}{2a}$ $= \frac{-(-4)}{2(2)}$ $= 1$ <p style="text-align: center;">→</p>	<p>✓ $\hat{C} = 90^\circ$</p> <p>✓ substitution / vervanging</p> <p>✓ $2x^2 - 4x + 34$</p> <p>✓ completing the square vierkantsvoltooiing</p> <p>✓ answer / antwoord</p> <p>✓ statement / stelling</p> <p>✓ substitution / vervanging</p> <p>✓ $2x^2 - 4x + 34$</p> <p>✓ $x = -\frac{b}{2a}$</p> <p>✓ answer / antwoord</p>	<p>(5)</p> <p>[26]</p>
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$$AB = \sqrt{2x^2 - 4x + 34}$$

$$= \sqrt{I}$$

$I =$ inside of $\sqrt{\quad}$

AB is a minimum when I is a minimum

I is a minimum when

$$x = \frac{-(-4)}{2(2)}$$

$$= 1 \rightarrow$$

QUESTION 2/VRAAG 2

<p>2.1</p>	$\frac{2^{2x} - 4^{x+1}}{4^x + 2^{2x-1}}$ $= \frac{2^{2x} - 2^{2x+2}}{2^{2x} + 2^{2x-1}}$ $= \frac{2^{2x} - 2^{2x} \cdot 2^2}{2^{2x} + 2^{2x} \cdot 2^{-1}}$ $= \frac{2^{2x}(1-2^2)}{2^{2x}(1+2^{-1})}$ $= \frac{-3}{\frac{3}{2}}$ $= -2$ <p><i>split</i> <i>num</i> <i>ans + selection</i></p>	$4 = 2^2$ ✓ 2^{2x+2} and/en 2^{2x} ✓ inverse of exp. law <i>omgekeerde van eksp. wet</i> ✓ factorisation of numerator <i>faktorisering van teller</i> ✓ answer / antwoord (4)
<p>2.2.1</p>	$3x^{\frac{3}{2}} = 81$ $x^{\frac{3}{2}} = 27$ $\left(x^{\frac{3}{2}}\right)^{\frac{2}{3}} = (27)^{\frac{2}{3}}$ $\therefore x = 9$ <p><i>isolate</i> <i>method</i></p>	$x^{\frac{3}{2}} = 27$ $\left(x^{\frac{3}{2}}\right)^{\frac{2}{3}} = (27)^{\frac{2}{3}}$ ✓ answer / antwoord (3)
<p>2.2.2</p>	$2^x + 5 = 3 \cdot 2^{1-x}$ $2^x + 5 = 3 \cdot 2 \cdot 2^{-x}$ $2^x + 5 = \frac{3 \cdot 2}{2^x}$ $(2^x)^2 + 5 \cdot 2^x - 6 = 0$ $(2^x + 6)(2^x - 1) = 0$ $\therefore 2^x \neq -6$ or / of $2^x = 1$ $= 2^0$ $\therefore x = 0$ <p><i>no soln</i> <i>ans + selection</i></p>	✓ inverse of exp. law <i>omgekeerde van eksp. wet</i> ✓ multiplying by 2^x <i>maal met 2^x</i> ✓ factors / faktore ✓ both answers/beide antwoorde ✓ selection / keuse (5)

4

3

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$k = 2^{3x}$
 $k + 5 = \frac{6}{k}$
 $k^2 + 5k = 6$
 $k^2 + 5k - 6 = 0$
 $(k - 1)(k + 6) = 0$
 $k = 1 \text{ or } -6$

2.3	$\frac{1+\sqrt{2}}{3+2\sqrt{2}}$ $= \frac{(1+\sqrt{2})(3-2\sqrt{2})}{(3+2\sqrt{2})(3-2\sqrt{2})}$ $= \frac{3-2\sqrt{2}+3\sqrt{2}-2.2}{3^2-(2\sqrt{2})^2}$ $= \frac{\sqrt{2}-1}{9-8}$ $= \sqrt{2}-1$ $\therefore a=2, b=-1$	<p>✓ rationalising the denominator <i>rasionalisering van die noemer</i></p> <p>✓ simplification / <i>vereenvoudiging</i></p> <p>✓ $\sqrt{2}-1$ ✓ $a=2$ ✓ $b=-1$</p>
		(5)
		[17]

5

QUESTION 3/VRAAG 3

$a = -2 \quad d = 5$

<p>3.1.1</p>	<p>$-2 ; 3 ; 8 ; \dots$ $T_n = a + (n-1)d$ $= -2 + (n-1)(5)$ $T_n = 5n - 7$</p>	<p>$\checkmark 5n \quad \checkmark -7$ (2)</p>
<p>3.1.2</p>	<p>$T_n = 5n - 7$ $T_{18} = 5(18) - 7$ $= 83$</p>	<p>\checkmark substitution / <i>vervanging</i> $\checkmark 83$ (2)</p>
<p>3.1.3</p>	<p>$T_n = 5n - 7$ $473 = 5n - 7$ $480 = 5n$ $\therefore n = 96$</p>	<p>\checkmark substitution / <i>vervanging</i> \checkmark answer / <i>antwoord</i> (2)</p>

2
2
2

3.2. $T_n = a + (n-1)d$

$T_{11} = a + 10d$

$-19 = a + 10d$

$-19 - 10d = a$

$T_{23} = a + 22d$

$65 = a + 22d$

$65 = -19 - 10d + 22d$

$84 = 12d$

$7 = d$

$-19 - 10(7) = a$

$-89 = a$

$T_n = -89 + (n-1)(7)$

$= -89 + 7n - 7$

$= -96 + 7n$

$T_n < 0$

$7n - 96 < 0$

$n < \frac{96}{7}$

(13, 7) ...

$\therefore n = 13$

$\therefore 13$ terms are negative.

5

3.2	<p style="text-align: center;">OR</p> $T_{11} = -19 \quad T_{23} = 65$ $-19 ; a ; b ; c ; e ; \dots ; 65$ $a - (-19) = b - a = c - b = \dots = d$ <p>\therefore There are 12 common differences / <i>Daar is 12 gemeenskaplike verskille</i></p> $\therefore 12d = 65 - (-19)$ $12d = 84$ $\therefore d = 7$ $\therefore T_n = 7n + b$ $-19 = 7(11) + b \quad \text{or / of} \quad 65 = 7(23) + b$ $\therefore b = -96$ $\therefore T_n = 7n - 96$ <p>For negative terms: $T_n < 0$ <i>Vir negatiewe terme:</i></p> $\therefore 7n - 96 < 0$ $7n < 96$ $\therefore n < 13,71$ <p>\therefore Number of negative terms = 13 <i>Aantal negatiewe terme</i></p> <p style="text-align: center;">OR/OF</p> $12d = 65 - (-19)$ $d = \frac{84}{12}$ $= 7$ <p>But / <i>Maar</i>: T_1 to T_{11} are all negative / <i>almal negatief</i></p> $T_{12} = -19 + 7 = -12$ $T_{13} = -12 + 7 = -5$ $T_{14} = -5 + 7 = 2$ <p>\therefore There are 13 negative terms <i>Daar is 13 negatiewe terme</i></p>	$\checkmark 12d = 65 - (-19)$ $\checkmark d = 7$ $\checkmark T_n = 7n - 96$ $\checkmark 7n - 96 < 0$ $\checkmark n = 13$ <p style="text-align: center;">OR/OF</p> $\checkmark 12d = 65 - (-19)$ $\checkmark d = 7$ $\checkmark T_1 \text{ to } T_{11} \text{ are all negative / is almal negatief}$ $\checkmark T_{12} = -12 \ \& \ T_{13} = -5$ $\checkmark \text{ answer / antwoord} \quad (5)$ <p style="text-align: right;">[11]</p>
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QUESTION 4/VRAAG 4

<p>4.1</p>		<p>✓ 104 ✓ 84</p> <p>(2)</p>
<p>4.2</p>	<p> $2a = 2$ $3a + b = -28$ $a + b + c = -12$ $\therefore a = 1$ $3(1) + b = -28$ $1 - 31 + c = 204$ $b = -31$ $c = 234$ $\therefore T_n = n^2 - 31n + 234$ </p>	<p> ✓ $a = 1$ ✓ $b = -31$ ✓ $c = 234$ ✓ $T_n = n^2 - 31n + 234$ </p> <p>(4)</p>
<p>4.3</p>	<p> $n^2 - 31n + 234 = 36$ ✓ $n^2 - 31n + 198 = 0$ $n = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ or / of $(n-9)(n-22) = 0$ ✓ $= \frac{-(-31) \pm \sqrt{(-31)^2 - 4(1)(198)}}{2(1)}$ $= \frac{31 \pm \sqrt{169}}{2}$ $\therefore n = 9$ or / of $n = 22$ ✓ </p>	<p> ✓ $n^2 - 31n + 234 = 36$ ✓ subst. into formule / factors <i>verv. in formule / faktore</i> ✓ $n = 9$ ✓ $n = 22$ </p> <p>(4)</p>
<p>4.4</p>	<p> $n^2 - 31n + 234 = 0$ or / of $(n-13)(n-18) = 0$ $n = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $= \frac{-(-31) \pm \sqrt{(-31)^2 - 4(1)(234)}}{2(1)}$ $= \frac{31 \pm \sqrt{25}}{2}$ $\therefore n = 13$ or / of $n = 18$ $\therefore T_{14} \text{ \& } T_{17} = -4$ $T_{15} \text{ \& } T_{16} = -6$ </p>	<p> ✓ $T_n = 0$ ✓ method / metode subst. into formule / factors <i>verv. in formule / faktore</i> ✓ $n = 13$ and / en $n = 18$ ✓ -4 ✓ -6 </p> <p>(5)</p>
[15]		

2

4

4

44.

$$T_n < 0$$

$$n^2 - 31n + 234 < 0 \quad \checkmark$$

$$(n - 13)(n - 18) < 0 \quad \checkmark$$

$$\text{CV} \quad (n - 13)(n - 18) = 0$$

$$n = 13 \text{ or } 18$$

$(n-13)(n-18)$	+		\ominus		+
n		13		18	
		$13 < n < 18$			$13; 18$

$$\therefore n = 14; 15; 16 \text{ and } 17$$

$$T_{14} = (14)^2 - 31(14) + 234 = -4$$

Similarly

$$T_{15} = -6$$

$$T_{16} = -6$$

$$T_{17} = -4$$

TABLE
MODE!
14 - 17
step 1

$$\therefore \overbrace{-4; -6; -6; -4}^{\checkmark}$$

5

QUESTION 5/VRAAG 5

5.1	$x=1$ ✓ $y=3$ ✓	✓ $x=1$ ✓ $y=3$ (2)	2
5.2	$0 = \frac{-2}{x-1} + 3$ ✓ ^o $\frac{2}{x-1} = 3$ $3(x-1) = 2$ $x = \frac{5}{3}$ ✓ ∴ $(\frac{5}{3}; 0)$ $y = \frac{-2}{x-1} + 3$ $= \frac{-2}{0-1} + 3$ $= 5$ ✓ ∴ $(0; 5)$ ∴ Intercepts are at / Afsnitte is by: $(\frac{5}{3}; 0)$ and / en $(0; 5)$	✓ $y=0$ ✓ $x = \frac{5}{3}$ ✓ $y=5$ (3)	3
5.3	<p>Hand-drawn graph showing a rational function with a vertical asymptote at $x=1$ and a horizontal asymptote at $y=3$. The graph has two branches: one in the upper-left quadrant relative to the asymptotes, passing through the y-intercept (0, 5), and another in the lower-right quadrant, passing through the x-intercept (5/3, 0). Labels include 'yint', 'xint', 'ha + va asy', and 'shape + quads'.</p>	✓ x -intercept / x -afsnit ✓ y -intercept / y -afsnit ✓ asymptotes / asimptote ✓ shape & quadrants vorm & kwadrante (4)	4
5.4	$y = -(x-1) + 3$ $y = -x + 4$	✓✓ $y = -x + 4$ (2)	2

$\rightarrow x + 4$ NB $y =$

<p>5.5</p>	$g(x) = -x + b$ $-2 = -(5) + b$ $\therefore b = 3$ $g(x) = -x + 3$ $y - y_1 = m(x - x_1)$ $y + 2 = -1(x - 5)$ $\therefore y = g(x) = -x + 3$	<p>✓ $a = -1$</p> <p>✓ substitution / <i>vervanging</i></p> <p>✓ $b = 3$</p> <p>(3)</p>
<p>5.6</p>	$f(x) = g(x)$ $\frac{-2}{x-1} + 3 = -x + 3$ $\frac{-2}{x-1} = -x$ $-x(x-1) = -2$ $-x^2 + x + 2 = 0$ $x^2 - x - 2 = 0$ $(x+1)(x-2) = 0$ $\therefore x = -1 \text{ or / of } x = 2$ $\therefore y = -(-1) + 3 \text{ or / of } y = -(2) + 3$ $= 4 \qquad \qquad \qquad = 1$ <p>Points of intersection / <i>Snynpunte</i> by:</p> <p><u>$(-1; 4)$ and / en $(2; 1)$</u></p> $\therefore d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ $= \sqrt{(2 - (-1))^2 + (1 - 4)^2}$ $= \sqrt{18} = 3\sqrt{2}$	<p>✓ equating/<i>gelykstel</i>: $f(x) = g(x)$</p> <p>✓ standard form / <i>standaardvorm</i></p> <p>✓ both sets of coordinates <i>beide pare van koördinate</i></p> <p>✓ substitution into correct formula / <i>vervanging in die korrekte formule</i></p> <p>✓ answer / <i>antwoord</i></p> <p>(5)</p>
<p>5.7</p>	$h(x) = -f(x+3)$ $= \frac{2}{(x+3)-1} - 3$ $= \frac{2}{x+2} - 3$	<p>✓ $a = +2$ & $q = -3$ (reflection/<i>refleksie</i>)</p> <p>✓ $x + 2$</p> <p>(2)</p>
		<p>[21]</p>

3

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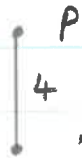
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$$f(x) = -\frac{2}{x-1} + 3$$

$$h(x) = -\left(-\frac{2}{(x+3)-1} + 3\right)$$

$$= \frac{2}{x+2} - 3$$

61. g int $y = -2$



$$\therefore y_0 = -2 - 4 \quad \checkmark c$$

$$c = -6$$

$$\therefore y = ax^2 + bx - 6$$

Sub $D(-1; -4)$

$$-4 = a(-1)^2 + b(-1) - 6$$

$$2 = a - b \quad \checkmark$$

$$x_{tp} = -\frac{b}{2a}$$

$$\frac{1}{2} = -\frac{b}{2a} \quad \checkmark$$

$$2a = -2b$$

$\div 2$:

$$a = -b \quad \checkmark$$

$$\therefore 2 = -b - b$$

$$2 = -2b$$

$$-1 = b$$

$$\therefore a = -(-1)$$

$$a = 1$$

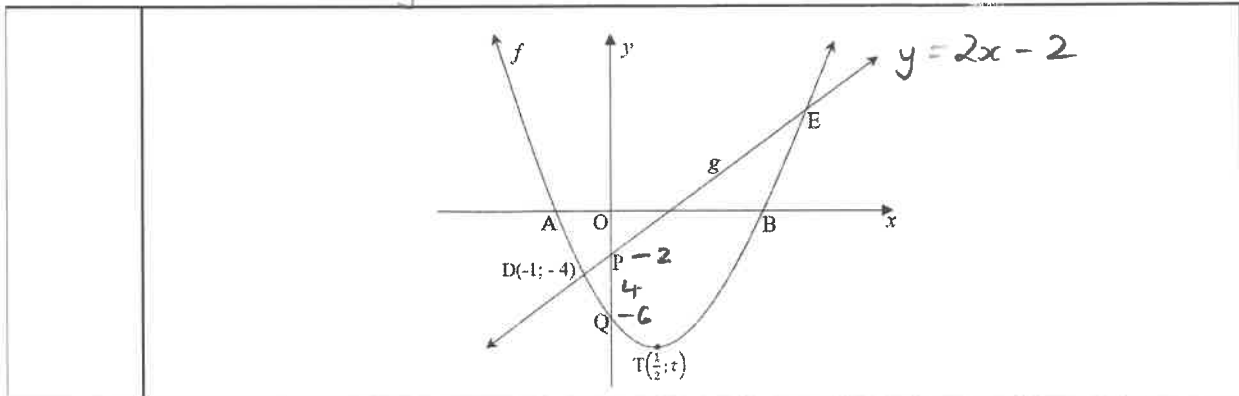
$$T\left(\frac{1}{2}; t\right)$$

$\checkmark a, b$

5

QUESTION 6/VRAAG 6

$y = x^2 - x - 6$
 $y = ax^2 + bx + c$



6.1

$f(x) = ax^2 + bx + c$

P is at/by: $(0; -2)$

Q is at/by: $(0; -6)$

$\therefore f(x) = ax^2 + bx - 6$

$-4 = (-1)^2 a + (-1)b - 6$

$2 = a - b \dots \dots \dots (1)$

At TP/By DP: $x = \frac{-b}{2a}$

$\frac{1}{2} = \frac{-b}{2a}$

$\therefore 2a = -2b$

$a = -b \dots \dots \dots (2)$

$\therefore 2 = -b - b$

$2 = -2b$

$b = -1$

$\therefore a = -(-1)$

$= 1$

✓ $c = -6$

✓ $a - b = 2$

✓ substitute for x / vervang vir x

✓ $a = -b$

✓ values of a and b.
waardes van a en b

(5)

6.2

$f(x) = x^2 - x - 6$

$= x^2 - x + \frac{1}{4} - \frac{1}{4} - 6$

$= (x - \frac{1}{2})^2 - 6\frac{1}{4}$

$t = -6\frac{1}{4}$

✓ completing the square
vierkantsvoltooiing

✓ factorisation / faktorisering

✓ $t = -6\frac{1}{4}$

OR/OF

$f(x) = x^2 - x - 6$

$\therefore y = (\frac{1}{2})^2 - (\frac{1}{2}) - 6$

$= -6\frac{1}{4}$

$\therefore t = -6\frac{1}{4}$



$-\frac{25}{4}$
 $-6,25$

OR/OF

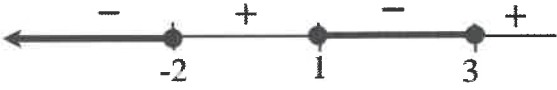
✓ $f(\frac{1}{2})$

✓ $y = -6\frac{1}{4}$

✓ $t = -6\frac{1}{4}$

(3)

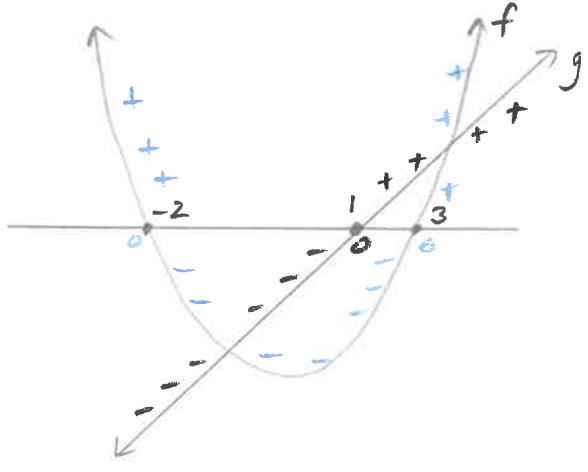
3

<p>6.3</p>	<p>$f(x) = x^2 - x - 6$ $0 = (x-3)(x+2)$ ✓ <i>f</i> $\therefore x = 3$ or / of $x = -2$ $\therefore A(-2;0)$ and/en $B(3;0)$ ✓ <i>woords</i></p>	<p>✓ factors / faktore ✓ $A(-2;0)$ ✓ $B(3;0)$ (3)</p>
<p>6.4</p>	<p>$f(x) = g(x)$ $x^2 - x - 6 = 2x - 2$ ✓ $x^2 - 3x - 4 = 0$ ✓ $(x-4)(x+1) = 0$ $\therefore x = 4$ or / of $x = -1$ ✓ <i>reject</i> $y = 2(4) - 2$ $= 6$ $\therefore E(4;6)$ ✓</p>	<p>✓ equating $f(x)$ and $g(x)$ gelykstel van $f(x)$ en $g(x)$ ✓ standard form / standaardvorm ✓ x-values / x-waardes ✓ coordinates of E koördinate van E (4)</p>
<p>6.5</p>	<p>$y \geq -6\frac{1}{4}$ or / of $y \geq t$ $y \in [-6\frac{1}{4}; \infty)$ or / of $y \in [t; \infty)$ ✓ <i>int not^n</i></p>	<p>✓ ✓ answer / antwoord (2)</p>
<p>6.6</p>	<p>$g(x) = 2x - 2$ $\therefore 0 = 2x - 2$ $\therefore x = 1$ $x \leq -2$ or / of $1 \leq x \leq 3$ OR/OF  $\therefore x \leq -2$ or / of $1 \leq x \leq 3$</p>	<p>✓ $x \leq -2$ ✓ $1 \leq x \leq 3$ ✓ $x \leq -2$ ✓ $1 \leq x \leq 3$ (2) [19]</p>

3

4

2



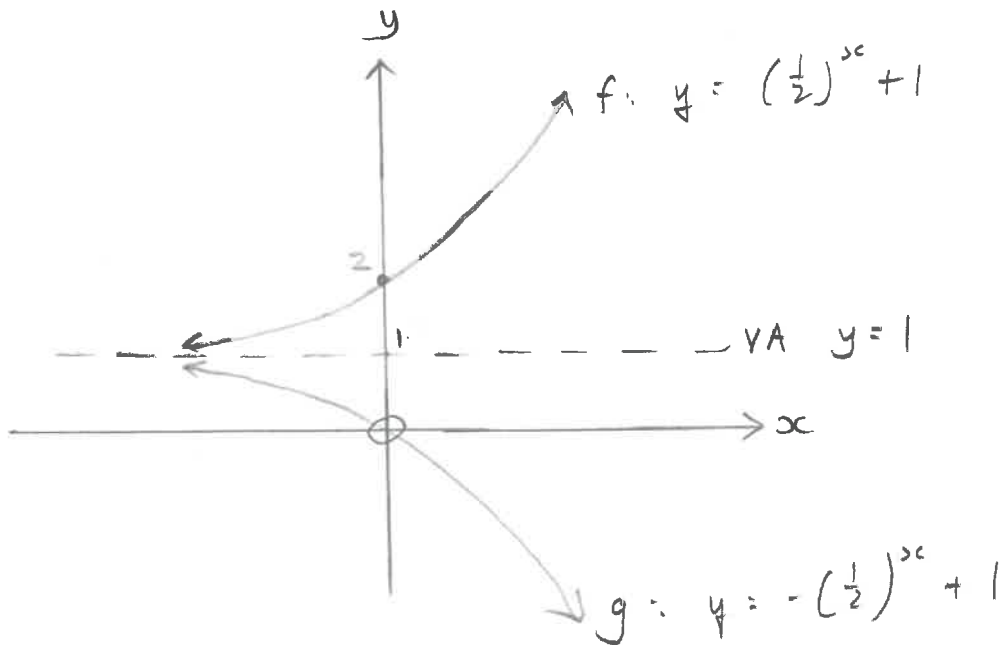
$f(x) \cdot g(x) \leq 0$
 $x \in (-2; -2] \text{ or } [1; 3]$
 ✓ A ✓ A
 • and ; -1 penalty 2

QUESTION 7/VRAAG 7

7.1	$f(x) = a^x + 1$ Sub $(-3; 9)$ $9 = a^{-3} + 1$ ✓ $8 = a^{-3}$ $\therefore a^3 = \frac{1}{8}$ $\sqrt[3]{a^3} = \sqrt[3]{\frac{1}{8}}$ $\therefore a = \frac{1}{2}$	✓ substitution / vervanging $\checkmark a^3 = \frac{1}{8}$ $\frac{1}{2} = a$ ✓ $f: y = \left(\frac{1}{2}\right)^x + 1$ ✓ answer / antwoord (3)
7.2	$g(x) = -\left(\frac{1}{2}\right)^x + 1$ $y = -a^x + 1$	$\checkmark -\left(\frac{1}{2}\right)^x \checkmark + 1$ (2)
[5]		

3

2



QUESTION 8/VRAAG 8

8.1	$1 + i_{eff} = \left(1 + \frac{i_{nom}}{12}\right)^{12}$ $1 + 0,0992 = \left(1 + \frac{x}{12}\right)^{12}$ $\therefore \sqrt[12]{1,0992} = \sqrt[12]{\left(1 + \frac{x}{12}\right)^{12}}$ $\therefore x = \left(\sqrt[12]{1,0992} - 1\right) \times 12$ $= 0,0950$ <p>\therefore The rate is 9,5% p.a. compounded monthly. Die koers is 9,5% p.j. maandeliks saamgestel.</p>	<p>✓ substitution / <i>vervanging</i></p> <p>✓ simplification / <i>vereenvoudiging</i></p> <p>✓ answer / <i>antwoord</i></p> <p>(3)</p>
8.2	$A = P(1 - i)^n$ $28607,30 = P(1 - 12\%)^7$ $P = \frac{A}{(1 - i)^n}$ $= \frac{28607,30}{(1 - 12\%)^7}$ $= R70\,000,00$	<p>✓ correct formula <i>korrekte formule</i></p> <p>✓ substitution / <i>vervanging</i></p> <p>✓ answer / <i>antwoord</i></p> <p>(3)</p>

8.3.1	$A = P(1+i)^n$ $A = \left(\left(32\,000 \left(1 + \frac{0,086}{12} \right)^{36} \right) + 23\,000 \right) \left(1 + \frac{0,086}{12} \right)^{12}$ $= R70141,04$ <p style="text-align: center;">04 03</p> <p style="text-align: center;">OR/OF</p> $A = P(1+i)^n$ $= 32\,000 \left(1 + \frac{0,086}{12} \right)^{48} + 23\,000 \left(1 + \frac{0,086}{12} \right)^{12}$ $= R70141,04$ <p style="text-align: center;">04 03</p>	$\checkmark i = \frac{0,082}{12}$ $\checkmark \left(32\,000 \left(1 + \frac{0,086}{12} \right)^{36} \right)$ $\checkmark +23\,000$ $\checkmark \times \left(1 + \frac{0,086}{12} \right)^{12}$ $\checkmark \text{ answer / antwoord}$ $\checkmark i = \frac{0,082}{12}$ $\checkmark \left(32\,000 \left(1 + \frac{0,086}{12} \right)^{48} \right)$ $\checkmark 23\,000 \left(1 + \frac{0,086}{12} \right)^{12}$ $\checkmark \text{ adding / optelling}$ $\checkmark \text{ answer / antwoord}$ <p style="text-align: right;">(5)</p>
8.3.2	$A = P(1+i)^n$ $= 70141,04 \left(1 + \frac{0,105}{4} \right)^8$ $= R86297,35 \dots$ $\therefore \text{Loan / Lening : } R220\,000 - R86\,297,35 \dots$ $= R133\,702,64$	$\checkmark P = R70\,141,04$ $\checkmark \text{ substitution / vervanging}$ $\checkmark R86\,297,35 \dots$ $\checkmark \text{ answer / antwoord}$ <p style="text-align: right;">(4)</p>
[15]		

8.1.

$$1 + i_{ea} = \left(1 + \frac{i_{nom}}{k}\right)^k$$

$$1 + \frac{9,92}{100} = \left(1 + \frac{i_{nom}}{12}\right)^{12} \quad \checkmark$$

$$\sqrt[12]{\frac{687}{625}} = 1 + \frac{i_{nom}}{12} \quad \checkmark$$

$$0,0949... = i_{nom}$$

$$9,495... = I_{nom}$$

9,50 % = x \checkmark

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8.2

$$A = P(1 - i)^n \quad \checkmark \text{ RB dep f}$$

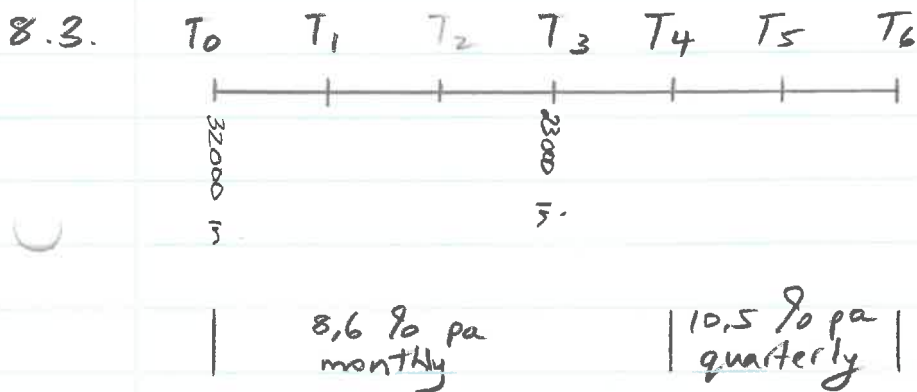
$$28\,607,30 = P \left(1 - \frac{12}{100}\right)^7 \quad \checkmark$$

$$= P \cdot 0,408...$$

$$70\,000,02... = P$$

\therefore P = R 70 000 \checkmark nearest R

3



8.3.1. $A = P(1 + i)^n$

Snowball $\checkmark i$

$$\underline{T_0 - T_3} \quad A = 32000 \left(1 + \frac{8,6}{1200}\right)^{3 \times 12}$$

$$= 41\,380,74...$$

Parallel $\checkmark i$

$$\underline{T_0 - T_4} \quad A = 32000 \left(1 + \frac{8,6}{1200}\right)^{4 \times 12}$$

$$= 45\,083,17...$$

Ⓐ

T₃-T₄

$$A = 64\,380,74 \dots \left(1 + \frac{8,6}{1200}\right)^{1 \times 12}$$
$$= \underline{R\ 70\,141,03}$$

5

$$T_3 - T_4 \quad A = 23000 \left(1 + \frac{8,6}{1200}\right)^{1 \times 12}$$
$$= 25057,85 \dots$$

(B)

∴ Balance is

$$(A) + (B)$$

$$= \underline{R\ 70\,141,03}$$

8.3.2.

T₄-T₆

$$A = 70\,141,03 \left(1 + \frac{10,5}{400}\right)^{4 \times 2}$$
$$= 86\,297,35 \dots$$

∴ Pratham needs to borrow

$$220\,000 - 86\,297,35 \dots$$
$$= \underline{R\ 133\,702,64}$$

4

QUESTION 9/VRAAG 9

<p>9.1.1</p>	<p>$P(A \text{ and/en } B) = 0$ <i>mut exc</i> $\therefore P(A \text{ or / of } B) = P(A) + P(B)$ ✓ $0,75 = 0,35 + P(B)$ ✓ $\therefore P(B) = 0,75 - 0,35$ $= 0,4 \text{ or / of } \frac{2}{5}$ ✓ <i>→</i></p>	<p>✓ correct formula / <i>korrekte formule</i> ✓ substitution / <i>vervanging</i> ✓ answer / <i>antwoord</i> (3)</p>
<p>9.1.2</p>	<p>$P(A \text{ and / en } B) = P(A) \times P(B)$ $\therefore P(A \text{ or/of } B) = P(A) + P(B) - P(A) \cdot P(B)$ ✓ $0,75 = 0,35 + P(B) - 0,35P(B)$ ✓ $0,4 = 0,65P(B)$ ✓ $\therefore P(B) = \frac{0,4}{0,65}$ $= \frac{8}{13}$ ✓ <i>→</i> <i>0,62</i></p>	<p>✓ correct formula / <i>korrekte formule</i> ✓ substitution / <i>vervanging</i> ✓ simplification / <i>vereenvoudiging</i> ✓ answer / <i>antwoord</i> (4)</p>
<p>9.2.1</p>	<p><i>U = 130</i></p>	<p>✓ 18, 12 and/en x (intersections) ✓ 34 - x ✓ x and/en y ✓ 8 and/en 11 (4)</p>
<p>9.2.2</p>	<p>$y + 12 + 11 + 18 = 81$ <i>W⁸¹</i> $y = 40$ ✓ $x + x + 11 + 12 + y + 18 + 34 - x + 8 = 130$ ✓ $x + 83 + 40 = 130$ $2x + 11 + 12 = 37$ <i>→</i> $\therefore x = 7$ ✓</p>	<p>✓ y-value / <i>y-waarde</i> ✓ equation / <i>vergelyking</i> ✓ x-value / <i>x-waarde</i> (3)</p>
<p>9.2.3</p>	<p>$P(\text{only one/slegs een}) = \frac{34-x}{130} + \frac{x}{130} + \frac{y}{130}$ <i>CA</i> $34 - x + x + y$ $= 34 + y$ $= \frac{74}{130} = \frac{37}{65}$ ✓ <i>→</i> <i>0,57</i></p>	<p>✓ method / <i>metode</i> ✓ answer / <i>antwoord</i> (2)</p>
<p>[16]</p>		

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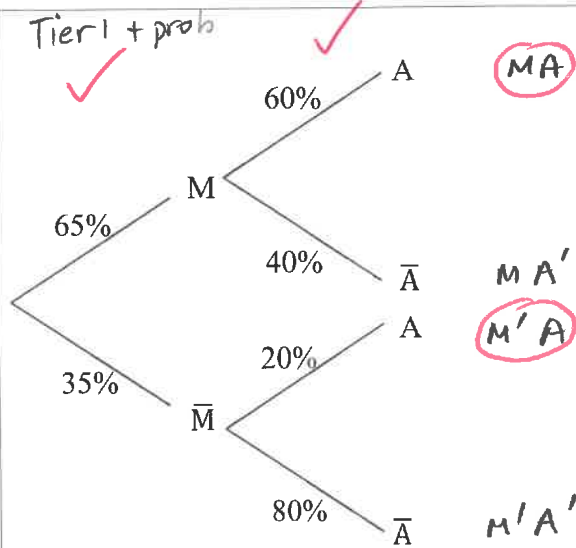
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QUESTION 10/VRAAG 10

Tier 2 + prob

10.



$$\begin{aligned}
 P(A) &= P(MA) + P(\bar{M}A) \\
 &= (65\% \times 60\%) + (35\% \times 20\%) \\
 &= 46\% \\
 &= \frac{23}{50}
 \end{aligned}$$

— = not =
 M = takes Maths
 A = distinction for Accounting

- ✓ $P(A) = P(MA) + P(\bar{M}A)$
- ✓ substitution / vervanging
- ✓ answer / antwoord

(5)

|5|

TOTAL / TOTAAL: 150