



Education and Sport Development

Department of Education and Sport Development
Departement van Onderwys en Sportontwikkeling
Lefapha la Thuto le Tlhabololo ya Metshameko

NORTH WEST PROVINCE

NASIONALE SENIOR SERTIFIKAAT

GRAAD 12

**WISKUNDE V1
SEPTEMBER 2019
NASIENRIGLYNE**

PUNTE: 150

Hierdie nasienriglyne bestaan uit 16 bladsye.

1.2	$x - 4y = 5$ $x = 4y + 5$ $3x^2 - 5xy + 2y^2 = 25$ $3(4y + 5)^2 - 5(4y + 5)y + 2y^2 = 25$ $3(16y^2 + 40y + 25) - 20y^2 - 25y + 2y^2 = 25$ $48y^2 + 120y + 75 - 20y^2 - 25y + 2y^2 - 25 = 0$ $30y^2 + 95y + 50 = 0$ $6y^2 + 19y + 10 = 0$ $(3y + 2)(2y + 5) = 0 \quad \text{OF} \quad y = \frac{-19 \pm \sqrt{(19)^2 - 4(6)(10)}}{2(6)}$ $3y = -2 \quad \text{of} \quad 2y = -5$ $y = -\frac{2}{3} \quad y = -\frac{5}{2}$ $x = \frac{7}{3} \quad x = -5$ <p>OF</p> $x - 4y = 5$ $4y = x - 5$ $y = \frac{x - 5}{4}$ $3x^2 - 5xy + 2y^2 = 25$ $3x^2 - 5x\left(\frac{x - 5}{4}\right) + 2\left(\frac{x - 5}{4}\right)^2 = 25$ $3x^2 - \left(\frac{5x^2 - 25x}{4}\right) + 2\left(\frac{x^2 - 10x + 25}{16}\right) - 25 = 0$ $3x^2 - \left(\frac{5x^2 - 25x}{4}\right) + \left(\frac{x^2 - 10x + 25}{8}\right) - 25 = 0$ $24x^2 - 10x^2 + 50x + x^2 - 10x + 25 - 200 = 0$ $15x^2 + 40x - 175 = 0$ $3x^2 + 8x - 35 = 0$ $(3x - 7)(x + 5) = 0 \quad \text{OF} \quad x = \frac{-8 \pm \sqrt{8^2 - 4(3)(-35)}}{2(3)}$ $x = \frac{7}{3} \quad \text{of} \quad x = -5$ $y = -\frac{2}{3} \quad y = -\frac{5}{2}$	$\checkmark x = 4y + 5$ \checkmark substitusie \checkmark standaardvorm \checkmark faktore/formule \checkmark beide y -waardes \checkmark beide x -waardes (6)
		$\checkmark y = \frac{x - 5}{4}$ \checkmark substitusie \checkmark standaardvorm \checkmark faktore/formule \checkmark beide x -waardes \checkmark beide y -waardes (6)

1.3	$x = \sqrt{12 + \sqrt{12 + \sqrt{12 + \sqrt{12 + \dots}}}}$ $(x)^2 = \left(\sqrt{12 + \sqrt{12 + \sqrt{12 + \sqrt{12 + \dots}}}} \right)^2$ $x^2 = 12 + \sqrt{12 + \sqrt{12 + \sqrt{12 + \dots}}}$ $x^2 = 12 + x$ $x^2 - x - 12 = 0$ $(x - 4)(x + 3) = 0$ $x = 4 \text{ of } x = -3$ <p style="text-align: center;">n.v.t.</p>	<p>✓ substitusie</p> <p>✓ standaardvorm</p> <p>✓ $x = 4$</p> <p>✓ $x = -3$ n.v.t.</p> <p style="text-align: right;">(4) [25]</p>
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VRAAG 2

2.1.1	$T_n = a + (n - 1)d$ $= -11 + (n - 1)(7)$ $= -11 + 7n - 7$ $= 7n - 18$	<p>✓ vervang a en d in T_n: $-11 + (n - 1)(7)$</p> <p>✓ antwoord Slegs antwoord: volpunte</p> <p style="text-align: right;">(2)</p>
2.1.2	$T_n = 7n - 18$ $T_{60} = 7(60) - 18$ $= 402$	<p>✓ vervang $n=60$ in T_n</p> <p>✓ antwoord</p> <p style="text-align: right;">(2)</p>
2.1.3	$S_n = \frac{n}{2}[2a + (n - 1)d]$ $S_{60} = \frac{60}{2}[2(-11) + (60 - 1)(7)]$ $= 11\,730$	<p>✓ substitusie</p> <p>✓ antwoord</p> <p style="text-align: right;">(2)</p>
2.2	$-4 + 3 + 10 + \dots + 486$ $T_n = 7n - 18$ $486 = 7n - 18$ $504 = 7n$ $72 = n$ $\therefore \sum_{n=2}^{72} (7n - 18)$ <p>OF</p>	<p>✓ $486 = 7n - 18$</p> <p>✓ $n = 72$</p> <p>✓✓ $\sum_{n=2}^{72} (7n - 18)$</p> <p style="text-align: right;">(4)</p>

	$-4 + 3 + 10 + \dots + 486$ $T_n = a + (n - 1)d$ $= -4 + (n - 1)(7)$ $= -4 + 7n - 7$ $= 7n - 11$ $486 = 7n - 11$ $497 = 7n$ $71 = n$ $\therefore \sum_{n=1}^{71} (7n - 11)$	$\checkmark T_n = 7n - 11$ $\checkmark 486 = 7n - 11$ $\checkmark n = 71$ $\checkmark \sum_{n=1}^{71} (7n - 11)$ <p style="text-align: right;">(4)</p>															
<p>2.3</p>	$2a = 7$ $a = \frac{7}{2} = 3,5$ $T_2 - T_1 = 3a + b$ $-11 = 3(3,5) + b$ $-\frac{43}{2} = b$ $-21,5 = b$ $n = -\frac{b}{2a} = -\frac{(-21,5)}{2(3,5)} = \frac{43}{14} = 3,07$ <p>Die 3^{de} term is die kleinste</p> <p>OF</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">T_1</td> <td style="text-align: center;">T_2</td> <td style="text-align: center;">T_3</td> <td style="text-align: center;">T_4</td> <td style="text-align: center;">T_5</td> </tr> <tr> <td style="text-align: center;">\</td> <td style="text-align: center;">/</td> <td style="text-align: center;">\</td> <td style="text-align: center;">/</td> <td style="text-align: center;">\</td> </tr> <tr> <td style="text-align: center;">-11</td> <td style="text-align: center;">-4</td> <td style="text-align: center;">3</td> <td style="text-align: center;">10</td> <td></td> </tr> </table> $T_1 - 11 = T_2 \quad T_1 > T_2$ $T_2 - 4 = T_3 \quad T_2 > T_3$ $T_3 + 3 = T_4 \quad T_4 > T_3$ $T_4 + 10 = T_5 \quad T_5 > T_4$ $T_1 > T_2 > T_3 \quad \& \quad T_5 > T_4 > T_3$ $\therefore T_3 \text{ is die kleinste term.}$	T_1	T_2	T_3	T_4	T_5	\	/	\	/	\	-11	-4	3	10		$\checkmark a = \frac{7}{2} = 3,5$ $\checkmark b = -21,5$ $\checkmark n = 3,07$ $\checkmark T_3 < T_4$ $\checkmark \text{ antwoord} \quad (5)$ $\checkmark \text{ bewys } T_1 > T_2$ $\checkmark \text{ bewys } T_2 > T_3$ $\checkmark \text{ bewys } T_4 > T_3$ $\checkmark \text{ bewys } T_5 > T_4$ $\checkmark \text{ antwoord} \quad (5)$ <p style="text-align: right;">[15]</p>
T_1	T_2	T_3	T_4	T_5													
\	/	\	/	\													
-11	-4	3	10														

VRAAG 3

3.1	$r = \frac{T_2}{T_1} = \frac{5(3x+1)^2}{5(3x+1)} = 3x+1$ $-1 < r < 1$ $-1 < 3x+1 < 1$ $-2 < 3x < 0$ $-\frac{2}{3} < x < 0$	$\checkmark r = 3x + 1$ $\checkmark -1 < 3x + 1 < 1$ \checkmark antwoord (3)
3.2	$x = -\frac{1}{6}$ $r = 3\left(-\frac{1}{6}\right) + 1 \quad a = 5\left(3\left(-\frac{1}{6}\right) + 1\right)$ $= \frac{1}{2} \quad = \frac{5}{2}$ $S_\infty = \frac{a}{1-r}$ $= \frac{\frac{5}{2}}{1 - \frac{1}{2}}$ $= 5$	$\checkmark r = \frac{1}{2}$ $\checkmark a = \frac{5}{2}$ \checkmark substitusie \checkmark antwoord (4) [7]

VRAAG 4

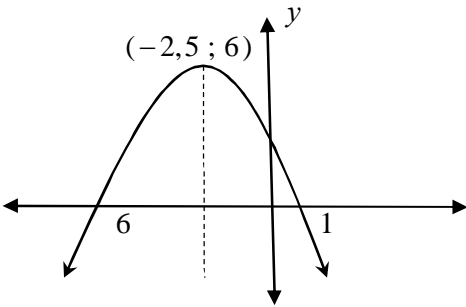
4.1	C(2; -9)	$\checkmark \checkmark$ C(2; -9) (2)
4.2	$y = \frac{1}{2}(x-2)^2 - 9$ $= \frac{1}{2}(0-2)^2 - 9$ $= -7$ $\therefore B(0; -7)$	$\checkmark x = 0$ $\checkmark y = -7$ (2)
4.3	$f(x) = x - 7$	$\checkmark \checkmark x - 7$ (2)

4.4	<p>By die snytpunt van die asimptote, $x = 2$</p> $\therefore y = 2 - 7 = -5$ $\therefore (2; -5)$ $h(x) = \frac{a}{x-2} - 5$ $-7 = \frac{a}{0-2} - 5$ $-2 = \frac{a}{-2}$ $4 = a$ $\therefore h(x) = \frac{4}{x-2} - 5$	<p>✓ $y = -5$</p> <p>✓ $p = -2$</p> <p>✓ $q = -5$</p> <p>✓ substitusie van $B(0; -7)$</p> <p>✓ $a = 4$</p> <p style="text-align: right;">(5)</p>
4.5	$3h(x) - 2 = 3\left(\frac{4}{x-2} - 5\right) - 2$ $= \frac{12}{x-2} - 15 - 2$ $x = 2$ $y = -17$	<p>✓ $x = 2$</p> <p>✓ $y = -17$</p> <p style="text-align: right;">(2)</p>
4.6	$h(x) = \frac{4}{x-2} - 5$ $0 = \frac{4}{x-2} - 5$ $5 = \frac{4}{x-2}$ $5(x-2) = 4$ $5x - 10 = 4$ $5x = 14$ $x = \frac{14}{5} = 2,8$	<p>✓ $y = 0$</p> <p>✓ vereenvoudig</p> <p>✓ antwoord</p> <p style="text-align: right;">(3)</p>
4.7.1	<p>$x \in (-\infty; 2)$ of $(2; 2,8)$</p> <p>OF</p> <p>$x \in (-\infty; 2,8); x \neq 2$</p> <p>OF</p> <p>$x < 2,8; x \neq 2$</p>	<p>✓ $(-\infty; 2)$</p> <p>✓✓ $(2; 2,8)$</p> <p>✓✓ $(-\infty; 2,8)$</p> <p>✓ $x \neq 2$</p> <p>✓✓ $x < 2,8$</p> <p>✓ $x \neq 2$</p> <p style="text-align: right;">(3)</p>

4.7.2	$f^{-1}(x-1): x-1 = y-7$ $\therefore y = x+6$ $f^{-1}(x-1) < 2: x+6 < 2$ $\therefore x < -4$ <p>OF</p> <p>(2, 65) lê op f (65 ; 2) lê op f^{-1} (64 ; 2) lê op $f^{-1}(x-1)$ Omdat $m_f = 1$, $m_{f^{-1}} = 1$ $\therefore f^{-1}$ is 'n stygende funksie $\therefore x < -4$</p>	✓ $f^{-1}(x-1)$ ✓ $y = x+6$ ✓ $x+6 < 2$ ✓ antwoord ✓ (65 ; 2) lê op f^{-1} ✓ (64 ; 2) lê op $f^{-1}(x-1)$ ✓ stygende funksie ✓ antwoord (4)
4.8	$\frac{1}{2}(x-2)^2 - 9 = x-7+k$ $\frac{1}{2}x^2 - 2x - 7 = x-7+k$ $\frac{1}{2}x^2 - 3x - k = 0$ <p>Vir gelyke wortels: $b^2 - 4ac = 0$</p> $(-3)^2 - 4\left(\frac{1}{2}\right)(-k) = 0$ $2k = -9$ $k = -\frac{9}{2}$ <p>\therefore Vir twee ongelyke positiewe wortels: $-4,5 < k < 0$</p> <p>OF</p>	✓ substitusie van $g(x)$ en $f(x)$ ✓ standaard vorm ✓ substitusie in $b^2 - 4ac = 0$ ✓ waarde van k vir gelyke wortels ✓✓ antwoord

	$\frac{1}{2}(x-2)^2 - 9 = x - 7 + k$ $\frac{1}{2}x^2 - 2x - 7 = x - 7 + k$ $\frac{1}{2}x^2 - 3x - k = 0$ <p>Vir gelyke wortels: $b^2 - 4ac = 0$</p> $(-3)^2 - 4\left(\frac{1}{2}\right)(-k) = 0$ $2k = -9$ $k = -\frac{9}{2}$ <p>y-afsnit van $y = x - 7 + k$:</p> $y = 0 - 7 - \frac{9}{2}$ $y = -11,5$ <p>∴ Vir twee ongelyke positiewe wortels:</p> $-11,5 < -7 + k < -7$ $-4,5 < k < 0$ <p>OF</p> $g(x) = \frac{1}{2}(x-2)^2 - 9$ $= \frac{1}{2}(x^2 - 4x + 4) - 9$ $= \frac{1}{2}x^2 - 2x - 7$ $g'(x) = x - 2$ $1 = x - 2$ $3 = x$ $g(3) = \frac{1}{2}(3-2)^2 - 9 \text{ of } g(3) = \frac{1}{2}(3)^2 - 2(3) - 7$ $g(3) = -8\frac{1}{2}$ $y = x + c$ $-8\frac{1}{2} = 3 + c$ $c = -11,5$ <p>Vir twee positiewe wortels:</p> $-11,5 < c < -7$ $-11,5 < k - 7 < -7$ $-4,5 < k < 0$	<p>✓ substitusie van $g(x)$ en $f(x)$</p> <p>✓ standaard vorm</p> <p>✓ substitusie in $b^2 - 4ac = 0$</p> <p>✓ waarde van k vir gelyke wortels</p> <p>✓ $-11,5 < -7 + k < -7$</p> <p>✓ antwoord</p> <p>✓ $\frac{1}{2}x^2 - 2x - 7$</p> <p>✓ $g'(x) =$ gradiënt van $f(x) = 1$</p> <p>✓ $g(3) = -8\frac{1}{2}$</p> <p>✓ $c = -11,5$</p> <p>✓ $-11,5 < c < -7$</p> <p>✓ antwoord (6)</p> <p>[29]</p>
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VRAAG 5

5.1.1	$h(x) = \left(\frac{5}{6}\right)^{-x}$ $= \left(\frac{6}{5}\right)^x$	✓ enige antwoord (1)
5.1.2	$f(x) = \left(\frac{5}{6}\right)^x$ $f^{-1}: x = \left(\frac{5}{6}\right)^y$ $y = \log_{\frac{5}{6}} x \quad x > 0$	✓ $x = \left(\frac{5}{6}\right)^y$ ✓ $y = \log_{\frac{5}{6}} x$ (2)
5.1.3	$x \in (0;1]$ OF $0 < x \leq 1$	✓ kritieke punte ✓ notasie (slegs as waardes korrek) ✓ kritieke punte ✓ notasie (slegs as waardes korrek) (2)
5.2		✓ draaipunt ✓ elke x -afsnit ✓ vorm (4) [9]

VRAAG 6

6.1	$\text{Lening} = \frac{75}{100} \times 2\,000\,000$ $= R\,1\,500\,000$ OF $\frac{25}{100} \times 2\,000\,000$ $= R\,500\,000$ $\text{Lening} = R\,2\,000\,000 - 500\,000$ $= R\,1\,500\,000$	✓ $\frac{75}{100} \times 2\,000\,000$ ✓ antwoord ✓ R 500 000 ✓ antwoord (2)
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<p>6.2</p>	$A = P(1 + i)^n$ $= 1\,500\,000 \left(1 + \frac{0,095}{4}\right)^1$ $= R1\,535\,625$ $P = \frac{x[1 - (1 + i)^{-n}]}{i}$ $1\,500\,000 \left(1 + \frac{0,095}{4}\right)^1 = \frac{58\,000 \left[1 - \left(1 + \frac{0,095}{4}\right)^{-n}\right]}{\frac{0,095}{4}}$ $0,6288119612 = 1 - \left(1 + \frac{0,095}{4}\right)^{-n}$ $\left(1 + \frac{0,095}{4}\right)^{-n} = 0,3711880386$ $\log_{\left(1 + \frac{0,095}{4}\right)}(0,3711880386) = -n$ <p>OF</p> $\frac{\log(0,3711880386)}{\log\left(1 + \frac{0,095}{4}\right)} = -n$ $n = 42,22185853$ <p>∴ 43 kwartaallikse paaiemente</p>	$\checkmark 1\,500\,000 \left(1 + \frac{0,095}{4}\right)^1$ $\checkmark i = \frac{0,095}{4}$ $\checkmark \text{substitusie in die regte formule}$ $\checkmark \text{korrekte gebruik van logs}$ $\checkmark n = 42,22$ $\checkmark \text{antwoord}$ <p style="text-align: right;">(6)</p>
<p>6.3</p>	<p>Uitstaande balans</p> $= P(1 + i)^n - \frac{x[(1 + i)^n - 1]}{i}$ $= 1\,535\,625 \left(1 + \frac{0,095}{4}\right)^{23} - \frac{58\,000 \left[\left(1 + \frac{0,095}{4}\right)^{23} - 1\right]}{\frac{0,095}{4}}$ $= R\,886\,790,15$ <p>OF</p>	$\checkmark n = 23$ $\checkmark 1\,535\,625 \left(1 + \frac{0,095}{4}\right)^{23}$ <p>OF</p> $1\,500\,000 \left(1 + \frac{0,095}{4}\right)^{24}$ \checkmark $\frac{58\,000 \left[\left(1 + \frac{0,095}{4}\right)^{23} - 1\right]}{\frac{0,095}{4}}$ $\checkmark \text{antwoord}$ <p style="text-align: right;">(4)</p>

	Uitstaande tyd = $42,22185853 - 23$ $= 19,22185853$ Uitstaande balans: $P = \frac{x[1 - (1 + i)^{-n}]}{i}$ $= \frac{58\,000 \left[1 - \left(1 + \frac{0,095}{4} \right)^{-19,22185853} \right]}{\frac{0,095}{4}}$ $= R\,886\,790,15$	✓ 23 ✓ $n = 19,22185853$ ✓ substitusie ✓ antwoord (4)
6.4	Rente gehef $= (58\,000 \times 23) - (1\,500\,000 - 886\,790,1491)$ $= R\,720\,790,15$	✓ $58\,000 \times 23$ ✓ ✓ $1\,500\,000 - 886\,790,1491$ ✓ antwoord (4) [16]

VRAAG 7

7.1	$f(x) = -x^2 + 3x - 7$ $f(x + h) = -(x + h)^2 + 3(x + h) - 7$ $= -(x^2 + 2xh + h^2) + 3x + 3h - 7$ $= -x^2 - 2xh - h^2 + 3x + 3h - 7$ $f(x + h) - f(x) = (-x^2 - 2xh - h^2 + 3x + 3h - 7)$ $\quad - (-x^2 + 3x - 7)$ $= -2xh - h^2 + 3h$ $f'(x) = \lim_{h \rightarrow 0} \frac{f(x + h) - f(x)}{h}$ $= \lim_{h \rightarrow 0} \frac{-2xh - h^2 + 3h}{h}$ $= \lim_{h \rightarrow 0} \frac{h(-2x - h + 3)}{h}$ $= \lim_{h \rightarrow 0} (-2x - h + 3)$ $= -2x + 3$ <p>OF</p>	✓ $-(x + h)^2 + 3(x + h) - 7$ ✓ $-x^2 - 2xh - h^2 + 3x + 3h - 7$ ✓ vereenvoudiging ✓ substitusie in formule ✓ faktore ✓ antwoord (6)
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	$f(x) = -x^2 + 3x - 7$ $f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ $= \lim_{h \rightarrow 0} \frac{-(x+h)^2 + 3(x+h) - 7 - (-x^2 + 3x - 7)}{h}$ $= \lim_{h \rightarrow 0} \frac{-(x^2 + 2xh + h^2) + 3x + 3h - 7 + x^2 - 3x + 7}{h}$ $= \lim_{h \rightarrow 0} \frac{-x^2 - 2xh - h^2 + 3x + 3h - 7 + x^2 - 3x + 7}{h}$ $= \lim_{h \rightarrow 0} \frac{-2xh - h^2 + 3h}{h}$ $= \lim_{h \rightarrow 0} \frac{h(-2x - h + 3)}{h}$ $= \lim_{h \rightarrow 0} (-2x - h + 3)$ $= -2x + 3$	<p>✓ $-(x+h)^2 + 3(x+h) - 7$ ✓ substitusie in formule</p> <p>✓ $-x^2 - 2xh - h^2 + 3x + 3h - 7$</p> <p>✓ vereenvoudiging</p> <p>✓ faktore</p> <p>✓ antwoord (6)</p>
<p>7.2</p>	$D_x \left[15\sqrt[5]{x^4} - \frac{3x^7 + x}{4x^3} \right]$ $= D_x \left[15x^{\frac{4}{5}} - \frac{3x^4}{4} - \frac{x^{-2}}{4} \right]$ $= 12x^{-\frac{1}{5}} - 3x^3 + \frac{1}{2}x^{-3}$	<p>✓ $15x^{\frac{4}{5}}$ ✓ $-\frac{3x^4}{4}$</p> <p>✓ $-\frac{x^{-2}}{4}$</p> <p>✓ $12x^{-\frac{1}{5}}$</p> <p>✓ $-3x^3$ ✓ $+\frac{1}{2}x^{-3}$</p> <p>(6) [12]</p>

VRAAG 8

<p>8.1</p>	<p>$x \leq -3$ of $x \geq 2$ Nota: Aanvaar $x < -3$ of $x > 2$. By die stasionêre punte is die grafiek beide stygend en dalend.</p>	<p>✓ $x \leq -3$ ✓ $x \geq 2$ (2)</p>
<p>8.2</p>	<p>$x = -3$</p>	<p>✓ $x = -3$ (1)</p>
<p>8.3</p>	<p>$f'(x) = 1(x+3)(x-2)$ $= x^2 + x - 6$</p>	<p>✓ $(x+3)(x-2)$ ✓ antwoord (2)</p>

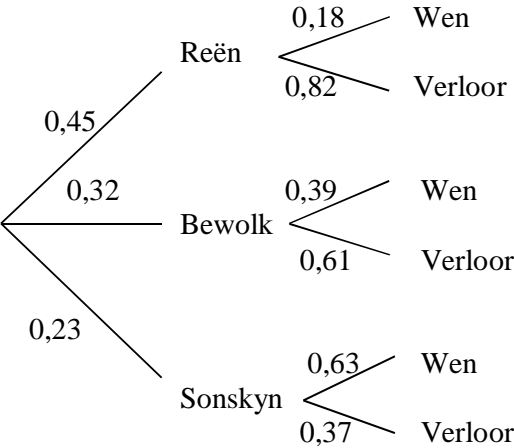
8.4	$f(x) = px^3 + qx^2 + rx + 10$ $f'(x) = 3px^2 + 2qx + r$ $f'(x) = x^2 + x - 6$ $\therefore 3p = 1 \quad 2q = 1 \quad r = -6$ $p = \frac{1}{3} \quad q = \frac{1}{2}$	$\checkmark f'(x) = 3px^2 + 2qx + r$ $\checkmark 3p = 1$ $\checkmark 2q = 1$ $\checkmark r = -6$ <p style="text-align: right;">(4)</p>
8.5	$f(x) = \frac{1}{3}x^3 + \frac{1}{2}x^2 - 6x + 10$ $f'(x) = x^2 + x - 6$ $f''(x) = 2x + 1$ <p>Konkaaf af as $f''(x) < 0$</p> $2x + 1 < 0$ $x < -\frac{1}{2}$ <p>OF</p> $f(x) = \frac{1}{3}x^3 + \frac{1}{2}x^2 - 6x + 10$ $f'(x) = x^2 + x - 6$ $x = \frac{-3+2}{2}$ $x = -\frac{1}{2}$ <p>$f'(x)$ is dalend as $x < -\frac{1}{2}$</p> $\therefore f''(x) < 0 \text{ as } x < -\frac{1}{2}$ $\therefore \text{Konkaaf af: } x < -\frac{1}{2}$	$\checkmark f''(x) = 2x + 1$ $\checkmark f''(x) < 0$ $\checkmark x < -\frac{1}{2}$ $\checkmark x = \frac{-3+2}{2}$ $\checkmark f''(x) < 0$ $\checkmark \text{antwoord}$ <p style="text-align: right;">(3)</p> <p style="text-align: right;">[12]</p>

VRAAG 9

9.1	$AH = 4t$ $HB = 1\,200 - 4t$ $BD = 5t$ $HD^2 = (1\,200 - 4t)^2 + (5t)^2 \quad \text{Pyth}$ $= 1\,440\,000 - 9\,600t + 16t^2 + 25t^2$ $= 41t^2 - 9\,600t + 1\,440\,000$ $HD(t) = \sqrt{41t^2 - 9\,600t + 1\,440\,000}$	$\checkmark HB = 1\,200 - 4t$ $\checkmark BD = 5t$ $\checkmark HD^2 = (1\,200 - 4t)^2 + (5t)^2$ $\checkmark 1\,440\,000 - 9\,600t + 16t^2 + 25t^2$ <p style="text-align: right;">(4)</p>
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<p>9.2</p>	$(HD^2)'(t) = 82t - 9\,600$ $0 = 82t - 9\,600$ $82t = 9\,600$ $t = 117,07 \text{ sekondes}$ <p>∴ na 117,07 sekondes</p> <p>OF</p> <p>Die minimum van HD vind plaas wanneer HD^2 'n minimum is.</p> $\min t = \frac{-(-9\,600)}{2(82)}$ $= 117,07 \text{ sekondes}$	<p>✓ $(HD^2)'(t) = 82t - 9\,600$</p> <p>✓ $(HD^2)'(t) = 0$</p> <p>✓ antwoord</p> <p>✓ min van HD = min HD^2</p> <p>✓ vervang in vergelyking van simmetrie-as</p> <p>✓ antwoord</p> <p style="text-align: right;">(3)</p>
<p>9.3</p>	$HD = \sqrt{41(117,07)^2 - 9\,600(117,07) + 1\,440\,000}$ $= \sqrt{878\,048,7805}$ $= 937,04 \text{ m}$ <p>Nee, die jagter is buite trefafstand.</p>	<p>✓ substitusie</p> <p>✓ antwoord</p> <p>✓ Nee</p> <p style="text-align: right;">(3)</p> <p style="text-align: right;">[10]</p>

VRAAG 10

<p>10.1</p>		<p>✓ eerste uitkoms</p> <p>✓ tweede uitkoms</p> <p style="text-align: right;">(2)</p>
<p>10.2</p>	$P(\text{wen}) = P(\text{RW}) + P(\text{BW}) + P(\text{SW})$ $= (0,45)(0,18) + (0,32)(0,39) + (0,23)(0,63)$ $= 0,3507$ $= 35,07\%$	<p>✓ $P(\text{RW}) = (0,45)(0,18)$</p> <p>✓ $P(\text{BW}) = (0,32)(0,39)$</p> <p>✓ $P(\text{SW}) = (0,23)(0,63)$</p> <p>✓ antwoord</p> <p style="text-align: right;">(4)</p> <p style="text-align: right;">[6]</p>

VRAAG 11

11.1	$9! = 362\,880$	✓ $9!$ OF $362\,880$ (1)
11.2	$8! \times 2! = 80\,640$	✓✓ $8! \times 2!$ OF $80\,640$ (2)
11.3	$\frac{5 \times 7! \times 4}{9!}$ $= \frac{5}{18}$ or 0,28	✓ $5 \times 7! \times 4$ ✓ $9!$ in noemer ✓ antwoord (3)
11.4	<p>Totale aantal maniere wat 9 perde in 4 stalle geplaas kan word $= 9 \times 8 \times 7 \times 6 = 3024$</p> <p>Totale aantal maniere sonder 'n merrie in die plasing $= 4! = 24$</p> <p>Totale aantal maniere met ten minste 1 merrie in die plasing $= 3\,024 - 24$ $= 3\,000$ maniere</p> <p>OF</p> <p>Die totale aantal maniere waar daar ten minste 1 merrie in die plasing is: $= [(5 \times 4 \times 3 \times 2) \times 4] + \left[(5 \times 4 \times 4 \times 3) \times \frac{12}{2} \right] +$ $[(5 \times 4 \times 3 \times 4) \times 4] + [5 \times 4 \times 3 \times 2]$ $= 3\,000$ maniere</p>	<p>✓ 3 024</p> <p>✓ 24</p> <p>✓ 3 000</p> <p>✓ $[(5 \times 4 \times 3 \times 2) \times 4] +$ $\left[(5 \times 4 \times 4 \times 3) \times \frac{12}{2} \right]$ ✓ $[(5 \times 4 \times 3 \times 4) \times 4] +$ $[5 \times 4 \times 3 \times 2]$ ✓ antwoord (3) [9]</p>
		TOTAAL: 150