



**NATIONAL
SENIOR CERTIFICATE/
NASIONALE
SENIORSERTIFIKAAT**

GRADE/GRAAD 12

JUNE/JUNIE 2023

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

MARKS/PUNTE: 150

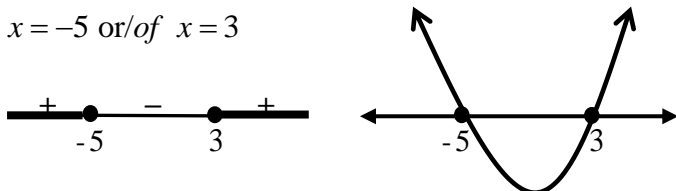
This marking guideline consists of 15 pages./
Hierdie nasienriglyn bestaan uit 15 bladsye.

NOTE/LET OP:

- If a candidate answered a question TWICE, mark the FIRST attempt ONLY.
Indien 'n kandidaat 'n vraag TWEE keer beantwoord het, merk SLEGS die EERSTE poging.
- Consistent accuracy(CA) applies in ALL aspects of the memorandum.
Volgehoue akkuraatheid geld deurgaans in ALLE aspekte van die memorandum.
- 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 vir substitusie in die korrekte formule toegeken.

QUESTION 1/VRAAG 1

1.1.1	$x^2 - 9 = 0$ $(x+3)(x-3) = 0$ $x+3 = 0 \text{ or/of } x-3 = 0$ $x = -3 \text{ or/of } x = 3$	<p style="text-align: center;">OR / OF</p> $x^2 - 9 = 0$ $x^2 = 9$ $x = \pm\sqrt{9}$ $x = \pm 3$	<p>✓ factors / faktore</p> <p>✓ both answers / beide antwoorde</p> <p style="text-align: center;">OR / OF</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>Answers only – Full marks Slegs antwoorde - Volpunte</p> </div> <p>✓ correct substitution into correct formula / korrekte vervanging in korrekte formule</p> <p>✓ both answers / beide antwoorde</p> <p style="text-align: right;">(2)</p>
	<p style="text-align: center;">OR / OF</p> $x^2 - 9 = 0$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $= \frac{-(0) \pm \sqrt{(0)^2 - 4(1)(-9)}}{2(1)}$ $= \frac{\pm\sqrt{36}}{2}$ $x = -3 \text{ or / of } x = 3$		

<p>1.1.2</p>	$x - 5 + \frac{2}{x} = 0$ $x^2 - 5x + 2 = 0$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $x = \frac{-(-5) \pm \sqrt{(-5)^2 - 4(1)(2)}}{2(1)}$ $x = \frac{5 \pm \sqrt{17}}{2}$ <p>$\therefore x = 4,56$ or/of $x = 0,44$</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>Penalise 1 mark for incorrect rounding off. / Penaliseer 1 punt vir verkeerde afronding.</p> </div>	<p>✓ standard form / <i>standaardvorm</i></p> <p>✓ substitution / <i>vervanging</i></p> <p>✓✓ x-values / <i>waardes</i></p> <p style="text-align: right;">(4)</p>
<p>1.1.3</p>	$x = 1 + \sqrt{7 - x}$ $x - 1 = \sqrt{7 - x}$ $(x - 1)^2 = (\sqrt{7 - x})^2$ $x^2 - 2x + 1 = 7 - x$ $x^2 - x - 6 = 0$ $(x + 2)(x - 3) = 0$ <p>$\therefore x \neq -2$ or/of $x = 3$</p>	<p>✓ isolating surd / <i>isoleer wortelvorm</i></p> <p>✓ square both sides / <i>kwadreer beide kante</i></p> <p>✓ standard form / <i>standaardvorm</i></p> <p>✓ factors / <i>faktore</i></p> <p>✓ selection / <i>keuse</i></p> <p style="text-align: right;">(5)</p>
<p>1.1.4</p>	$x^2 + 2x - 15 \geq 0$ $(x + 5)(x - 3) \geq 0$ <p>critical values/kritieke waardes</p> $x = -5$ or/of $x = 3$  <p>The diagram shows a number line with points at -5 and 3. The regions are labeled as +, -, +. To the right is a graph of a parabola opening upwards with x-intercepts at -5 and 3.</p> <p>$x \leq -5$ or/of $x \geq 3, x \in \mathbf{R}$</p> <p style="text-align: center;">OR/OF</p> <p>$x \in (-\infty; -5]$ or/of $x \in [3; \infty), x \in \mathbf{R}$</p>	<p>✓ critical values / <i>kritieke waardes</i></p> <p>✓✓ $x \leq -5$ or/of $x \geq 3, x \in \mathbf{R}$ (accuracy / <i>akkuraatheid</i>)</p> <p style="text-align: center;">OR/OF</p> <p>$x \in (-\infty; -5]$ or/of $x \in [3; \infty), x \in \mathbf{R}$</p> <p style="text-align: right;">(3)</p>

1.2	<p> $y + 2x = 3$(1) $y^2 - y = 3x^2 - 5x$(2) <i>From / Vanaf</i> (1): $y = -2x + 3$(3) (3) into/in (2): $(-2x + 3)^2 - (-2x + 3) = 3x^2 - 5x$ $4x^2 - 12x + 9 + 2x - 3 = 3x^2 - 5x$ $4x^2 - 12x + 9 + 2x - 3 - 3x^2 + 5x = 0$ $x^2 - 5x + 6 = 0$ $(x - 2)(x - 3) = 0$ $x = 2$ or/of $x = 3$ $y = -1$ or/of $y = -3$ </p> <p style="text-align: center;">OR / OF</p> <p> $y + 2x = 3$(1) $y^2 - y = 3x^2 - 5x$(2) </p> <p> $x = \frac{3 - y}{2}$(3) <i>Subst. / Verv.</i> (3) into / in (2): $y^2 - y = 3\left(\frac{3 - y}{2}\right)^2 - 5\left(\frac{3 - y}{2}\right)$ $y^2 - y = 3\left(\frac{9 - 6y + y^2}{4}\right) - 5\left(\frac{3 - y}{2}\right)$ $y^2 - y = \frac{27 - 18y + 3y^2}{4} + \frac{-15 + 5y}{2}$ $4y^2 - 4y - 27 + 18y - 3y^2 + 30 - 10y = 0$ $y^2 + 4y + 3 = 0$ $(y + 1)(y + 3) = 0$ $y = -1$ or / of $y = -3$ $x = 2$ or / of $x = 3$ </p>	<p> $\checkmark y = -2x + 3$ \checkmark substitution / <i>vervanging</i> </p> <p> \checkmark standard form / <i>standaardvorm</i> \checkmark factors / <i>faktore</i> \checkmark x-values / <i>waardes</i> \checkmark y-values / <i>waardes</i> </p> <p style="text-align: center;">OR / OF</p> <p> $\checkmark x = \frac{3 - y}{2}$ \checkmark substitution / <i>vervanging</i> </p> <p> \checkmark standard form / <i>standaardvorm</i> \checkmark factors / <i>faktore</i> \checkmark y-values / <i>waardes</i> \checkmark x-values / <i>waardes</i> </p> <p style="text-align: right;">(6)</p>
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1.3	$\sqrt[n]{\frac{10^n + 2^{n+2}}{5^{2n} + 4(5^n)}}$ $= \left[\frac{2^n \times 5^n + 2^n \cdot 2^2}{5^n \cdot 5^n + 4(5^n)} \right]^{\frac{1}{n}}$ $= \left[\frac{2^n (5^n + 4)}{5^n (5^n + 4)} \right]^{\frac{1}{n}}$ $= \left[\left(\frac{2}{5} \right)^n \right]^{\frac{1}{n}}$ $= \frac{2}{5}$	<p>✓ $\frac{2^n \times 5^n + 2^n \cdot 2^2}{5^n \cdot 5^n + 4(5^n)}$</p> <p>✓ factors / faktore</p> <p>✓ changing surd to exponent / verandering van wortel na eksponent</p> <p>✓ answer / antwoord</p> <p>(4)</p>
		[24]

QUESTION 2/VRAAG 2

2.1.1	$r = \frac{T_3}{T_2} = \frac{6x}{12}$ $= \frac{x}{2}$	✓ answer / <i>antwoord</i> (1)
2.1.2	$-1 < r < 1$ $-1 < \frac{x}{2} < 1$ $-2 < x < 2$	✓ substitution / <i>vervanging</i> ✓ answer / <i>antwoord</i> (2)
2.1.3	$x = 4 \Rightarrow a = 6 \text{ \& } r = 2$ $S_{15} = \frac{a(r^n - 1)}{r - 1}$ $= \frac{6(2^{15} - 1)}{2 - 1}$ $= 196\,602$	✓ values of <i>a</i> and <i>r</i> / <i>waardes van a en r</i> ✓ substitution / <i>vervanging</i> ✓ answer / <i>antwoord</i> (3)
2.2	$T_1 = 6(2)^{-1} = 3$ $T_2 = 6(2)^{-2} = \frac{3}{2}$ $\therefore r = \frac{1}{2}$ $S_\infty = \frac{a}{1 - r}$ $= \frac{3}{1 - \frac{1}{2}}$ $= 6$	✓ values of <i>a</i> and <i>r</i> / <i>waardes van a en r</i> ✓ substitution / <i>vervanging</i> ✓ answer / <i>antwoord</i> (3)

2.3.1	$S_{15} = -(15)^2 + 8(15)$ $= -105$	✓ substitution / <i>vervanging</i> ✓ answer / <i>antwoord</i> (2)
2.3.2	$T_{15} = S_{15} - S_{14}$ $= -105 - (-84)$ $= -21$	✓ method / <i>metode</i> ✓ answer / <i>antwoord</i> (2)
2.3.3	$T_1 = S_1 = 7$ $S_2 = -(2)^2 + 8(2) = 12$ $\therefore T_2 = 5$ $\Rightarrow d = -2$ $a + (n-1)d = T_n$ $7 + (n-1)(-2) = -169$ $7 - 2n + 2 = -169$ $-2n = -178$ $n = 89$ <p style="text-align: center;">OR / OF</p> $S_n - S_{n-1} = T_n$ $-n^2 + 8n - [-(n-1)^2 + 8(n-1)] = -169$ $-n^2 + 8n - [-n^2 + 2n - 1 + 8n - 8] = -169$ $-n^2 + 8n + n^2 - 2n + 1 - 8n + 8 = -169$ $-2n = -178$ $n = 89$	$a + 14d = -21$ $7 + 14d = -21$ $14d = -28$ $d = -2$ ✓ $T_2 = 5$ OR / OF $14d = -28$ ✓ $d = -2$ ✓ substitution / <i>vervanging</i> ✓ answer / <i>antwoord</i> <p style="text-align: center;">OR / OF</p> ✓ formula / <i>formule</i> ✓ substitution / <i>vervanging</i> ✓ simplification / <i>vereenvoudiging</i> ✓ answer / <i>antwoord</i> (4)
		[17]

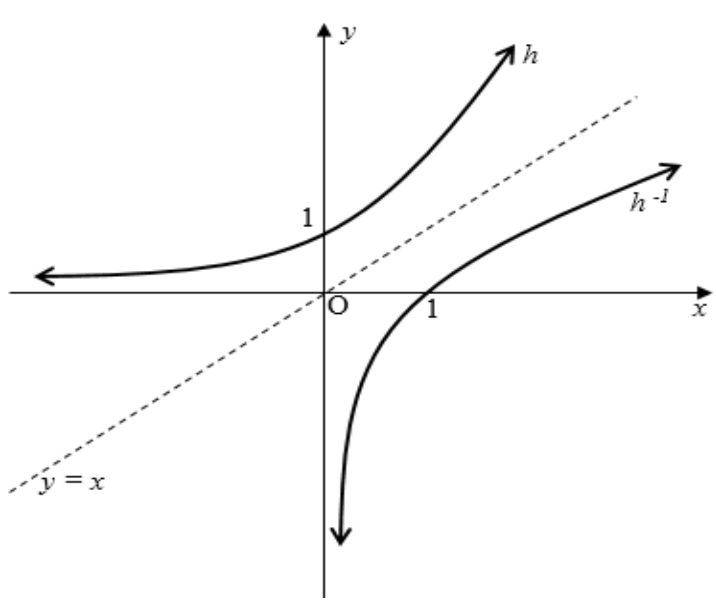
QUESTION 3/VRAAG 3

3.1	$95 ; 72 ; y ; 32 ; \dots$ $-23 ; y - 72 ; 32 - y ; \dots$ (first diff. / eerste verskille) $y - 49 ; -2y + 104$ $\therefore y - 49 = -2y + 104$ $3y = 153$ $y = 51$	✓ equating 2 nd differences / gelykstel van 2 ^{de} verskille ✓ answer / antwoord (2)
3.2	$\begin{array}{ccccccc} 95 & ; & 72 & ; & 51 & ; & 32 \\ & -23 & ; & -21 & ; & -19 & \\ & & 2 & ; & 2 & & \end{array}$ $2a = 2 \quad 3(1) + b = -23 \quad 1 - 26 + c = 95$ $a = 1 \quad b = -26 \quad c = 120$ $T_n = n^2 - 26n + 120$	✓ 2 nd difference / 2 ^{de} verskil ✓ $a = 1$ ✓ $b = -26$ ✓ $c = 120$ (4)
3.3	$T_{22} = (22)^2 - 26(22) + 120$ $= 32$	✓ answer / antwoord (1)
3.4	$n^2 - 26n + 120 = 1040$ $n^2 - 26n - 920 = 0$ $(n - 46)(n + 20) = 0$ $n = 46$ or / of $n \neq -20$ <p style="text-align: center;">OR / OF</p> $n^2 - 26n + 120 = 1040$ $n^2 - 26n - 920 = 0$ $n = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $= \frac{-(-26) \pm \sqrt{(-26)^2 - 4(1)(-920)}}{2(1)}$ $\therefore n = 46$ or / of $n \neq -20$	✓ equating / gelykstel ✓ standard form / standaardvorm ✓ factors / faktore ✓ answer / antwoord <p style="text-align: center;">OR / OF</p> ✓ equating / gelykstel ✓ standard form / standaardvorm ✓ substitution / vervanging ✓ answer / antwoord (4)
		[11]

QUESTION 4/VRAAG 4

4.1	S(0;3)	✓✓ answer / <i>antwoord</i> (2)
4.2.1	$x = -\frac{b}{2a} = -\frac{10}{2(-5)}$ $y = 5(-1)^2 + 10(-1) + 3$ $x = -1 \qquad y = -2$ <p>T(-1; -2)</p>	✓ method / <i>metode</i> ✓ x-coordinate / <i>x-koördinaat</i> ✓ substitution / <i>vervanging</i> ✓ y-coordinate / <i>y-koördinaat</i> (4)
4.2.2	$p = 1$ and / <i>en</i> $q = -2$	✓ $p = 1$ ✓ $q = -2$ (2)
4.2.3	$\frac{5}{x+1} - 2 = 0$ $\therefore x = \frac{3}{2}$ $\Rightarrow \text{OR} = 1,5 \text{ units / eenhede}$	✓ equating to 0 / <i>stel gelyk aan 0</i> ✓ answer / <i>antwoord</i> (2)
4.2.4	$y \geq -2$; $y \in \square$	✓✓ answer / <i>antwoord</i> (2)
4.3.1	$m = 10x + 10 \qquad y - y_1 = m(x - x_1)$ $= 10(0) + 10 \qquad y - 3 = 10(x - 0)$ $= 10 \qquad y = 10x + 3$	✓ $m = 10$ ✓ substitution into eqn of line / <i>vervanging in verg. van lyn</i> ✓ answer / <i>antwoord</i> (3)
4.3.2	$y = (x+1) - 2 \qquad y = x + k$ $y = x - 1 \qquad \text{OR / OF} \qquad -2 = -1 + k$ $k = -1$ $\therefore y = x - 1$	✓ substitution / <i>vervanging</i> ✓ answer / <i>antwoord</i> (2)
4.4	$x \geq \frac{3}{2}$	✓✓ answer / <i>antwoord</i> (A) (2)
		[19]

QUESTION 5/VRAAG 5

5.1	$h(x) = a^x$ $\frac{1}{2} = a^{-1}$ $\therefore a = 2$	<ul style="list-style-type: none"> ✓ substitution / <i>vervanging</i> ✓ answer / <i>antwoord</i> 	(2)
5.2	$y = 2^x$ $x = 2^y$ $\therefore h^{-1}(x) : y = \log_2 x$	<ul style="list-style-type: none"> ✓ interchanging x and y / <i>omruil van x en y</i> ✓ answer / <i>antwoord</i> 	(2)
5.3		<ul style="list-style-type: none"> ✓ y-intercept for h / <i>y-afsnit vir h</i> ✓ shape and asymptote of h <i>vorm en asimptoot van h</i> ✓ x-intercept for h^{-1} / <i>x-afsnit vir h^{-1}</i> ✓ shape and asymptote of h^{-1} <i>vorm en asimptoot van h^{-1}</i> 	(4)
5.4	$x > 0 ; x \in \square$	✓ answer / <i>antwoord</i>	(1)
5.5	$x > 2 ; x \in \square$ <p style="text-align: center;">OR / OF</p> $\log_2 x > 1$ $\therefore x > 2$ (algebraically/algebraïes)	<ul style="list-style-type: none"> ✓ answer / <i>antwoord</i> <p style="text-align: center;">OR / OF</p> <ul style="list-style-type: none"> ✓ answer / <i>antwoord</i> 	(1)
5.6.1	$t(x) = \left(\frac{1}{2}\right)^x - 1$ $= 2^{-x} - 1$ \Rightarrow reflection about the y -axis / <i>refleksie om die y-as</i> shift of 1 unit down / <i>skuif van 1 eenheid af</i>	<ul style="list-style-type: none"> ✓ reflection / <i>refleksie</i> ✓ shift / <i>skuif</i> 	(2)
5.6.2	$y = -1$	✓ answer / <i>antwoord</i>	(1)
			[13]

QUESTION 6/VRAAG 6

<p>6.1</p>	$A = P(1-i)^n$ $A = 980000(1-9,2\%)^7$ $A = R498685,82$	<ul style="list-style-type: none"> ✓ formula / formule ✓ substitution / vervanging ✓ answer / antwoord <p style="text-align: right;">(3)</p>
<p>6.2</p>	$A = P(1+i)^n$ $20020,28 = 13500(1+8,2\%)^n$ $1,4829837037 = 1,082^n$ $\therefore n = \log_{(1,082)} [1,4829837037]$ $n = 5 \text{ years / jaar}$	<ul style="list-style-type: none"> ✓ substitution / vervanging ✓ simplification / vereenvoudiging ✓ use of logs / gebruik van logs ✓ answer / antwoord <p style="text-align: right;">(4)</p>
<p>6.3</p>	<p>Amount in savings account / <i>Bedrag in spaarrekening</i> :</p> $= 3500 \left(1 + \frac{0,07}{4}\right)^8 \left(1 + \frac{0,08}{12}\right)^{36} + 5700 \left(1 + \frac{0,08}{12}\right)^{24}$ $= R11793,19$ <p style="text-align: center;">OR / OF</p> $A_1 = 3500 \left(1 + \frac{7\%}{4}\right)^8 = R4021,08624$ $A_2 = 4021,08624 \left(1 + \frac{8\%}{12}\right)^{12} = R4354,834415$ $A_3 = 4354,83441 + 5700 = R10054,834415$ <p>Final Amount / <i>Finale Bedrag</i></p> $= 10054,83441 \left(1 + \frac{8\%}{12}\right)^{24}$ $= R11793,19$	<ul style="list-style-type: none"> ✓ $n = 8$ and / en $i = 0,07/4$ ✓ substitution / vervanging ✓ $n = 36$ and / en $i = 0,08/12$ ✓ substitution / vervanging ✓ addition / optelling ✓ answer / antwoord <p style="text-align: center;">OR / OF</p> <ul style="list-style-type: none"> ✓ $n = 8$ and / en $i = 0,07/4$ ✓ substitution / vervanging ✓ $n = 12$ and / en $i = 0,08/12$ ✓ addition / optelling ✓ substitution / vervanging ✓ answer / antwoord <p style="text-align: right;">(6)</p>
		<p>[13]</p>

QUESTION 7/VRAAG 7

7.1	$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ $= \lim_{h \rightarrow 0} \frac{5 - 2(x+h)^2 - (5 - 2x^2)}{h}$ $= \lim_{h \rightarrow 0} \frac{5 - 2x^2 - 4xh - 2h^2 - 5 + 2x^2}{h}$ $= \lim_{h \rightarrow 0} \frac{-4xh - 2h^2}{h}$ $= \lim_{h \rightarrow 0} \frac{h(-4x - 2h)}{h}$ $= \lim_{h \rightarrow 0} (-4x - 2h)$ $= -4x$	<div style="border: 1px solid black; padding: 2px; margin-bottom: 10px;"> Penalise 1 mark for incorrect notation in this question Penaliseer 1 punt vir verkeerde notasie in hierdie vraag </div> <p>✓ $5 - 2x^2 - 4xh - 2h^2$</p> <p>✓ simplification / vereenvoudiging</p> <p>✓ factorisation / faktorisering (dividing by h / deel deur h)</p> <div style="border: 1px solid black; padding: 2px; margin: 10px auto; width: fit-content;"> Answer ONLY: 0 marks SLEGS antwoord: 0 punte </div> <p>✓ answer / antwoord</p> <p style="text-align: right;">(4)</p>
7.2.1	$f(x) = 2x^5 - 7\sqrt{x} + \frac{1}{x}$ $= 2x^5 - 7x^{\frac{1}{2}} + x^{-1}$ $f'(x) = 10x^4 - \frac{7}{2}x^{-\frac{1}{2}} - x^{-2}$ $= 10x^4 - \frac{7}{2\sqrt{x}} - \frac{1}{x^2}$	<p>✓ $2x^5 - 7x^{\frac{1}{2}} + x^{-1}$</p> <p>✓ $10x^4$</p> <p>✓ $-\frac{7}{2}x^{-\frac{1}{2}}$</p> <p>✓ $-x^{-2}$</p> <p style="text-align: right;">(4)</p>
7.2.2	$\frac{d}{dx} \left[\frac{2x^2 - x - 6}{2x + 3} \right]$ $\frac{d}{dx} \left[\frac{(2x+3)(x-2)}{(2x+3)} \right]$ $\frac{d}{dx} [x - 2]$ $= 1$	<p>✓ factors / faktore</p> <p>✓ simplification / vereenvoudiging</p> <p>✓ answer / antwoord</p> <p style="text-align: right;">(3)</p>
		[11]

QUESTION 8/VRAAG 8

<p>8.1</p>	$f'(x) = 3x^2 - 10x - 8 = 0$ $(3x + 2)(x - 4) = 0$ $x = -\frac{2}{3} \text{ or / of } x = 4$ $y = \frac{400}{27} (14,81) \text{ or / of } y = -36$ $L\left(-\frac{2}{3}; \frac{400}{27}\right) \text{ and / en } M(4; -36)$	<ul style="list-style-type: none"> ✓ $f'(x) = 0$ ✓ factors / faktore ✓ x-values / x-waardes ✓ y-values / y-waardes <p style="text-align: right;">(4)</p>
<p>8.2</p>	$f(x) = x^3 - 5x^2 - 8x + 12 = 0$ $(x - 6)(x - 1)(x + 2) = 0$ $\therefore x = 6 ; x = 1 ; x = -2$	<ul style="list-style-type: none"> ✓ factors / faktore ✓ $x = 1$ ✓ $x = -2$ <p style="text-align: right;">(3)</p>
<p>8.3</p>		<ul style="list-style-type: none"> ✓ x-intercepts / x-afsnitte ✓ y-intercept / y-afsnit ✓ turning points / draaipunte ✓ shape / vorm <p style="text-align: right;">(4)</p>
<p>8.4</p>	$m = \frac{0 - (-16)}{6 - 2} = 4$ $y - y_1 = m(x - x_1)$ $y - 0 = 4(x - 6)$ $y = 4x - 24$ $\therefore a = 4 \text{ and / en } q = -24$	<ul style="list-style-type: none"> ✓ $a = 4$ ✓ $q = -24$ <p style="text-align: right;">(2)</p>
<p>8.5</p>	$f''(x) = 6x - 10$ $f''(2) = 6(2) - 10$ $= 2 > 0$ $\Rightarrow \text{concave up / konkaaf op}$	<ul style="list-style-type: none"> ✓ $f''(x)$ ✓ substitution / vervanging ✓ conclusion / gevolgtrekking <p style="text-align: right;">(3)</p>
<p>8.6</p>	$4x - 24 = -36$ $x = -3$ $\therefore -3 \leq x \leq 2 \text{ or / of } x \geq 6$	<ul style="list-style-type: none"> ✓ equating / gelyk stel ✓ $x = -3$ ✓✓ answer / antwoord <p style="text-align: right;">(4)</p>
		<p>[20]</p>

QUESTION 9/VRAAG 9

9.1	<p>Hourly cost = fuel cost + other costs <i>Uurlikse koste = brandstofkoste + ander koste</i> $= 4x^2 + 1000$</p> <p>Duration of trip/<i>Tydsduur van reis</i> = $\frac{\text{distance/afstand}}{\text{speed/spoed}} = \frac{500}{x}$</p> <p>Total cost/<i>Totale koste</i> = (hourly cost/<i>uurlikse koste</i>) \times (number of hours/<i>aantal ure</i>) $C(x) = (4x^2 + 1000) \times \left(\frac{500}{x}\right)$ $= 2000x + \frac{500\,000}{x}$</p>	<p>✓ $4x^2 + 1000$</p> <p>✓ $\frac{500}{x}$</p> <p>✓ $(4x^2 + 1000) \times \left(\frac{500}{x}\right)$</p> <p>(3)</p>
9.2	$C'(x) = 2000 - \frac{500\,000}{x^2} = 0$ $2000x^2 - 500\,000 = 0$ $2000x^2 = 500\,000$ $x^2 = 250$ $x = \sqrt{250} = 15,81 \text{ km/h}$	<p>✓ $C'(x)$ ✓ $C'(x) = 0$ ✓ standard form / <i>standaardvorm</i></p> <p>✓ simplification / <i>vereenvoudiging</i> ✓ answer / <i>antwoord</i></p> <p>(5)</p>
		[8]

QUESTION 10/VRAAG 10

<p>10.1</p>	<p>$P(A \text{ or / of } B) = P(A) + P(B)$ $0,64 = 3P(B) + P(B)$ $0,64 = 4P(B)$ $\therefore P(B) = 0,16$</p>	<p>✓ rule / reël ✓ substitution / vervanging ✓ answer / antwoord (3)</p>
<p>10.2.1</p>		<p>✓ 37% and / en 63% ✓ 12% and / en 88% ✓ 36% and / en 64% ✓ outcomes / uitkomst (4)</p>
<p>10.2.2</p>	<p>$(37\% \times 88\%) + (63\% \times 64\%)$ $= 0,7288 \approx \frac{73}{100}$</p>	<p>✓ $(37\% \times 88\%) + (63\% \times 64\%)$ ✓ answer / antwoord (2)</p>
<p>10.3.1</p>	<p>$182 + x + 4 + 30 = 240$ OR / OF $x + 182 = 206$ OR / OF $x + 4 = 28$ $x = 240 - 216$ $x = 24$ $x = 24$ $x = 24$</p>	<p>✓ equation / vergelyking ✓ answer / antwoord (2)</p>
<p>10.3.2</p>	<p>For independent events Vir onafhanklike gebeurtenisse $P(R) \times P(C) = P(R \cap C)$ $P(R \text{ and / en } C) = \frac{24}{240} = 0,10$ $P(R) \times P(C)$ $= \left(\frac{206}{240}\right) \times \left(\frac{28}{240}\right)$ $= 0,10$ \therefore Yes, the events are independent. Ja, die gebeurtenisse is onafhanklik.</p>	<p>✓ $P(R \cap C) = 0,10$ ✓ $P(R) \times P(C) = 0,10$ ✓ conclusion / gevolgtrekking (3)</p>
<p style="text-align: right;">[14]</p>		
<p style="text-align: right;">TOTAL/TOTAAL: 150</p>		