



education

Department:
Education
North West Provincial Government
REPUBLIC OF SOUTH AFRICA

PROVINCIAL ASSESSMENT/ PROVINSIALE ASSESSERING

GRADE/GRAAD 12

MATHEMATICS P1/WISKUNDE V1

JUNE/JUNIE 2025

MARKING GUIDELINES/NASIENRIGLYNE

MARKS/PUNTE: 150

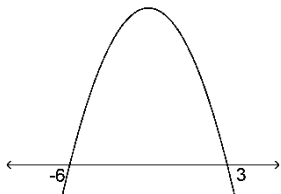
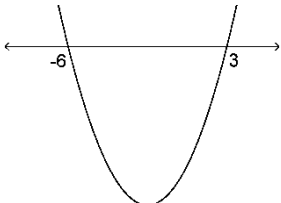
**This marking guidelines consists of 12 pages.
Hierdie nasienriglyne bestaan uit 12 bladsye.**

NOTE:

- If a candidate answers a question TWICE, only mark the FIRST attempt.
- If a candidate has crossed out an attempt of a question and not redone the question, mark the crossed-out version.
- Consistent Accuracy applies in ALL aspects of the marking guidelines. Stop marking at the second calculation error.
- Assuming answers/values in order to solve a problem is NOT acceptable.

LET WEL:

- Indien 'n kandidaat 'n vraag TWEE KEER beantwoord, sien slegs die EERSTE poging na.
- Indien 'n kandidaat 'n antwoord van 'n vraag doodtrek en nie oordoen nie, merk die doodgetrekte poging.
- Volgehoue akkuraatheid isdeurgans op ALLE aspekte van die nasienriglyne van toepassing. Hou op nasien by die tweede berekeningsfout.
- Aanvaar van antwoorde/waardes om 'n probleem op te los, word NIE toegelaat nie.

QUESTION/VRAAG 1			
1.1.1	$x^2 - x - 12 = 0$ $(x + 3)(x - 4) = 0$ $x = -3$ or/of $x = 4$	✓ factors/faktore ✓ $x = -3$ ✓ $x = 4$	(3)
1.1.2	$5x^2 + 2x = 9$ $5x^2 + 2x - 9 = 0$ $x = \frac{-2 \pm \sqrt{2^2 - 4(5)(-9)}}{2(5)}$ $= 1,16$ or/of $x = -1,56$	✓ std form/vorm ✓ subst ✓ $x = 1,16$ ✓ $x = -1,56$	(4)
1.1.3	$18 - 3x - x^2 \geq 0$ $(6 + x)(3 - x) \geq 0$ $-6 \leq x \leq 3$ OR/OF $18 - 3x - x^2 \geq 0$ $x^2 + 3x - 18 \leq 0$ $(x + 6)(x - 3) \leq 0$ $-6 \leq x \leq 3$	 OR/OF  ✓ factors/faktore ✓ critical values/ kritiese waardes ✓✓ answer/antw	(4)

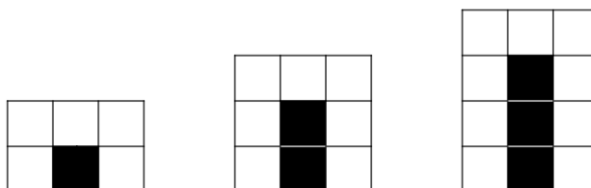
1.1.4	$6 - \sqrt{x+4} = x + 4$ $-\sqrt{x+4} = x - 2$ $x + 4 = x^2 - 4x + 4$ $x^2 - 5x = 0$ $x(x - 5) = 0$ $x = 0 \quad \text{or/of} \quad x \neq 5$	✓ isolate/soleer $\sqrt{\quad}$ ✓ square/kwadreer ✓ std form/vorm ✓ factors/faktore ✓ $x = 0$ or/of $x = 5$ ✓ $x \neq 5$	(6)
1.2	$2y - x = 3 \quad \dots\dots\dots \textcircled{1}$ $y^2 + 3x - 2xy = 0 \quad \dots\dots \textcircled{2}$ $2y - 3 = x \quad \dots\dots\dots \textcircled{3}$ $\therefore y^2 + 3(2y - 3) - 2y(2y - 3) = 0$ $y^2 + 6y - 9 - 4y^2 + 6y = 0$ $-3y^2 + 12y - 9 = 0$ $y^2 - 4y + 3 = 0$ $(y - 1)(y - 3) = 0$ $y = 1 \quad \text{or/of} \quad y = 3$ $x = 2(1) - 3 \quad \text{or/of} \quad x = 2(3) - 3$ $= -1 \quad \quad \quad = 3$	✓ equation/vergelyking ✓ subst ✓ std form/vorm ✓ factors/faktore ✓ y-values/waardes ✓ x-values/waardes	(6)
1.3	$\left(3 - \frac{1}{\sqrt{5}}\right)\left(9 + \frac{3}{\sqrt{5}} + \frac{1}{5}\right)$ $= 3^3 - \left(\frac{1}{\sqrt{5}}\right)^3$ $= 27 - \frac{1}{5} \cdot \frac{1}{\sqrt{5}} \times \frac{\sqrt{5}}{\sqrt{5}}$ $= 27 - \frac{1}{25} \sqrt{5}$ $\therefore a = 27 \quad \text{and/en} \quad b = 5$	✓ cubes/derdemagte ✓ rationalise/rasionaliseer ✓ $a = 27$ ✓ $b = 5$	(4)
			[27]

QUESTION/VRAAG 2

2.1	$2; 7; 16; \dots\dots\dots; 781; 862$ $5 \quad 9 \quad 13$ $\therefore T_4 = 29$	✓ 29	(1)
2.2	$2a = 4; a = 2$ $3(2) + b = 5; b = -1$ $2 - 1 + c = 2; c = 1$ $T_n = 2n^2 - n + 1$	✓ $2a = 4; \checkmark a = 2$ ✓ $b = -1$ ✓ $c = 1$	(4)
2.3	$T_n = 2n^2 - n + 1$ $862 = 2n^2 - n + 1$ $0 = 2n^2 - n - 861$ $0 = (n - 21)(2n + 41)$ $n = 21 \quad \text{or/of} \quad n = -\frac{41}{2}$ $\therefore T_{21} = 862 \quad \text{N/A}$	✓ subst ✓ factorise/faktoriseer ✓ term 21	(3)
			[8]

QUESTION/VRAAG 3			
3.1.1	$2 + 6 + 18 + 54 + \dots$ $T_n = 2 \cdot 3^{n-1}$	$\checkmark 2 \cdot 3^{n-1}$	(1)
3.1.2	$\sum_{n=1}^m \frac{2}{3} \cdot 3^n = 59\,048$ $\therefore 2 + 6 + 18 + 54 + \dots$ $S_m = 59\,048; a = 2; r = 3$ $\frac{a(r^m - 1)}{r - 1} = 59\,048$ $\frac{2(3^m - 1)}{3 - 1} = 59\,048$ $3^m = 59\,049$ $3^m = 3^{10}$ $m = 10$	$\checkmark a; r$ $\checkmark$ subst $\checkmark$ exp law/eksp wet $\checkmark$ answer/antwoord	(4)
3.2.1	$a = 3; r = \frac{1}{2}$ $3 + \frac{3}{2} + \frac{3}{4} + \dots$ $\therefore T_3 = \frac{3}{4}$	$\checkmark \frac{3}{4}$	(1)
3.2.2	$S_\infty = \frac{a}{1 - r}$ $= \frac{3}{1 - \frac{1}{2}}$ $= 6$	$\checkmark$ subst $\checkmark 6$	(2)
3.3	$1; 2; 3; 4; \dots; 8\,000$ $S_{8000} = \frac{8\,000}{2}(1 + 8\,000)$ $= 32\,004\,000$ Powers of 6/Magte van 6: $6; 36; 216; 1\,296; 7\,776$ $S_5 = \frac{6(6^5 - 1)}{6 - 1}$ $= 9\,330$ $\therefore S = 32\,004\,000 - 9\,330 = 31\,994\,670$ OR/OF	$\checkmark$ answer/antwoord $\checkmark$ sequence/ry $\checkmark$ subst $\checkmark$ answer/antwoord	(4)

1; 2; 3; 4; ; 8 000 $S_{8000} = \frac{8\,000}{2}(1 + 8\,000)$ $= 32\,004\,000$ Powers of 6/Magte van 6: 6; 36; 216; 1 296; 7 776 $S_5 = 6 + 36 + 216 + 1\,296 + 7\,776$ $= 9\,330$ $\therefore S = 32\,004\,000 - 9\,330$ $= 31\,994\,670$	OR/OF ✓answer/antwoord ✓series/ry ✓add terms to 9 330/ tel terme op na 9 330 ✓answer/antwoord	
		[12]

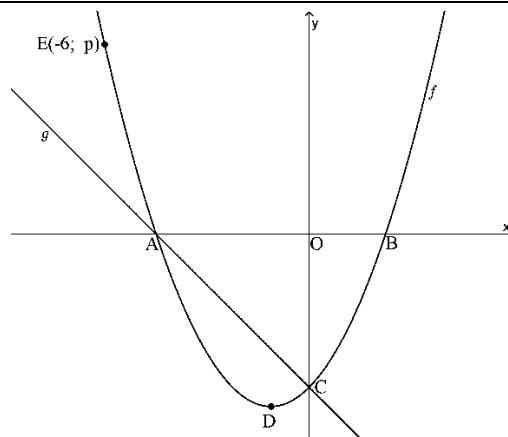
QUESTION/VRAAG 4

4.1.1	$T_{17} = 3 \times 17 - 14$ $= 37$	✓3 x 17 ✓ - 14	(2)
4.1.2	White tiles/wit teëls 5; 7; 9; . . . $\therefore T_n = 5 + (n - 1)2$ $= 2n + 3$	✓2n ✓3	(2)
4.1.3	Black tiles/Swart teëls: $1 + 2 + 3 + \dots + 25$ $\therefore S_n = \frac{n}{2}[a + l] \quad \left \quad = \frac{n}{2}[2a + (n - 1)d]$ $S_{25} = \frac{25}{2}(1 + 25) \quad \left \quad = \frac{25}{2}[2(1) + 24(1)]$ $= 325 \quad \left \quad = 325$ White tiles/Wit teëls: $5 + 7 + 9 + \dots + 53$ $\therefore S_n = \frac{n}{2}[a + l] \quad \left \quad = \frac{n}{2}[2a + (n - 1)d]$ $S_{25} = \frac{25}{2}(5 + 53) \quad \left \quad = \frac{25}{2}[2(5) + 24(2)]$ $= 725 \quad \left \quad = 725$ ∴ Tiles all together/Teëls altesaam = 1 050	✓subst ✓325 ✓subst ✓725 ✓1 050	(5)

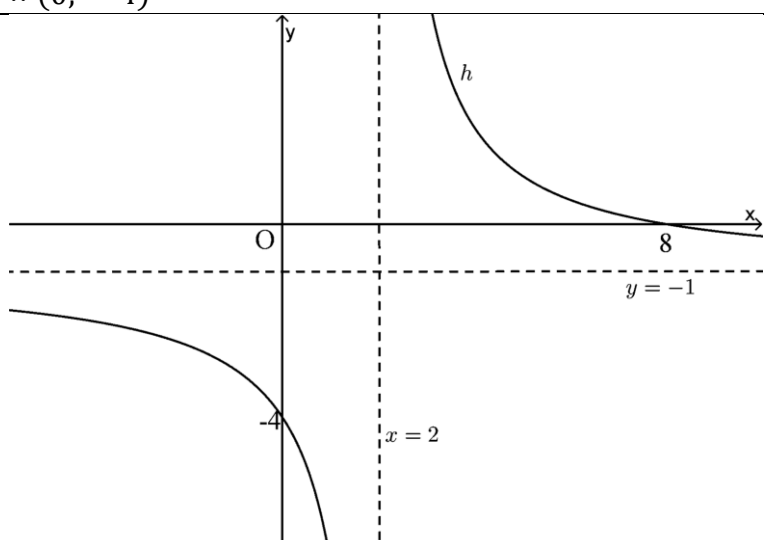
	OR/OF $6 + 9 + 12 + \dots$ 25 terms/terme $a = 6; d = 3$ $S_{25} = \frac{25}{2} [2(6) + (25 - 1)(3)]$ $= 1\ 050$	✓series/reeks ✓a ✓d ✓subst ✓1 050	
4.2	$19 + 18\frac{1}{5} + 17\frac{2}{5} + \dots$ $d = -\frac{4}{5}; a = 19$ $T_n = 19 + (n - 1)\left(-\frac{4}{5}\right)$ $= 19 - \frac{4}{5}n + \frac{4}{5}$ $= \frac{99}{5} - \frac{4}{5}n$ $\frac{99}{5} - \frac{4}{5}n < 0$ $-\frac{4n}{5} < -\frac{99}{5}$ $n > 24,75$ ∴ First negative term is/Eerste negatiewe term is T_{25}	✓a; d ✓subst ✓$\frac{99}{5} - \frac{4}{5}n < 0$ ✓$n > 24,75$ ✓answer/antwoord	(5)
			[14]

QUESTION/VRAAG 5

Given/Gegee: $f(x) = x^2 + 2x - 8$ and/en
 $g(x) = mx + c$

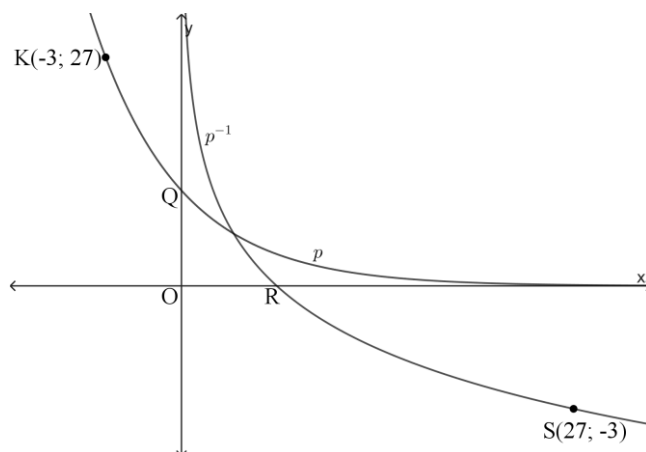


5.1	$p = (-6)^2 + 2(-6) - 8$ $= 16$	✓16	(1)
5.2	<u>x-intercepts/afsnitte: $y = 0$</u> $x^2 + 2x - 8 = 0$ $(x + 4)(x - 2) = 0$ $x = -4$ or/of $x = 2$ $\therefore A(-4; 0)$ $\therefore B(2; 0)$	✓ $f(x) = 0$ ✓factorise/faktoriseer ✓ $A(-4; 0)$ ✓ $B(2; 0)$	(4)
5.3	<u>Turning point/draaipunt:</u> $x = -\frac{b}{2a} = -\frac{2}{2(1)} = -1$ $y = (-1)^2 + 2(-1) - 8 = -9$ $\therefore D(-1; -9)$	✓ x –value/waarde ✓ y –value/waarde	(2)
5.4	$c = -8$ $m = -2$	✓ $c = -8$ ✓ $m = -2$	(2)
5.5	$m = f'(x) = 2x + 2$ $m = f'(0)$ $= 2(0) + 2$ $= 2$ Subst $m = 2$ and/en $C(0; -8)$ into/in $y = mx + c$ $\therefore y = 2x - 8$	✓ $f'(x) = 2x + 2$ ✓subst ✓equation/vergelyking	(3)
5.6	$(-\infty; 9]$ OR/OF $y \leq 9; y \in \mathbb{R}$	✓values/waardes ✓notation/notasie OR/OF ✓✓answer/antwoord	(2)
5.7	$f(x) - g(x) > 0$ $f(x) > g(x)$ $\therefore x < -4$ or/of $x > 0$	✓ $x < -4$ ✓ $x > 0$	(2)
5.8	$x^2 + 2x + k = 0$ $x^2 + 2x - 8 = -k - 8$ $\therefore -k - 8 < -9$ $\therefore k > 1$	✓✓answer/antwoord	(2)
			[18]

QUESTION/VRAAG 6			
Given/Gegee: $h(x) = \frac{6}{x-2} - 1$			
6.1	$x = 2$ $y = -1$	$\checkmark x = 2$ $\checkmark y = -1$	(2)
6.2	<u>x-intercept/afsnit: $y = 0$</u> $0 = \frac{6}{x-2} - 1$ $1 = \frac{6}{x-2}$ $x - 2 = 6$ $x = 8$ $\therefore (8; 0)$ <u>y-intercept/afsnit: $x = 0$</u> $y = \frac{6}{-2} - 1$ $= -4$ $\therefore (0; -4)$	$\checkmark h(x) = 0$ $\checkmark (8; 0)$ $\checkmark (0; -4)$	(3)
6.3		$\checkmark$ shape/vorm $\checkmark$ asymptotes/asimptote $\checkmark$ x- and y-intercept/afsnit	(3)
6.4	$h(x) < 0; x \in [0; \infty)$ $\therefore 0 \leq x < 2$ or/of $x > 8$	$\checkmark 0 \leq x < 2$ $\checkmark x > 8$	(2)
			[10]

QUESTION/VRAAG 7

Given/Gegee: $p(x) = b^x$ and/en $p^{-1}(x)$
 $S(27; -3)$ lies on p^{-1} /lê op p^{-1}
 $K(-3; 27)$ lies on p /lê op p

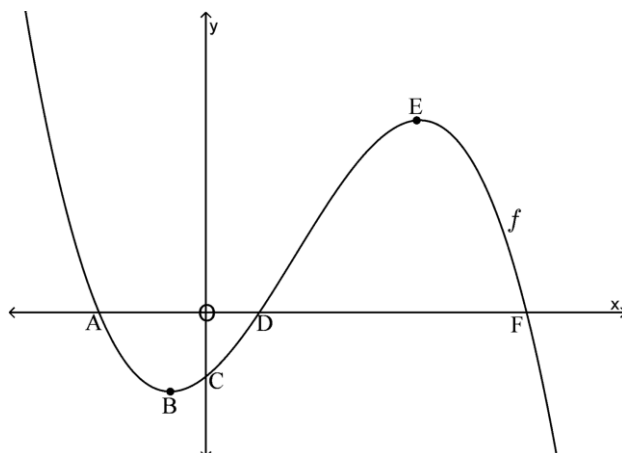


7.1	$p(x) = b^x$ $27 = b^{-3}$ $\frac{1}{b^3} = 27$ $b^3 = \frac{1}{27}$ $\therefore b = \frac{1}{3}$	$\checkmark$ subst (27; -3) $\checkmark b = \frac{1}{3}$	(2)
7.2	$f(x) = y = \left(\frac{1}{3}\right)^x$ $f^{-1}(x): x = \left(\frac{1}{3}\right)^y$ $y = \log_{\frac{1}{3}} x$	$\checkmark$ swapping/omruil $\checkmark$ equation/vergelyking Answer only: 2/2	(2)
7.3	$Q(0; 1)$ $R(1; 0)$	$\checkmark Q(0; 1)$ $\checkmark R(1; 0)$	(2)
7.4.1	$0 < p(x) \leq 1$ $\therefore x \geq 0$	$\checkmark x \geq 0$	(1)
7.4.2	$\log_{\frac{1}{3}} x < -3$ $\therefore x > 27$	$\checkmark x > 27$	(1)
7.5	$T(27; 1)$ $\therefore TQ = 27; TS = 4$ $\therefore \text{Area } \Delta QTS = \frac{1}{2} \cdot TQ \cdot TS$ $= \frac{1}{2} \times 27 \times 4$ $= 54 \text{ units}^2/\text{eenh}^2$	$\checkmark T(27; 1)$ $\checkmark TQ; TS$ $\checkmark$ subst $\checkmark$ answer/antwoord	(4)
			[12]

QUESTION/VRAAG 8			
8.1	$f(x) = 3x^2 - 2$ $f(x+h) = 3(x+h)^2 - 2$ $= 3x^2 + 6xh + 3h^2 - 2$ $f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ $= \lim_{h \rightarrow 0} \frac{3x^2 + 6xh + 3h^2 - 2 - 3x^2 + 2}{h}$ $= \lim_{h \rightarrow 0} \frac{h(6x + 3h)}{h}$ $= \lim_{h \rightarrow 0} (6x + 3h)$ $= 6x$	$\checkmark f(x+h)$ value/waarde $\checkmark$ subst $\checkmark$ simplification/vereenv $\checkmark$ factors/faktore $\checkmark$ answer/antwoord	(5)
8.2.1	$f(x) = 3x^4 - \frac{1}{2}x^2 + 5$ $f'(x) = 12x^3 - x$	$\checkmark 12x^3$ $\checkmark -x$	(2)
8.2.2	$y = \frac{\sqrt{x}}{2} - \frac{1}{9x^3}$ $= \frac{1}{2}x^{\frac{1}{2}} - \frac{1}{9}x^{-3}$ $\therefore \frac{dy}{dx} = \frac{1}{4}x^{-\frac{1}{2}} + \frac{1}{3}x^{-4}$	$\checkmark \frac{1}{2}x^{\frac{1}{2}}$ $\checkmark \frac{1}{9}x^{-3}$ $\checkmark \frac{1}{4}x^{-\frac{1}{2}}$ $\checkmark +\frac{1}{3}x^{-4}$	(4)
8.2.3	$f(x) = \frac{2x^2 - 3x - 5}{x+1}$ $= \frac{(2x-5)(x+1)}{(x+1)}$ $= 2x - 5$ $\therefore f'(x) = 2$	$\checkmark$ factors/faktore $\checkmark 2x - 5$ $\checkmark f'(x) = 2$	(3)
8.3	$y = -x^2 + 4x \quad \text{and/en} \quad y = \frac{1}{2}x - 4$ $m = -2x + 4 \quad \therefore m_{\perp} = -2$ $\therefore -2 = -2x + 4$ $\therefore x = 3$ $y = -(3)^2 + 4(3) = 3$ $\therefore (3; 3) \quad \text{and/en} \quad m = -2$ $\therefore 3 = -2(3) + c$ $\therefore c = 9$ $\therefore y = -2x + 9$	$\checkmark y' = -2x + 4$ $\checkmark m_{\perp} = -2$ $\checkmark$ eqauting/Vergelyk $\checkmark x = 3$ $\checkmark (3; 3)$ $\checkmark$ subst $\checkmark$ answer/antwoord	(7)
			[21]

QUESTION/VRAAG 9

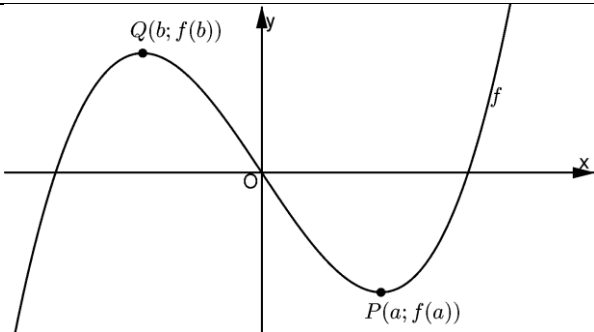
Given/Gegee: $f(x) = -2x^3 + 5x^2 + 4x - 3$



9.1	$f(x) = -2x^3 + 5x^2 + 4x - 3$ $0 = -(2x^3 - 5x^2 - 4x + 3)$ $2x^3 - 5x^2 - 4x + 3 = 0$ $(x + 1)(2x^2 + kx + 3) = 0$ $2x^2 + kx^2 = -5x^2$ $kx^2 = -7x^2$ $(x + 1)(2x^2 - 7x + 3) = 0$ $(x + 1)(x - 3)(2x - 1) = 0$ $x = -1 \text{ or/of } x = 3 \text{ or/of } x = \frac{1}{2}$	✓method to factorise/ faktoriiseer metode ✓✓✓each x -value/ elke x -waarde	(4)
9.2	$f(x) = -2x^3 + 5x^2 + 4x - 3$ $f'(x) = -6x^2 + 10x + 4 = 0$ $3x^2 - 5x - 2 = 0$ $(x - 2)(3x + 1) = 0$ $x = 2 \text{ or/of } x = -\frac{1}{3}$ $f(2) = -2(2)^3 + 5(2)^2 + 4(2) - 3$ $= 9$ $f\left(-\frac{1}{3}\right) = -2\left(-\frac{1}{3}\right)^3 + 5\left(-\frac{1}{3}\right)^2 + 4\left(-\frac{1}{3}\right) - 3$ $= -\frac{100}{27}$ $\therefore B\left(-\frac{1}{3}; -\frac{100}{27}\right) \text{ and/en } E(2; 9)$	✓$f'(x) = 0$ ✓factors/faktore ✓x -values/waardes ✓$B\left(-\frac{1}{3}; -\frac{100}{27}\right)$ ✓$E(2; 9)$	(5)
9.3	$f(x) = -2x^3 + 5x^2 + 4x - 3$ $f'(x) = -6x^2 + 10x + 4$ $f''(x) < 0$ $\therefore -12x + 10 < 0$ $-12x < -10$ $\therefore x > \frac{5}{6}$	✓$f''(x) < 0$ ✓$f''(x) = -12x + 10$ ✓$x > \frac{5}{6}$	(3)

9.4	$x \cdot f'(x) > 0$ $0 < x < 2$ or/of $x < -\frac{1}{3}$	$\checkmark\checkmark 0 < x < 2$ $\checkmark x < -\frac{1}{3}$	(3)
9.5	$2x^3 - 5x^2 - 4x + 3 = k$ $\therefore -f(x) = k$ $f(x) = -k$ $\therefore -\frac{100}{27} < -k < 9$ $\therefore -9 < k < \frac{100}{27}$	$\checkmark f(x) = -k$ $\checkmark$ notation/notasie $\checkmark$ values/waardes	(3)
			[18]

QUESTION/VRAAG 10

10.1	 Q is the maximum t.pt/maksimum dr.pt P is the minimum t.pt/minimum dr.pt	$\checkmark$ Q max/maks $\checkmark$ P minimum	(2)
10.2	$x > a$ $\therefore f(x)$ is increasing/stygend	$\checkmark\checkmark$ increase/stygend	(2)
10.3	$f'(x) = 3px^2 + 2qx + r$ $\therefore (o; r)$	$\checkmark f'(x)$ $\checkmark$ coordinate/koördinaat	(2)
10.4	If $x = b \Rightarrow f'(x) = 0$ $\therefore$ turning point/draaipunt Q	$\checkmark f'(x) = 0$ $\checkmark$ Q t.pt/dr.pt	(2)
10.5	$\left(\frac{a+b}{2}; 0\right)$	$\checkmark\checkmark$ answer	(2)
			[10]
		TOTAL/TOTAAL:	150