

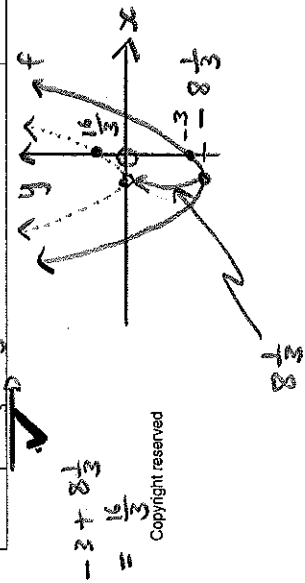
Gr 12 Sept 2015
Paper 1 Selms

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 applies in ALL aspects of the memorandum. Polgehoue akkuraetheid 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 deurgekreuk het en nie die vraag weer beantwoord het nie, merk die poging wat deurgekreuk 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/VRAG 1

1.1.1	$(x+3)(3x-1) = m$ $(x+3)(3x-1) = 0$ $x = -3$ or/of $x = \frac{1}{3}$ If a candidate removes brackets and factorised incorrectly, maximum 1 mark if both x-values are correct/ As kandidaat hakies verwyder en verkeerd faktoriseer, maksimum 1 punt indien beide x-waardes korrek is.	✓ x-values/waardes
1.1.2	$(x+3)(3x-1) = m$ $(x+3)(3x-1) = 6$ $3x^2 - x + 9x - 3 = 6$ $3x^2 + 8x - 9 = 0$ $x = \frac{-8 \pm \sqrt{(8)^2 - 4(3)(-9)}}{2(3)}$ $x = \frac{-8 \pm \sqrt{72}}{6}$ $x = 0,85$ or/of $x = -3,52$ If stopped at $\frac{-8 \pm \sqrt{72}}{6}$: max 3 marks As stop by $\frac{-8 \pm \sqrt{72}}{6}$: maks 3 punte	✓ simplification/vereenvoudiging ✓ standard form/standaardvorm ✓ substitution/substitusie ✓ x-values/waardes
1.1.3 (a)	The graph should be shifted $8\frac{1}{2}$ units upwards / Die grafiek moet $8\frac{1}{2}$ eenhede opwaarts geskuif word.	✓ $8\frac{1}{2}$ ✓ upwards/opwaarts
(b)	$k > 8\frac{1}{2}$	✓ answer/aanwoord



1.2	$x - 2y = 3$ $x = 2y + 3$ $4x^2 - 5xy = 3 - 6y$ $4(2y+3)^2 - 5y(2y+3) = 3 - 6y$ $4(4y^2 + 12y + 9) - 10y^2 - 15y = 3 - 6y$ $16y^2 + 48y + 36 - 10y^2 - 15y = 3 - 6y$ $6y^2 + 33y + 33 = 0$ $2y^2 + 11y + 11 = 0$ $(2y+11)(y+1) = 0$ $y = -\frac{11}{2}$ or/of $y = -1$ $x = -8$ or/of $x = 1$	$\checkmark x = 2y + 3$ \checkmark substitution/substitusie \checkmark standard form/standaardvorm \checkmark factors/faktore \checkmark y-values/waardes \checkmark x-values/waardes
OR/OF	If a candidate makes a mistake and both equations become linear, max. 3 marks. Indien 'n kandidaat 'n fout begaan en beide vergelykings word lineêr, maks. 3 punte. $x - 2y = 3$ $-2y = 3 - x$ $2y = x - 3$ $y = \frac{x-3}{2}$ $4x^2 - 5x(\frac{x-3}{2}) = 3 - 6(\frac{x-3}{2})$ $8x^2 - 5x(x-3) = 6 - 6(x-3)$ $8x^2 - 5x^2 + 15x = 6 - 6x + 18$ $3x^2 + 21x - 24 = 0$ $x^2 + 7x - 8 = 0$ $(x+8)(x-1) = 0$ $x = -8$ or/of $x = 1$ $y = -\frac{11}{2}$ or/of $y = -1$	$\checkmark y = \frac{x-3}{2}$ \checkmark substitution/substitusie \checkmark standard form/standaardvorm \checkmark factors/faktore \checkmark x-values/waardes \checkmark y-values/waardes
1.3	$(3^x - 1)(3^x - 12) = 0$ $3^x - 1 = 0$ or/of $3^x - 12 = 0$ $3^x = 1$ or/of $3^x = 12$ $x = 0$ or/of $\log_3 3 = \log_3 12$ $x \log_3 3 = \log_3 12$ $x = \frac{\log_3 12}{\log_3 3}$ $x = 2,26$	$\checkmark 3^x = 1$ or/of $3^x = 12$ $\checkmark x = 0$ \checkmark use of logs/gebruik van logs $\checkmark x = 2,26$

<p>1.4</p> $-n^2 + 14n + 15 \geq 0$ $n^2 - 14n - 15 \leq 0$ $(n - 15)(n + 1) \leq 0$ $-1 \leq n \leq 15$ <p>OR/OR</p> $n \in [-1; 15]$ <p>OR/OR</p> 	<p>✓ factors/faktore.</p> <p>✓ critical values/kritieke waardes</p> <p>✓ solution/oplossing</p> <p>✓ factors/faktore</p> <p>✓ substitution/substitusie</p> <p>✓ answer/antwoord</p> <p>(3)</p>
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<p>2.1.1</p> $14; 9; 4; \dots$ $T_n = a + (n - 1)d$ $14 + (49)(-5)$ $= -231$	<p>✓ $d = -5$</p> <p>✓ substitution/substitusie</p> <p>✓ answer/antwoord</p> <p>(3)</p>
<p>2.1.2</p> $S_{50} = \frac{50}{2} [2(14) + (49)(-5)]$ $= -5425$ <p>OR/OR</p> <p>If a candidate expands series but gives incorrect answer: 0 marks/ Indien 'n kandidaat reeks uitbrei, maar gee verkeerde antwoord: 0 punte</p> $S_{50} = \frac{50}{2} [14 - 231]$ $= -5425$	<p>✓ substitution/substitusie</p> <p>✓ answer/antwoord</p> <p>(2)</p>
<p>2.2</p> $T_2 - T_1 = T_3 - T_2$ $p - (-24) = p^2 - p$ $p^2 - 2p - 24 = 0$ $(p - 6)(p + 4) = 0$ $p = 6 \text{ or/of } p = -4$	<p>✓ $T_2 - T_1 = T_3 - T_2$</p> <p>✓ standard form/standaardvorm</p> <p>✓ factors/faktore</p> <p>✓ answers/antwoorde</p> <p>(4)</p>
<p>2.3.1</p> $r = \frac{m}{3}$ $-1 < r < 1$ $-1 < \frac{m}{3} < 1$ $-3 < m < 3$	<p>✓ r</p> <p>✓ $-1 < r < 1$</p> <p>✓ answer/antwoord</p> <p>(3)</p>
<p>2.3.2</p> $S_{\infty} = \frac{a}{1-r}$ $\frac{3}{1-\frac{m}{3}} = \frac{27}{7}$ $27 - 9m = 21$ $-9m = -6$ $m = \frac{2}{3} \text{ or/of } \frac{2}{3}$ <p>OR/OR</p> $\frac{3}{1-\frac{m}{3}} = \frac{27}{7}$ $\frac{3}{\frac{3-m}{3}} = \frac{27}{7}$ $\frac{9}{3-m} = \frac{27}{7}$ $27(3-m) = 63$ $81 - 27m = 63$ $-27m = -18$ $m = \frac{18}{27} \text{ or/of } \frac{2}{3}$	<p>Wrong formula/verkeerde formule 0 marks/punte</p> <p>✓ substitution/substitusie</p> <p>✓ simplification/vereenvoudiging</p> <p>✓ answer/antwoord</p> <p>✓ substitution/substitusie</p> <p>✓ simplification/vereenvoudiging</p> <p>✓ answer/antwoord</p> <p>(3)</p>

2.4

$S_3 = 31\frac{1}{2}$ $T_4 + T_5 + T_6 = 3\frac{15}{16}$
 $a + ar + ar^2 = 31\frac{1}{2}$
 $ar^3 + ar^4 + ar^5 = 3\frac{15}{16}$
 $r^3(\alpha + ar + ar^2) = 3\frac{15}{16}$
 $r^3(31\frac{1}{2}) = 3\frac{15}{16}$
 $r^3 = \frac{1}{8}$
 $r = \frac{1}{2}$

✓ $a + ar + ar^2 = 31\frac{1}{2}$
 ✓ $ar^3 + ar^4 + ar^5 = 3\frac{15}{16}$
 ✓ common factor/gemene factor
 ✓ substituaion/substitusie
 ✓ answer/antwoord (5) [20]

Answer ONLY: 1 mark
 SLEGS antwoord: 1 punt

3.2

$T_{20} = \frac{2}{2}(19)^2 + \frac{3}{2}(19) + 6 = 576$
 Fifth term in Row 20/Vyde term in Ry 20:
 $576 + 9 = 585$
 OR/OR
 If $n = 20$, answer = 645; 1 mark
 As $n = 20$, antwoord = 645; 1 punt

✓ $n = 19; T_n = \frac{3}{2}n^2 + \frac{3}{2}n + 6$
 ✓ method/metode
 ✓ answer/antwoord

Sub $n = 20$
 $\rightarrow 636$
 $+ 9$
 $\underline{\quad}$
 645 ✓
 1 mark

Ry 1	3								
Ry 2	6	9							
Ry 3	12	15	18						
Ry 4	21	24	27	30					
Ry 5	33	36	39	42	45				
Ry 6	48	51	54	57	60	63			
Ry 7	66	69	72	75	78	81	84		

Terms in 5th column/terme in 5^{de} kolom
 45; 60; 75; ...

$T_n = \frac{3}{2}n^2 + 10\frac{1}{2}n + 33$
 $T_{16} = \frac{3}{2}(16)^2 + 10\frac{1}{2}(16) + 33 = 585$

✓ method/metode
 ✓ $n = 16; T_n = \frac{3}{2}n^2 + 10\frac{1}{2}n + 33$
 ✓ answer/antwoord (3) [7]

Sub $n = 20$
 $\rightarrow 843$ ✓
 2 marks

QUESTION 3/VRAAG 3

3.1

$9; 15; 24; 36 \dots$
 $2a = 3$
 $\therefore a = \frac{3}{2}$
 $3a + b = 6$
 $3(\frac{3}{2}) + b = 6$
 $\therefore b = \frac{3}{2}$
 $a + b + c = 9$
 $\frac{3}{2} + \frac{3}{2} + c = 9$
 $\therefore c = 6$
 $T_n = \frac{3}{2}n^2 + \frac{3}{2}n + 6$

OR/OR

$T_n = an^2 + bn + c$
 $9a + 3b + c = 24 \dots (1)$
 $4a + 2b + c = 15 \dots (2)$
 $a + b + c = 9 \dots (3)$
 $(1) - (2) \dots 5a + b = 9$
 $(2) - (3) \dots 3a + b = 6$
 $2a = 3$
 $\therefore a = \frac{3}{2}$
 $3(\frac{3}{2}) + b = 6$
 $\therefore b = \frac{3}{2}$
 $\frac{3}{2} + \frac{3}{2} + c = 9$
 $\therefore c = 6$
 $T_n = \frac{3}{2}n^2 + \frac{3}{2}n + 6$

✓ common 2nd difference/gemene tweede verski
 ✓ a-value/waarde
 ✓ b-value/waarde
 ✓ c-value/waarde
 ✓ method/metode
 ✓ a-value/waarde
 ✓ b-value/waarde
 ✓ c-value/waarde (4)

Answer ONLY: 4 marks
 SLEGS antwoord: 4 punte

QUESTION 3/VRAAG 3

3.1

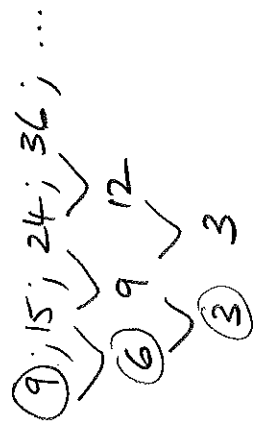
$9; 15; 24; 36 \dots$
 $2a = 3$
 $\therefore a = \frac{3}{2}$
 $3a + b = 6$
 $3(\frac{3}{2}) + b = 6$
 $\therefore b = \frac{3}{2}$
 $a + b + c = 9$
 $\frac{3}{2} + \frac{3}{2} + c = 9$
 $\therefore c = 6$
 $T_n = \frac{3}{2}n^2 + \frac{3}{2}n + 6$

OR/OR

$T_n = an^2 + bn + c$
 $9a + 3b + c = 24 \dots (1)$
 $4a + 2b + c = 15 \dots (2)$
 $a + b + c = 9 \dots (3)$
 $(1) - (2) \dots 5a + b = 9$
 $(2) - (3) \dots 3a + b = 6$
 $2a = 3$
 $\therefore a = \frac{3}{2}$
 $3(\frac{3}{2}) + b = 6$
 $\therefore b = \frac{3}{2}$
 $\frac{3}{2} + \frac{3}{2} + c = 9$
 $\therefore c = 6$
 $T_n = \frac{3}{2}n^2 + \frac{3}{2}n + 6$

✓ method/metode
 ✓ $n = 16; T_n = \frac{3}{2}n^2 + 10\frac{1}{2}n + 33$
 ✓ answer/antwoord (3) [7]

Sub $n = 20$
 $\rightarrow 843$ ✓
 2 marks



31 119 82... $i = 12,08$ $n = 24$

4.1.1	$F = 2000 \left(1 + \frac{0,08}{12}\right)^{24} + \frac{1200 \left(1 + \frac{0,08}{12}\right)^{24} - 1}{\frac{0,08}{12}}$ $= R33\ 465,60$ If used present value formula: max 2 marks As huidige waarde formule gebruik: maks 2 punte OR/OF $F = 800 \left(1 + \frac{0,08}{12}\right)^{24} + \frac{1200 \left(1 + \frac{0,08}{12}\right)^{25} - 1}{\frac{0,08}{12}}$ $= R33\ 465,60$ IF ONLY compound formula or ONLY future value formula used: max 3 marks Indien SLEGS saamgestelde formule of SLEGS toekomstige waarde formule gebruik: maks 3 punte	$i = \frac{0,08}{12}$ $\checkmark 2000 \left(1 + \frac{0,08}{12}\right)^{24}$ $\checkmark n = 24$ $\checkmark \frac{1200 \left(1 + \frac{0,08}{12}\right)^{24} - 1}{\frac{0,08}{12}}$ \checkmark answer/antwoord	\checkmark swap x and y/ruil x en y om \checkmark answer/antwoord
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4.1.2	$A = 33\ 465,60 \left(1 + \frac{0,08}{12}\right)^5$ $= R34\ 596,10$ or/of $R34\ 596,09$ Wrong formula/ Verkeerde formule 0 marks/punte	$\checkmark 33\ 465,60$ \checkmark substitution/substitutie \checkmark answer/antwoord	\checkmark answer/antwoord
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4.2.1	$150\ 000 \left(1 + \frac{0,15}{12}\right)^2 = \frac{x \left[1 - \left(1 + \frac{0,15}{12}\right)^{-94}\right]}{\frac{0,15}{12}}$ $x = R2\ 721,64$ If/Indien: $150\ 000 = \frac{x \left[1 - \left(1 + \frac{0,15}{12}\right)^{-94}\right]}{\frac{0,15}{12}}$ $x = R2\ 721,64$ 4 marks/punte If used present value formula: max 2 marks As huidige waarde formule gebruik: maks 2 punte	$\checkmark i = \frac{0,15}{12}$ $\checkmark 150\ 000 \left(1 + \frac{0,15}{12}\right)^2$ $\checkmark n = -94$ $\checkmark \frac{x \left[1 - \left(1 + \frac{0,15}{12}\right)^{-94}\right]}{\frac{0,15}{12}}$ \checkmark answer/antwoord	$\checkmark 2^2 \cdot 2^{-x-1} = 2^{\frac{1}{2}}$ $2^{-x-1} = 2^{\frac{1}{2}}$ $\therefore -x-1 = \frac{1}{2}$ $-x = \frac{3}{2}$ $x = -\frac{3}{2}$
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4.2.2	$1 + i = \left(1 + \frac{0,15}{12}\right)^{12}$ $i = 16,08\%$ OR/OF $A = 100 \left(1 + \frac{0,15}{12}\right)^{12}$ $A = 116,08$ $i = 16,08\%$ Wrong formula: 0 marks Verkeerde formule: 0 punte	\checkmark substitution/substitutie \checkmark answer/antwoord \checkmark substitution/substitutie \checkmark answer/antwoord	$\checkmark y = 1$ $\checkmark y \in \mathbb{R}, y \neq 1$
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5.1	$f(x) = \left(\frac{1}{2}\right)^x$ $x = \left(\frac{1}{2}\right)^y$ $y = \log_2 x$ or/of $y = -\log_2 x$ or/of $y = \frac{\log_2 x}{\log_2 \frac{1}{2}}$ or/of $y = \frac{\log_2 x}{\log_2 \frac{1}{2}}$	\checkmark Answer ONLY: 2 marks SLEGS antwoord: 2 punte \checkmark swap x and y/ruil x en y om \checkmark answer/antwoord	\checkmark answer/antwoord
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5.2	$x > 0$	\checkmark answer/antwoord	\checkmark answer/antwoord
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5.3	$4 \times f(x+1) = \sqrt{2}$ $4 \times \left(\frac{1}{2}\right)^{x+1} = \sqrt{2}$ $4 \times (2^{-1})^{x+1} = 2^{\frac{1}{2}}$ $2^2 \times 2^{-x-1} = 2^{\frac{1}{2}}$ $2^{-x-1} = 2^{\frac{1}{2}}$ $-x-1 = \frac{1}{2}$ $-x = \frac{3}{2}$ $x = -\frac{3}{2}$ OR/OF $4 \cdot f(x+1) = \sqrt{2}$ $4 \cdot \left(\frac{1}{2}\right)^{x+1} = \sqrt{2}$ $\left(\frac{1}{2}\right)^{x+1} = \frac{\sqrt{2}}{4}$ $= 2^{\frac{1}{2}-2}$ $2^{-x-1} = 2^{\frac{1}{2}-2}$ $\therefore -x-1 = \frac{1}{2}-2$ $-x = \frac{1}{2}$ $x = -\frac{1}{2}$	$\checkmark 4 \cdot \left(\frac{1}{2}\right)^{x+1} = \sqrt{2}$ $\checkmark 2^2 \cdot 2^{-x-1} = 2^{\frac{1}{2}}$ \checkmark answer/antwoord $\checkmark 4 \cdot \left(\frac{1}{2}\right)^{x+1} = \sqrt{2}$ $\checkmark 2^{-x-1} = 2^{\frac{1}{2}-2}$ $\checkmark -x-1 = \frac{1}{2}-2$ $\checkmark -x = \frac{1}{2}$ $\checkmark x = -\frac{1}{2}$	\checkmark answer/antwoord
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5.4	$y = \left(\frac{1}{2}\right)^0$ $y = 1$ $\therefore A(0; 1)$ \therefore range/terrein $y \in \mathbb{R}, y \neq 1$	$\checkmark y = 1$ $\checkmark y \in \mathbb{R}, y \neq 1$	\checkmark answer/antwoord
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5.5	$y = x + 3$ $1 = x + 3$ $x = -2$ $B(-2; 1)$	$\checkmark y = x + 3$ $\checkmark 1 = x + 3$ $\checkmark x = -2$ $\checkmark B(-2; 1)$	$\checkmark y = 1$ $\checkmark x = -2$
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5.6	$g(x) = \frac{a}{x+2} + 1$ $0 = \frac{a}{0+2} + 1$ $0 = a + 2$ $a = -2$ $g(x) = \frac{-2}{x+2} + 1$	$\checkmark p = 2 \checkmark q = 1$ \checkmark substitute/vervang (0; 0) $\checkmark a = -2$	(4)
5.7	$x \in \mathbb{R}, x \neq -2$	\checkmark answer/antwoord	(1) [15]

$g' > 0$
 since
 g up \rightarrow \rightarrow
 by inspect.

QUESTION 6/VRAAG 6

6.1	$(0; -28)$	\checkmark answer/antwoord	(1)
6.2	$f(x) = 2x^2 - 10x - 28$ $2x^2 - 10x - 28 = 0$ $x^2 - 5x - 14 = 0$ $(x-7)(x+2) = 0$ $x = 7$ or/of $x = -2$	$\checkmark f(x) = 0$ \checkmark factors/faktore \checkmark x-values/waardes	(3)
6.3	$x = \frac{-b}{2a} = \frac{-(-10)}{2(2)} = \frac{5}{2}$ OR/OR $x = \frac{7+(-2)}{2} = \frac{5}{2}$ OR/OR $f'(x) = 4x - 10 = 0$ $x = \frac{5}{2}$ $y = f\left(\frac{5}{2}\right) = \left(\frac{5}{2}\right)^2 - 10\left(\frac{5}{2}\right) - 28 = -40\frac{1}{2}$ $\left(\frac{5}{2}; -40\frac{1}{2}\right)$	$\checkmark x = \frac{5}{2}$ $\checkmark y = -40\frac{1}{2}$	(2)

$2,5$
 $-\frac{81}{2}$
 $-40,5$

6.4		\checkmark Intercepts/asse \checkmark turning point/draaipunt	(2)
6.5	$f(x) = 4x - 10$ $4x - 10 = 6$ $4x = 16$ $x = 4$ $f(4) = 2(4)^2 - 10(4) - 28$ $= -36$ $P(4; -36)$	$\checkmark f'(x)$ $\checkmark f(x) = 6$ $\checkmark x = 4$ $\checkmark y = -36$	(4)
6.6	$B(-2; 0)$ and/of $F(4; -36)$ $m_{BF} = \frac{-36-0}{4-(-2)} = \frac{-36}{6} = -6$ $y = -6x + c$ $(-2; 0)$ or/of $(4; -36)$ $0 = -6(-2) + c$ or $-36 = -6(4) + c$ $c = -12$ or $c = -12$ $y = -6x - 12$	$\checkmark m = -6$ \checkmark substitution/substitusie $(-2; 0)$ or/of $(4; -36)$ \checkmark answer/antwoord	(3)
6.7	f translates 2 units left and 3 down/ f translateer 2 eenhede links en 3 af $h(x) = 2\left(x - \frac{1}{2}\right)^2 - 43\frac{1}{2}$	$\checkmark -\frac{1}{2}$ $\checkmark -43\frac{1}{2} / -\frac{87}{2}$ \checkmark answer/antwoord	(3) [18]

$\left(\frac{5}{2}; -40\frac{1}{2}\right)$
 $\xrightarrow{2 \leftarrow}$
 $\xrightarrow{3 \downarrow}$
 $\left(\frac{1}{2}; -\frac{87}{2}\right)$

QUESTION 7/PRAAG 7

7.1	$f(x) = -5x^2$ $f(x+h) = -5(x+h)^2$ $= -5(x^2 + 2xh + h^2)$ $= -5x^2 - 10xh - 5h^2$ $f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ $= \lim_{h \rightarrow 0} \frac{-5x^2 - 10xh - 5h^2 - (-5x^2)}{h}$ $= \lim_{h \rightarrow 0} \frac{-5x^2 - 10xh - 5h^2 + 5x^2}{h}$ $= \lim_{h \rightarrow 0} \frac{-10xh - 5h^2}{h}$ $= \lim_{h \rightarrow 0} \frac{h(-10x - 5h)}{h}$ $= \lim_{h \rightarrow 0} (-10x - 5h)$ $= -10x$	✓ substitute/vervang $(x+h)$ ✓ formula/formule Penalise 1 mark for incorrect use of formula. Must show $f'(x)$. Penaliseer 1 punt vir verkeerde gebruik van formule. Moet $f'(x)$ toon.	✓ simplification/vereenvoudiging ✓ common factor/gemene faktor ✓ answer/antwoord (5)	Answer ONLY: 0 marks SLEGS antwoord: 0 punte
7.2.1	$y = 8x^3$ $\frac{dy}{dx} = 24x^2$	✓ answer/antwoord (1)	✓ answer/antwoord (2)	Penalise 1 mark for incorrect notation in 7.2. Penaliseer 1 punt vir verkeerde notasie in 7.2.
7.2.2	$\sqrt{a} = y^{\frac{1}{2}}$ $a = y^{\frac{1}{2}}$ $\frac{da}{dy} = \frac{1}{2}y^{-\frac{1}{2}}$	✓ $a = y^{\frac{1}{2}}$ ✓ answer/antwoord	✓ $a = y^{\frac{1}{2}}$ ✓ answer/antwoord	✓ substitute/vervang $y = 8x^3$ ✓ $a = 16x^4$ ✓ answer/antwoord (3)
7.3	$g(x) = -8x + 3$ $f(5) = g(5) = -8(5) + 3 = -37$ $f'(5) = -8$ $f(5) - f'(5) = -37 - (-8) = -29$	✓ $f(5) = -37$ ✓ $f'(5) = -8$ ✓ answer/antwoord (3) [14]		

$y = a(x+1)(x-4)(x-7)$

$y = -x^3 \dots$

$\therefore a = -1 \text{ so } y = -(x+1)(x-4)(x-7)$

$d = -1(1)(-4)(-7) = -28$

QUESTION 8/PRAAG 8

Sub an intercept into eqn containing d

8.1	$f(x) = -x^3 + 10x^2 - 17x + d$ $d = (-1)(4)(7) = -28$	✓ answer/antwoord (1)	✓ $f'(x) = 0$ ✓ factors/faktore	5, 6, 7 14, 81 $B(\frac{17}{3}, \frac{400}{27})$
8.2	$f(x) = -3x^2 + 20x - 17 = 0$ $3x^2 - 20x + 17 = 0$ $(3x-17)(x-1) = 0$ $x = \frac{17}{3} (\frac{51}{3})$ or/of $x = 1$ $f(\frac{17}{3}) = -(\frac{17}{3})^2 + 10(\frac{17}{3}) - 17(\frac{17}{3}) - 28$ $= -14\frac{22}{27} (\frac{400}{27})$ $f(1) = -(1)^3 + 10(1)^2 - 17(1) - 28$ $= -36$ $A(1; -36)$ and/en $B(\frac{17}{3}; 14\frac{22}{27})$	✓ $f''(x) = 0$ ✓ answer/antwoord (2)	✓ $x = \frac{10}{3}$ ✓ $y = -10\frac{16}{27}$ or/of $-10,59$	✓ $x = \frac{10}{3}$ ✓ $y = -10\frac{16}{27}$ or/of $-10,59$
8.3	$f''(x) = -6x + 20 = 0$ $-6x = -20$ $x = \frac{10}{3}$ or/of $3\frac{1}{3}$ or/of 3,33	✓ $f''(x) = 0$ ✓ answer/antwoord (2)	Maximum where/maksimum waar $f''(x) = 0$ \therefore at/by $x = \frac{10}{3}$ $f(\frac{10}{3}) = -(\frac{10}{3})^3 + 10(\frac{10}{3})^2 - 17(\frac{10}{3}) - 28$ $= -16\frac{16}{27}$ or/of $-10,59$ $(\frac{10}{3}; -16\frac{16}{27})$ or/of $(\frac{10}{3}; -10,59)$	✓ $-1 \leq x \leq 1$ or/of $4 \leq x \leq \frac{17}{3}$ or/of $x \geq 7$ ✓ $-1 \leq x \leq 1$ ✓ $4 \leq x \leq \frac{17}{3}$ ✓ $x \geq 7$
8.5	$f(x) f'(x) = -(x+1)(x-4)(x-7)(-(3x-17)(3x-1))$ $= -1 \oplus 0 \oplus -1 \oplus 0 \oplus -1 \oplus 0 \oplus -1 \oplus 0 \oplus 7$ $-1 \quad 1 \quad 4 \quad 17 \quad 3$	✓ $-1 \leq x \leq 1$ or/of $4 \leq x \leq \frac{17}{3}$ or/of $x \geq 7$ ✓ $-1 \leq x \leq 1$ ✓ $4 \leq x \leq \frac{17}{3}$ ✓ $x \geq 7$	✓ $-1 \leq x \leq 1$ or/of $4 \leq x \leq \frac{17}{3}$ or/of $x \geq 7$ ✓ $-1 \leq x \leq 1$ ✓ $4 \leq x \leq \frac{17}{3}$ ✓ $x \geq 7$	✓ $-1 \leq x \leq 1$ or/of $4 \leq x \leq \frac{17}{3}$ or/of $x \geq 7$ ✓ $-1 \leq x \leq 1$ ✓ $4 \leq x \leq \frac{17}{3}$ ✓ $x \geq 7$

table made
start -1,5
end 7,5
steps 0,5

QUESTION 9/VRAAG 9

9.1	$P(q; -2q^2)$	✓ answer/antwoord	(1)
9.2	$A = 2q^2(6-q)$ $= 12q^2 - 2q^3$	✓ $\frac{dA}{dq} = 24q - 6q^2$ $b = 6 - q$ and method/en metode	(2)
9.3	$\frac{dA}{dq} = 24q - 6q^2 = 0$ $6q(4-q) = 0$ $q = 0$ or/of $q = 4$ $A = 12(4)^2 - 2(4)^3$ $= 64$ square units/vierkante eenhede	✓ $\frac{dA}{dq} = 0$ ✓ factors/faktore ✓ q-values/waardes ✓ area/oppervlakte	(4) [7]

QUESTION 10/VRAAG 10

10.1.1	$P(A) = 1 - P(\text{not/nie } A)$ $P(A) = 1 - 0,45$ $P(A) = 0,55$	11 20 ✓	(1)
10.1.2	Mutually exclusive events/onderling uitsluitende gebeurtenisse: $P(A \text{ or/of } B) = P(A) + P(B)$ $= 0,55 + 0,35$ $= 0,9$	✓ rule/reël ✓ answer/antwoord	(2)
10.1.3	Independent events/onafhanklike gebeurtenisse: $P(A \text{ and/en } B) = P(A) \times P(B)$ $= 0,55 \times 0,35$ $= 0,1925$ or/of 0,19	✓ rule/reël ✓ answer/antwoord	(2)

QUESTION 11/VRAAG 11

11.1	$n(\text{codes/kodes}) = 20^4 \times 9^4$ $= 1\,049\,760\,000$	✓ ✓ $20^4 \checkmark 9^4$ ✓ answer/antwoord	(3)
11.2	$n(\text{syfers ongetylike ewe getalle/digits unequal even numbers}) = 20^4 \times 4! = 3\,840\,000$ $P(\text{syfers ongetylike ewe getalle/digits unequal even numbers}) = \frac{3\,840\,000}{1\,049\,760\,000}$ or/of $\frac{8}{2\,187}$ OR/OR $P(\text{syfers ongetylike ewe getalle/digits unequal even numbers}) = \frac{4!}{9^4} = \frac{24}{6561}$ or/of $\frac{8}{2\,187}$	✓ ✓ $20^4 \checkmark 4!$ ✓ $3\,840\,000$ ✓ answer/antwoord OR/OR ✓ $\frac{4!}{9^4}$ ✓ $\frac{24}{6561}$ ✓ answer/antwoord	(2) [5]

QUESTION 12/VRAAG 12

12.1	$P(R) = P(BR) + P(GR)$ $= \frac{1}{2} \left(\frac{2}{8} \right) + \frac{1}{2} \left(\frac{2}{6} \right)$ $= \frac{3}{8} + \frac{1}{6}$ $= \frac{16}{88} = \frac{2}{11}$	✓ ✓ $\frac{1}{2} \left(\frac{2}{8} \right)$ ✓ $\frac{1}{2} \left(\frac{2}{6} \right)$ ✓ $\frac{3}{8} + \frac{1}{6}$ ✓ $\frac{16}{88} = \frac{2}{11}$ 0,58 83 144	(3) [12]
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$(q; -2q^2)$
 $(q; -2q^2) \leftarrow l = 2q$
 $b = 6 - q$

1 2 4 1 2 2

4 3 3 2