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Department:
Basic Education
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SENIOR CERTIFICATE/*SENIOR SERTIFIKAAT*
NATIONAL SENIOR CERTIFICATE/
NASIONALE SENIOR SERTIFIKAAT

GRADE 12/*GRAAD 12*

MATHEMATICS P1/*WISKUNDE V1*

NOVEMBER 2020

MARKING GUIDELINES/*NASIENRIGLYNE*

MARKS/*PUNTE*: 150

These guidelines consist of 18 pages.
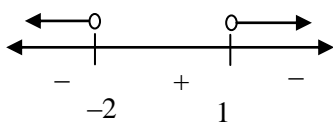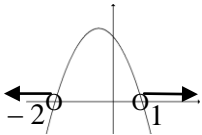*Hierdie nasienriglyne bestaan uit 18 bladsye.*

NOTE:
- If a candidate answers a question TWICE, only mark the FIRST attempt.
- Consistent accuracy applies in all aspects of the marking memorandum.

LET WEL:
- *Indien 'n kandidaat 'n vraag TWEE keer beantwoord, sien slegs die EERSTE poging na.*
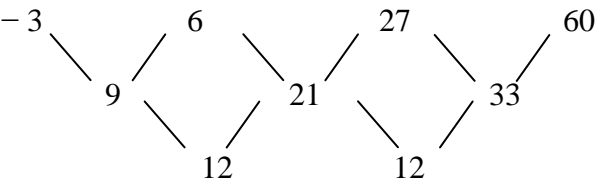- *Volgehoue akkuraatheid is op ALLE aspekte van die nasienriglyne van toepassing.*

REMEMBER: (A) next o the description of a tick implies accuracy mark
ONTHOU: (A) langs die beskrywing van `n regmerk impliseer akkuraatheids-punt
QUESTION/*VRAAG* 1

1.1.1	$x^2 - 6x = 0$ $x(x-6) = 0$ $x = 0$ or $x = 6$	✓ common factor ✓ both answers (2)
1.1.2	$x^2 + 10x + 8 = 0$ $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $= \dfrac{-10 \pm \sqrt{10^2 - 4(1)(8)}}{2(1)}$ $= \dfrac{-10 \pm \sqrt{68}}{2}$ $x = -0{,}88$ or $x = -9{,}12$	✓ substitution into the correct formula ✓ $-0{,}88$ ✓ $-9{,}12$ (3)
1.1.3	$(1-x)(x+2) < 0$ Critical values: $x = 1$ or $x = -2$ or $x < -2$ or $x > 1$	✓ critical values ✓ correct method ✓ answer (3)
1.1.4	$\sqrt{x+18} = x-2$ $x + 18 = x^2 - 4x + 4$ $0 = x^2 - 5x - 14$ $(x-7)(x+2) = 0$ $x = 7$ or $x \neq -2$	✓ squaring both sides (m) ✓ standard form ✓ factors ✓ both answers ✓ rejection of $x = -2$ (5)

1.2	$x + y = 3$	✓ y subject of the formula
	$y = 3 - x$ …….. (1)	
	$2x^2 + 4xy - y = 15$ ……….. (2)	
	Substitute (1) into (2):	✓ substitution
	$2x^2 + 4x(3 - x) - (3 - x) = 15$	
	$2x^2 + 12x - 4x^2 - 3 + x - 15 = 0$	
	$-2x^2 + 13x - 18 = 0$	✓ standard form
	$2x^2 - 13x + 18 = 0$	✓ factors
	$(2x - 9)(x - 2) = 0$	
	$x = \dfrac{9}{2}$ or $x = 2$	✓ x-values
	$y = -\dfrac{3}{2}$ or $y = 1$	✓ y-values
		(6)
	OR	**OR**
	$x + y = 3$	✓ x subject of the formula
	$x = 3 - y$ …….. (1)	
	$2x^2 + 4xy - y = 15$ ……….. (2)	
	Substitute (1) into (2):	✓ substitution
	$2(3 - y)^2 + 4(3 - y)y - y = 15$	
	$2y^2 - 12y + 18 - 4y^2 + 12y - y - 15 = 0$	
	$-2y^2 - y + 3 = 0$	
	$2y^2 + y - 3 = 0$	✓ standard form
	$(2y + 3)(y - 1) = 0$	✓ factors
	$y = -\dfrac{3}{2}$ or $y = 1$	✓ y-values
	$x = \dfrac{9}{2}$ or $x = 2$	✓ x-values
		(6)
1.3	$n^{200} < 5^{300}$	
	$\left(n^2\right)^{100} < \left(5^3\right)^{100}$	✓ $\left(n^2\right)^{100} < \left(5^3\right)^{100}$
	$\left(n^2\right)^{100} < (125)^{100}$	
	$n^2 < 125$	✓ $n^2 < 125$
	Maximum value of n is 11.	✓ 11
		(3)
	OR	**OR**
	$200 \log n < 300 \log 5$	✓ use of logs
	$n < 10^{\frac{3}{2}\log 5}$	
	$n < 11{,}18$	✓ $n < 11{,}18$
	$\therefore n = 11$	✓11
		(3)
	OR	**OR**

$n^{200} < 5^{300}$ $(n^2)^{100} < (5^3)^{100}$ $\sqrt{n^2} < \sqrt{5^3}$ $n < 5^{\frac{3}{2}}$ $n < 11,18$ $\therefore n = 11$ **OR** $n^{200} < 5^{300}$ $n < 5^{\frac{300}{200}}$ $n < 11,18$ $\therefore n = 11$	✓ $(n^2)^{100} < (5^3)^{100}$ ✓ $n < 11,18$ ✓ 11 (3) **OR** ✓ $n < 5^{\frac{300}{200}}$ ✓ $n < 11,18$ ✓ $n = 11$ (3)
	[22]

QUESTION/*VRAAG* 2
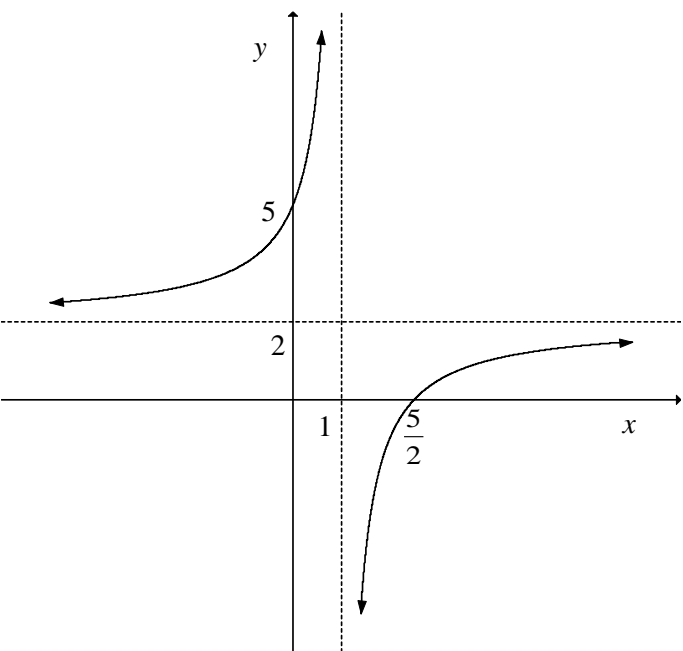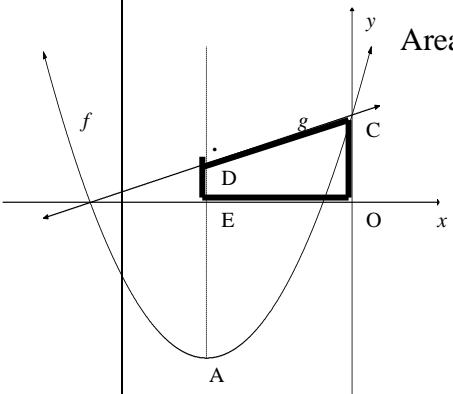
2.1	$7 \; ; \; x \; ; \; y \; ; \; -11 \; ; \; \ldots$ $\qquad a = 7$ $\qquad a + 3d = -11$ $\qquad 7 + 3d = -11$ $\qquad\qquad d = -6$ $\qquad\qquad x = a + d = 7 + (-6) = 1$ $\qquad\qquad y = a + 2d = 7 + 2(-6) = -5$	$\checkmark\ 7 + 3d = -11$ $\checkmark\ d = -6$ $\checkmark$ value of x $\checkmark$ value of y (4)
	OR $\quad a + 3d = -11$ $\qquad 3d = -11 - 7$ $\qquad 3d = -18$ $\qquad\ d = -6$ $\qquad\ x = 1$ $\qquad\ y = -5$	**OR** $\checkmark\ 3d = -11 - 7$ $\checkmark\ d = -6$ $\checkmark\ x = 1$ $\checkmark\ y = -5$ (4)
	OR $x - 7 = y - x \qquad$ and $\qquad y - x = -11 - y$ $2x - 7 = y \ \ldots.(1) \qquad\qquad 2y = -11 + x \ldots(2)$ $(1)\,\text{into}\,(2)$ $2(2x - 7) = -11 + x$ $4x - 14 = -11 + x$ $3x = 3$ $x = 1$ $y = 2(1) - 7 = -5$	**OR** $\checkmark$ 2 equations $\checkmark$ substitution $\checkmark$ value of x $\checkmark$ value of y (4)
2.2.1	$-3 \; ; \; 6 \; ; \; 27 \; ; \; 60 \; ; \; \ldots$ $\qquad 2a = 12$ $\qquad\ a = 6$ $\quad 3a + b = 9$ $\quad 3(6) + b = 9$ $\qquad\qquad b = -9$ $\ a + b + c = -3$ $\ 6 - 9 + c = -3$ $\qquad\qquad c = 0$ $\qquad T_n = 6n^2 - 9n$	$\checkmark$ second difference $\checkmark\ a = 6$ $\checkmark\ b = -9$ $\checkmark\ c = 0 \qquad$ (4)
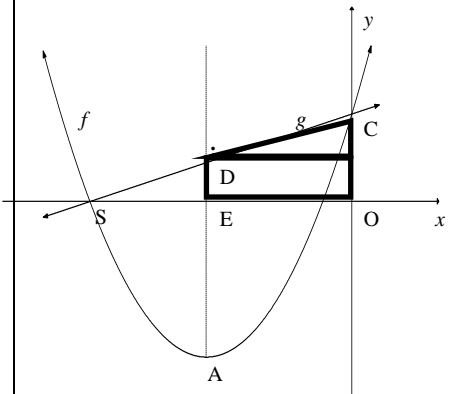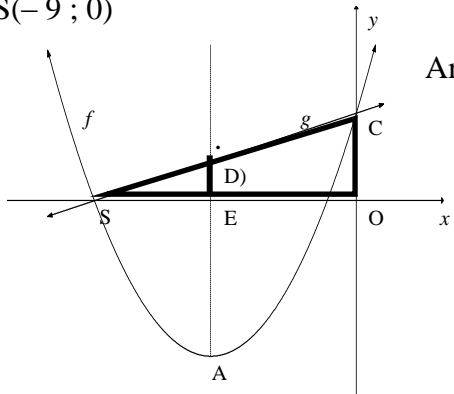
2.2.2	$T_{50} = 6(50)^2 - 9(50)$ $= 14\,550$	**Answer Only: Full Marks**	✓ substitute 50 ✓ answer (2)
2.2.3	$9\,;\,21\,;\,33\,;\,\ldots$ $a = 9$ $d = 12$ $S_n = \dfrac{n}{2}\big[2a + (n-1)d\big]$ $S_n = \dfrac{n}{2}\big[2(9) + (n-1)(12)\big]$ $= \dfrac{n}{2}\big[18 + 12n - 12\big]$ $= \dfrac{n}{2}\big[12n + 6\big]$ $= 6n^2 + 3n$		✓ a and d ✓ substitution into the correct formula ✓ $\dfrac{n}{2}\big[12n + 6\big]$ (3)
2.2.4	$-3 + S_n = 21060$ $\qquad S_n = 21063$ $6n^2 + 3n = 21063$ $6n^2 + 3n - 21063 = 0$ $2n^2 + n - 7021 = 0$ $n = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $n = \dfrac{-1 \pm \sqrt{(1)^2 - 4(1)(-7021)}}{2(2)}$ $n = 59 \ or \ n \neq \dfrac{-119}{2}$ $\therefore \ n = 59$ **OR** $T_n = 21060$ $6n^2 - 9n - 21060 = 0$ $2n^2 - 3n - 7020 = 0$ $n = 60$ $\therefore 59$ first differences must be added.		✓ $-3 + S_n = 21060$ ✓ equation ✓ standard form ✓ answer (4) ✓ equation ✓ standard form ✓✓ answer (4)
			[17]

QUESTION/*VRAAG* 3

3.1	$\sum\limits_{k=1}^{\infty} 4.3^{2-k} = 12 + 4 + \dfrac{4}{3} + ...$ $r = \dfrac{4}{12} = \dfrac{1}{3}$ $-1 < \dfrac{1}{3} < 1$ $\therefore$ series is convergent $(-1 < r < 1)$	✓ $12 + 4 + \dfrac{4}{3} + ..$ or $36\left(\dfrac{1}{3}\right)^{k}$ ✓ value of r ✓ $-1 < r < 1$ (3)
3.2	$\sum\limits_{k=p}^{\infty} 4.3^{2-k} = 4.3^{2-p} + 4.3^{1-p} + 4.3^{-p} + ...$ $a = 4.3^{2-p}$ $r = \dfrac{1}{3}$ $S_{\infty} = \dfrac{a}{1-r}$ $\dfrac{2}{9} = \dfrac{4.3^{2-p}}{1 - \dfrac{1}{3}}$ $4.3^{2-p} = \dfrac{4}{27}$ $3^{2-p} = 3^{-3}$ $2 - p = -3$ $p = 5$	✓ expression for a ✓ substitution of a, r and S_{∞} ✓ simplification $\left(4.3^{2-p} = \dfrac{4}{27}\right)$ ✓ $3^{2-p} = 3^{-3}$ ✓ answer (5)
		[8]

QUESTION/*VRAAG* 4

4.1.1	$x = 1$ $y = 2$	✓ $x = 1$ ✓ $y = 2$ (2)
4.1.2	$y = mx + c$ $\quad\quad$ $y - y_1 = m(x - x_1)$ $\quad\quad$ $y = -(x - p) + q$ $2 = -1 + c$ **or** $\quad$ $y - 2 = -1(x - 1)$ **or** $\quad$ $= -(x - 1) + 2$ $c = 3$ $\quad\quad\quad\quad$ $y - 2 = -x + 1$ $\quad\quad\quad$ $y = -x + 3$ $y = -x + 3$ $\quad\quad\quad$ $y = -x + 3$	✓ substitution of $m = -1$ and $(1 ; 2)$ ✓ answer (2)
4.1.3		✓ vertical asymptote: $x = 1$ and horizontal asymptote: $y = 2$ ✓ x-intercept: $\frac{5}{2}$ ✓ y-intercept: 5 ✓ shape (A) (4)
4.2.1	$(-5 ; -8)$	✓ $x = -5$ ✓ $y = -8$ (2)
4.2.2	$y \geq -8$ **or** $\left[-8;\infty\right)$	✓ answer (1)
4.2.3	$m = -5$ $n = g(-5)$ $\quad = \frac{1}{2}(-5) + \frac{9}{2}$ $\quad = 2$	✓ $m = -5$ ✓ substitution ✓ $n = 2$ (3)
4.2.4		
	Area trapezium $= \frac{1}{2}(DE + OC) \times OE$ $\quad\quad\quad\quad\quad = \frac{1}{2}(2 + 4{,}5) \times 5$ $\quad\quad\quad\quad\quad = \frac{65}{4}$ or 16,25 **OR**	✓ method ✓ correct substitution ✓ answer (3) **OR**

$$\text{Area } \Delta = \frac{1}{2}b.h$$
$$= \frac{1}{2}(5)\left(\frac{5}{2}\right)$$
$$= \frac{25}{4}$$
$$\text{Area rect} = b.h$$
$$= (5)(2)$$
$$= 10$$

✓ method

✓ correct substitution
✓ answer   (3)

Area trapezium = $\frac{25}{4}$ + 10 = $\frac{65}{4}$ or 16,25

OR

OR
S(− 9 ; 0)

$$\text{Area } \Delta \text{ SOC} = \frac{1}{2}b.h$$
$$= \frac{1}{2}(9)\left(\frac{9}{2}\right)$$
$$= \frac{81}{4}$$

Area Δ SED = $\frac{1}{2}b.h = \frac{1}{2}(4)(2) = 4$

Area trapezium = area Δ SOC − Area Δ SED

$$= \frac{81}{4} - 4$$
$$= \frac{65}{4} \text{ or } 16,25$$

✓ method

✓ correct substitution

✓ answer   (3)

4.2.5	g^{-1}: $x = \frac{1}{2}y + \frac{9}{2}$ g^{-1}: $y = 2x - 9$	✓ changing x and y ✓ answer (2)

4.2.6	$f(x) = \frac{1}{2}(x+5)^2 - 8$	
	$f(x) = \frac{1}{2}(x^2 + 10x + 25) - 8$	
	$f(x) = \frac{1}{2}x^2 + 5x + 4{,}5$	
	$f'(x) = x + 5$	✓ $f'(x)$
	$h(x) = 2x - 9 + k$	
	$x + 5 = 2$	✓ $x + 5 = 2$
	$x = -3 \quad y = -6$	
	$(-3 ; -6)$	✓ $x = -3$ ✓ $y = -6$
		(4)
	OR	**OR**
	$f(x) = h(x)$	
	$\frac{1}{2}(x+5)^2 - 8 = 2x - 9 + k$	✓ equating
	$\frac{1}{2}x^2 + 3x + \frac{27}{2} - k = 0$	
	$x = \dfrac{-3}{2\left(\frac{1}{2}\right)} = -3 \qquad b^2 - 4ac = 0$	✓ turning point / $\triangle = 0$
	$y = -6$	
	$(-3 ; -6)$	✓ $x = -3$ ✓ $y = -6$ (4)
		[23]

QUESTION/*VRAAG* 5

5.1	A(0 ; 1)	✓ answer (1)
5.2	$9 = 3^{-x}$ $3^2 = 3^{-x}$ $x = -2$ B(-2 ; 9)	✓ equating ✓ $3^2 = 3^{-x}$ ✓ $x = -2$ (3)
5.3	$x \in (0;\infty)$ or $x > 0$	✓✓answer (2)
5.4	$h(x) = 27.3^{-x}$ $h(x) = 3^{-(x-3)}$ f shifted 3 units to the right	✓ $h(x) = 3^{-(x-3)}$ ✓3 units ✓ right (3)
5.5	$\dfrac{27}{3^x} < 1$ $3^{-x+3} < 1$ $3^x > 27$ **or** $3^{-x+3} < 3^0$ $3^x > 3^3$ $-x + 3 < 0$ $x > 3$ $x > 3$ **OR** The graph shifts 3 units to the right Thus the *y*-intercept shift 3 units to the right (3 ; 1) $\therefore x > 3$	✓ $3^x > 27$ **or** $3^{-x+3} < 3^0$ ✓ $3^x > 3^3$ **or** $-x + 3 < 0$ ✓ $x > 3$ (3) **OR** ✓ translation ✓ *y*-intercept ✓answer (3)
		[12]

QUESTION/*VRAAG* 6

6.1.1	$F = \dfrac{x\left[(1+i)^n - 1\right]}{i}$ $= \dfrac{1\,000\left[\left(1+\dfrac{0,075}{12}\right)^{145} - 1\right]}{\dfrac{0,075}{12}}$ $= R234\,888,53$	✓ $n = 145$ ✓ $i = \dfrac{0,075}{12}$ ✓ substitution into the correct formula ✓ answer (4)
6.1.2	$A = P(1+i)^n$ $= 234\,888,53\left(1+\dfrac{0,075}{12}\right)^{12}$ $= R253\,123,54$	✓ substitution into the correct formula ✓ answer (2)
6.2	$A = P(1-i)^n$ $92\,537,64 = 250\,000(1-0,22)^n$ $0,37015056 = (0,78)^n$ $n = \dfrac{\log 0,37015056}{\log 0,78}$ $n = 4$ years	✓ substitution into the correct formula ✓ correct use of logs ✓ answer (3)
6.3.1	Loan amount: $= \dfrac{x[1-(1+i)^{-n}]}{i}$ $= \dfrac{1500\left[1-\left(1+\dfrac{0,113}{12}\right)^{-72}\right]}{\dfrac{0,113}{12}}$ $= R78\,173,49323$	✓ 72 ✓ substitution into the correct formula ✓ answer (3)
6.3.2	Balance after 5 years: $P = \dfrac{x\left[1-(1+i)^{-n}\right]}{i}$ $= \dfrac{1\,500\left[1-\left(1+\dfrac{0,113}{12}\right)^{-12}\right]}{\dfrac{0,113}{12}}$ $= R16\,945,00629$ Amount paid: $R1\,500 \times 60 = R90\,000$ Interest $=$ Amount paid $-$ [Loan $-$ Balance] $= R90\,000 - [\,R78\,173,49323 - R16\,945,00629\,]$ $= R28\,771,51$	✓ substitution (A) ✓ R16 945,00629 (A) ✓ R90 000 $-$ [Loan $-$ Balance] ✓ answer (4)

	OR Balance $= 78\,173,49\left(1+\dfrac{0,133}{12}\right)^{60} - \dfrac{1\,500\left(\left(1+\dfrac{0,113}{12}\right)^{60}-1\right)}{\dfrac{0,113}{12}}$ Balance = R16 945.00 Amount paid: R1 $500 \times 60 = $ R90 000 Interest = Amount paid – [Loan – Balance] = R90 000 – [R78 173,49323 – R16 945,00629] = R28 771,51	**OR** ✓ substitution ✓ R16 945,00629 ✓ R90 000 – [Loan – Balance] ✓ answer (4)
		[16]

QUESTION/*VRAAG* 7
Penalty of – 1 for notation only in 7.1

7.1	$f(x) = 2x^2 - 1$ $f(x+h) = 2(x+h)^2 - 1$ $\qquad = 2(x^2 + 2xh + h^2) - 1$ $\qquad = 2x^2 + 4xh + 2h^2 - 1$ $f(x+h) - f(x) = 2x^2 + 4xh + 2h^2 - 1 - (2x^2 - 1)$ $\qquad = 2x^2 + 4xh + 2h^2 - 1 - 2x^2 + 1$ $\qquad = 4xh + 2h^2$ $f'(x) = \lim_{h \to 0} \dfrac{f(x+h) - f(x)}{h}$ $\qquad = \lim_{h \to 0} \dfrac{4xh + 2h^2}{h}$ $\qquad = \lim_{h \to 0} \dfrac{h(4x + 2h)}{h}$ $\qquad = \lim_{h \to 0} (4x + 2h)$ $\qquad = 4x$	✓ $2x^2 + 4xh + 2h^2 - 1$ ✓ $4xh + 2h^2$ ✓ substitution ✓ simplification ✓ answer (5)
7.2.1	$\dfrac{d}{dx}\left(\sqrt[5]{x^2} + x^3\right)$ $= \dfrac{d}{dx}\left(x^{\frac{2}{5}} + x^3\right)$ $\dfrac{dy}{dx} = \dfrac{2}{5}x^{-\frac{3}{5}} + 3x^2$	✓ $x^{\frac{2}{5}}$ ✓ $\dfrac{2}{5}x^{-\frac{3}{5}}$ ✓ $3x^2$ (3)
7.2.2	$f(x) = \dfrac{4x^2 - 9}{4x + 6}$ $\quad = \dfrac{(2x-3)(2x+3)}{2(2x+3)}$ $\quad = \dfrac{2x-3}{2}$ $\quad = x - \dfrac{3}{2}$ $f'(x) = 1$	✓ $(2x-3)(2x+3)$ ✓ $2(2x+3)$ ✓ simplification to two separate terms ✓ answer (4)
		[12]

QUESTION/*VRAAG* 8

8.1	$-1 < x < 2$		$\checkmark\checkmark$ answer (2)
8.2	$x = \dfrac{-1+2}{2}$ $x = \dfrac{1}{2}$	**Answer Only: Full Marks**	$\checkmark$ method $\checkmark$ answer (2)
8.3	From the graph $x > \dfrac{1}{2}$	**Answer Only: Full Marks**	$\checkmark\checkmark$ answer (2)
8.4	$g(x) = ax^3 + bx^2 + cx$ $g'(x) = 3ax^2 + 2bx + c = -6x^2 + 6x + 12$ $3a = -6. \qquad 2b = 6 \qquad c = 12$ $\ \ a = -2 \qquad b = 3$ $g(x) = -2x^3 + 3x^2 + 12x$		$\checkmark$ $g'(x) = 3ax^2 + 2bx + c$ $\checkmark$ $a = -2$ $\checkmark$ $b = 3$ $\checkmark$ $g(x) = -2x^3 + 3x^2 + 12x$ (4)
8.5	$g'\left(\dfrac{1}{2}\right) = -6\left(\dfrac{1}{2}\right)^2 + 6\left(\dfrac{1}{2}\right) + 12$ $\qquad m = \dfrac{27}{2} \quad$ or $\ 13,5$ $y = -2\left(\dfrac{1}{2}\right)^3 + 3\left(\dfrac{1}{2}\right)^2 + 12\left(\dfrac{1}{2}\right)$ $\ \ y = \dfrac{13}{2} \quad$ or $\quad 6,5$ $y - y_1 = m(x - x_1)$ $y - 6,5 = 13,5(x - 0,5)$ $y = 13,5x - 0,25$		$\checkmark$ max gradient at $x = \dfrac{1}{2}$ $\checkmark$ answer $\checkmark$ y value $\checkmark$ substitution $\checkmark$ answer (5)
			[15]

QUESTION/*VRAAG* 9

9.1	Total surface area $= 2\ell w + 2wh + 2\ell h$ but: $\ell = 3w$ Total surface area $= 6w^2 + 2wh + 6wh$ $\begin{aligned} C &= 15(6w^2) + 6(2wh + 6wh) \\ &= 15(6w^2) + 6(8wh) \\ &= 90w^2 + 48wh \end{aligned}$	✓ $2\ell w + 2wh + 2\ell h$ ✓ $\ell = 3w$ ✓ $15(6w^2)$ ✓ $6(2wh + 6wh)$ (4)
9.2	$5 = 3w^2 h$ $h = \dfrac{5}{3w^2}$ $C = 90w^2 + 48wh$ $C(w) = 90w^2 + 48w\left(\dfrac{5}{3w^2}\right)$ $= 90w^2 + 80w^{-1}$ $C'(w) = 180w - 80w^{-2}$ $180w - 80w^{-2} = 0$ $180w^3 - 80 = 0$ $w^3 = \dfrac{80}{180}$ $w = \sqrt[3]{\dfrac{80}{180}}$ $w = 0{,}76$	✓ $h = \dfrac{5}{3w^2}$ ✓ substitution ✓ $C(w) = 90w^2 + 80w^{-1}$ ✓ derivative ✓ equating derivative to zero ✓ value of w (6)
		[10]

QUESTION/*VRAAG* 10

10.1	10^{10} or 10 000 000 000	✓✓ answer (2)

10.2.1	$\underline{8} \times \underline{10} \times \underline{10}$ × $\underline{8} \times \underline{8} \times \underline{10}$ × $\underline{2} \times \underline{10} \times \underline{10} \times \underline{10}$
	  Area exchange number
	
	No. of valid 10-digit numbers
	$= (8 \times 10 \times 10) \times (8 \times 8 \times 10) \times (2 \times 10 \times 10 \times 10)$
	$= 1,024 \times 10^9$
		✓ $\underline{8} \times \underline{10} \times \underline{10}$
		      or
		  $\underline{8} \times \underline{8} \times \underline{10}$
		
		✓ $\underline{2} \times \underline{10} \times \underline{10} \times \underline{10}$
		
		✓ $1,024 \times 10^9$ (A) (3)

10.2.2	Probability $= \dfrac{1,024 \times 10^9}{10^{10}}$ $= \dfrac{64}{625} = 0,1024 = 10,24\%$	✓ $\dfrac{1,024 \times 10^9}{10^{10}}$ ✓ answer (2)
		[7]

QUESTION/*VRAAG* 11

11		
11.1	P (Bull's eye first shot and second shot) $= 0,5 \times 0,5$ $= 0,25$ or $\dfrac{1}{4}$	✓two 0,5's ✓ $0,5 \times 0,5$ (2)

11.2	P (Bull's eye at least twice in 3 shots) $= (0,5 \times 0,5 \times 0,5) + (0,5 \times 0,5 \times 0,5) + (0,5 \times 0,5 \times 0,5) +$ $\quad (0,5 \times 0,5 \times 0,5)$ $= 0,125 + 0,125 + 0,125 + 0,125$ $= 0,5 \quad$ or $\quad \dfrac{1}{2}$	✓ $0,5 \times 0,5 \times 0,5$ ✓four events ✓ answer (A) (3)
11.3	Person shoots first: $(0,5) + (0,5)^3 + (0,5)^5 + ...$ $P = \dfrac{a}{1-r}$ $P = \dfrac{0,5}{1-0,25}$ $P = \dfrac{2}{3} = 0,67$	✓ $(0,5) + (0,5)^3$ ✓ $..._{...} + (0,5)^5 + ...$ ✓ $P = \dfrac{0,5}{1-0,25}$ (3)
		[8]

TOTAL/*TOTAAL*: 150