Province of the
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EDUCATION

NATIONAL SENIOR CERTIFICATE/ NASIONALE SENIOR SERTIFIKAAT

GRADE/GRAAD 12

SEPTEMBER 2014

MATHEMATICS P1/WISKUNDE V1 MEMORANDUM

MARKS/PUNTE: 150

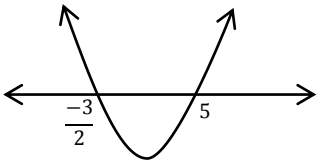
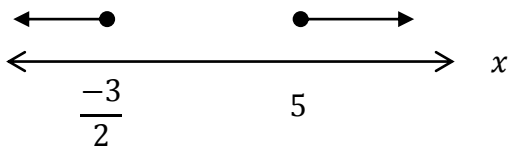
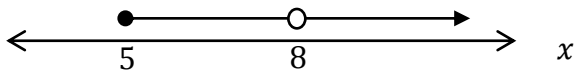
Hierdie memorandum bestaan uit 16 bladsye./
This memorandum consists of 16 pages.

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.
  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 toegeken vir substitusie in die korrekte formule.

QUESTION 1/*VRAAG 1*

1.1.1	$3x^2 - 7x = 0$ $x(3x - 7) = 0$ $x = 0$ or/of $x = \frac{7}{3}$ **OR/OF** $3x^2 - 7x = 0$ $x = \frac{-(-7) \pm \sqrt{(-7)^2 - 4(3)(0)}}{2(3)}$ $x = 0$ or/of $x = \frac{7}{3}$ Note/Let op: If divided by *x*/*indien deel deur x* $\therefore x = \frac{7}{3}$ only/slegs, 0 marks/punte.	✓ factors/*faktore* ✓ x-values/*waardes* ✓ substitution/*substitusie* ✓ x-values/*waardes* (2)
1.1.2	$5x^2 = 3x + 6$ $5x^2 - 3x - 6 = 0$ $x = \frac{-(-3) \pm \sqrt{(-3)^2 - 4(5)(-6)}}{2(5)}$ $x = \frac{3 \pm \sqrt{129}}{10}$ $x = -0{,}84$ or/of $x = 1{,}44$ Penalise 1 mark for incorrect rounding off. *Penaliseer 1 punt vir verkeerde afronding.*	✓ standard form/*standaardvorm* ✓ substitution/*substitusie* ✓✓ x-values/*waardes* (4)
1.1.3	$3x^{\frac{2}{3}} - 13x^{\frac{1}{3}} - 10 = 0$ $\left(3x^{\frac{1}{3}} + 2\right)\left(x^{\frac{1}{3}} - 5\right) = 0$ $x^{\frac{1}{3}} = \frac{-2}{3}$ or/*of* $x^{\frac{1}{3}} = 5$ $x = \frac{-8}{27}$ or/*of* $x = 125$ **OR/*OF***	✓ factors/*faktore* ✓ $x^{\frac{1}{3}} = \frac{-2}{3}$ or/*of* $x^{\frac{1}{3}} = 5$ ✓ answer/*antwoord*

	$3x^{\frac{2}{3}} - 13x^{\frac{1}{3}} - 10 = 0$ Let/*stel* $x^{\frac{1}{3}} = m$ $3m^2 - 13m - 10 = 0$ $(3m + 2)(m - 5) = 0$ $m = \frac{-2}{3}$ or/*of* $m = 5$ $x^{\frac{1}{3}} = \frac{-2}{3}$ or/*of* $x^{\frac{1}{3}} = 5$ $x = \frac{-8}{27}$ or/*of* $x = 125$	✓ factors/*faktore* ✓ $x^{\frac{1}{3}} = \frac{-2}{3}$ or/of $x^{\frac{1}{3}} = 5$ ✓ answer/*antwoord* (3)
1.2.1	$2x^2 - 7x - 15 \geq 0$ $(2x + 3)(x - 5) \geq 0$ $x \leq \frac{-3}{2}$ or/*of* $x \geq 5$  **OR/*OF*** $x \in \left(-\infty; \frac{-3}{2}\right]$ or/*of* $[5; \infty)$ **OR/*OF***  Note/*Let op*: If/*As* $x \leq \frac{-3}{2}$ and/en $x \geq 5$ max/*maks.* 3 marks/*punte*. If/*As* $x \geq \frac{-3}{2}$ or/of $x \geq 5$ max/ *maks.* 2 marks/*punte.* If correct graphical solution but concludes incorrectly, max 3 marks./ *As korrekte grafiese oplossing, maar maak verkeerde gevolgtrekking, maks. 3 punte*. If omits "or", max 3 marks./ *As "of" uitlaat, maks 3 punte.*	✓ factors/*faktore* ✓ $\frac{-3}{2}$; 5 ✓✓ answer/*antwoord* (4)
1.2.2	$x \geq 5$; $x \neq 8$ **OR/OF**  	✓ $x \geq 5$ ✓ $x \neq 8$ (2) **[15]**

QUESTION 2/*VRAAG 2*

2.1	$4^{x+y} = 2^{y+4}$ $2^{2x+2y} = 2^{y+4}$ $2x + 2y = y + 4$ $y = -2x + 4$ $2x^2 - 3xy = -4$ $2x^2 - 3x(-2x + 4) = -4$ $2x^2 + 6x^2 - 12x + 4 = 0$ $8x^2 - 12x + 4 = 0$ $2x^2 - 3x + 1 = 0$ $(2x - 1)(x - 1) = 0$ $x = \frac{1}{2}$ or/*of* $x = 1$ $y = 3$ or/*of* $y = 2$ **OR/*OF*** $4^{x+y} = 2^{y+4}$ $2^{2x+2y} = 2^{y+4}$ $2x + 2y = y + 4$ $x = \frac{-y}{2} + 2$ $2x^2 - 3xy = -4$ $2\left(\frac{-y}{2} + 2\right)^2 - 3y\left(\frac{-y}{2} + 2\right) = -4$ $\frac{y^2}{2} - 4y + 8 + \frac{3y^2}{2} - 6y = -4$ $4y^2 - 20y + 24 = 0$ $y^2 - 5y + 6 = 0$ $(y - 3)(y - 2) = 0$ $y = 3$ or/*of* $y = 2$ $x = \frac{1}{2}$ or/*of* $x = 1$ 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.*	✓ 2^{2x+2y} ✓ $y = -2x + 4$ ✓ substitution/*substitusie* ✓ standard form/*standaardvorm* ✓ factors/*faktore* ✓ x-values/*waardes* ✓ y-values/*waardes* ✓ 2^{2x+2y} ✓ $x = \frac{-y}{2} + 2$ ✓ Substitution/*substitusie* ✓ Standard form/*standaardvorm* ✓ Factors/*faktore* ✓ x-values/*waardes* ✓ y-values/*waardes* (7)
2.2	$b^2 - 4ac = (-5)^2 - 4(3)(3) = -11$ ∴ roots are nonreal/*wortels is nie-reëel* Note/Let op: If a candidate states 'nonreal' and eg. 'irrational', max 1 mark./ *Indien kandidaat 'nie-reëel' en bv. 'irrasionaal' meld, maks 1 punt.*	✓ -11 ✓ conclusion/*gevolgtrekking* (2) **[9]**

QUESTION 3/VRAAG 3

3.1	$T_4 = 10$	✓ answer/*antwoord* (1)
3.2	$T_n = an^2 + bn + c$ Second difference/*Tweede verskil* $= -4$ $2a = -4$ $a = -2$ $3a + b = 8$ $-6 + b = 8$ $b = 14$ $a + b + c = 2$ $-2 + 14 + c = 2$ $c = -10$ $T_n = -2n^2 + 14n - 10$ **OR/*OF*** $T_n = an^2 + bn + c$ $a + b + c = 2$ (1) $4a + 2b + c = 10$ (2) $9a + 3b + c = 14$ (3) $(2) - (1)$ $3a + b = 8$ $(3) - (2)$ $5a + b = 4$ $2a = -4$ $a = -2$ $b = 14$ $c = -10$ $T_n = -2n^2 + 14n - 10$	✓ Second difference/ *Tweede verskil* ✓ a-value/*waarde* ✓ b-value/*waarde* ✓ c-value/*waarde* ✓ method/*metode* ✓ a-value/*waarde* ✓ b-value/*waarde* ✓ c-value/*waarde* (4) **[5]**

QUESTION 4/*VRAAG 4*

4.1.1	$3\ ;\ \frac{64}{250}$	✓ 3 ✓ $\frac{64}{250}$ (2)
4.1.2	$3\ ;\ \frac{1}{2}\ ;\ 3\ ;\ \frac{4}{10}\ ;\ 3\ ;\ \frac{16}{50}\ ;\ \ldots$ 3; 3; 3; ... (18 terms/*terme*) $\frac{1}{2}\ ;\ \frac{4}{10}\ ;\ \frac{16}{50}$; ... (GS/MR 17 terms/*terme*) $S_{35} = 18(3) + \frac{\frac{1}{2}\left(\left(\frac{4}{5}\right)^{17} - 1\right)}{\frac{4}{5} - 1}$ $S_{35} = \quad 54 \quad + \quad 2{,}44$ $S_{35} \ = \ 56{,}44$	✓ identifies two patterns/ *identifiseer twee patrone* ✓ substitution/*substitusie* ✓ 54 ✓ 2,44 ✓ answer/*antwoord* (5)
4.2	$T_1 = 5.3^{1-3} = 5.3^{-2} = \frac{5}{9}$; $T_2 = 5.3^{1-4} = 5.3^{-3} = \frac{5}{27}$ Answer ONLY: 1 mark *SLEGS antwoord: 1 punt* $a = \frac{5}{9} \quad ; \quad r = \frac{1}{3}$ $S_\infty = \frac{a}{1-r}$ $S_\infty = \frac{\frac{5}{9}}{1-\frac{1}{3}}$ $S_\infty = \frac{5}{6}$ or/*of* 0,83 If a candidate substitutes incorrect r-value, CA only if $-1 < r < 1$. *Indien kandidaat verkeerde r-waarde vervang, CA slegs as $-1 < r < 1$.*	✓ a-value/*waarde* ✓ r-value/*waarde* ✓ substitution/*substitusie* ✓ answer/*antwoord* (4) **[11]**

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QUESTION 5/*VRAAG 5*

5.1.1	$26; 28; 30$	✓ answer/*antwoord* (1)
5.1.2	$26; 28; 30; \ldots; 998$ $26 + (n-1)2 = 998$ $26 + 2n - 2 = 998$ $2n = 974$ $n = 487$ $S_n = \frac{n}{2}[2a + (n-1)d]$ $S_{487} = \frac{487}{2}[2(26) + 486(2)]$ $S_{487} = 249\,344$ **OR/*OF*** $26; 28; 30; \ldots; 998$ $26 + (n-1)2 = 998$ $26 + 2n - 2 = 998$ $2n = 974$ $n = 487$ $S_n = \frac{n}{2}[a + l]$ $S_{487} = \frac{487}{2}[26 + 998]$ $S_{487} = 249\,344$ Answer ONLY: Full marks *SLEGS antwoord: Volpunte*	✓ $T_n = 998$ ✓ substitution/*substitusie* ✓ n-value/*waarde* ✓ substitution/*substitusie* ✓ answer/*antwoord* ✓ $T_n = 998$ ✓ substitution/*substitusie* ✓ n-value/*waarde* ✓ substitution/*substitusie* ✓ answer/*antwoord* (5)
5.2	$T_m = k \quad \therefore \quad k = a + (m-1)d$ $T_k = m \quad \therefore \quad m = a + (k-1)d$ $k = a + md - d \quad \ldots \quad (1)$ $m = a + kd - d \quad \ldots \quad (2)$ $(1) - (2) \quad k - m = md - kd$ $md - kd = k - m$ $d(m-k) = k - m$ $d = \frac{k-m}{-(k-m)}$ $d = -1$ Answer ONLY: 1 mark *SLEGS antwoord: 1 punt*	✓ substitution/*substitusie* ✓ simultaneous equation/ *gelyktydige vergelykings* ✓ factors/*faktore* ✓ answer/*antwoord* (4) **[10]**

QUESTION 6/*VRAAG 6*

6.1	$A = P(1-i)^n$ $83\,543 = 245\,000(1-0{,}13)^n$ $(0{,}34\ldots) = 0{,}87^n$ $\log(0{,}87)^n = \log(0{,}34\ldots$ $n = \frac{\log(0{,}34\ldots)}{\log(0{,}87)}$ $n = 7{,}73$ years/*jare* Wrong formula: 0 marks *Verkeerde formule: 0 punte* Accept/Aanvaar 7,7 years/*jare*; 8 years/*jare* or/of 7 years/*jare* 9 months/maande	✓ substitution/*substitusie* ✓ simplification/*vereenvoud*. ✓ correct use of logs/*korrekte gebruik van logs* ✓ answer/*antwoord* (4)
6.2.1	$\frac{10}{100} \times 450\,000 = R45\,000$ ∴ Loan amount/*Leningsbedrag* = $R405\,000$ **OR/*OF*** Loan amount/*Leningsbedrag* $\frac{90}{100} \times 450\,000 = R405\,000$	✓ $R45\,000$ ✓ answer/*antwoord* ✓ $\frac{90}{100} \times 450\,000$ ✓ $R405\,000$ (2)
6.2.2	$P = \frac{x[1-(1+i)^{-n}]}{i}$ $405\,000 = \frac{x\left[1-\left(1+\frac{0{,}08}{12}\right)^{-240}\right]}{\frac{0{,}08}{12}}$ $x = R3\,387{,}58$ Wrong formula: max 1 mark (i) *Verkeerde formule:* *maks. 1 punt* (i)	✓ i ✓ correct formula/*formule* ✓ substitution/*substitusie* ✓ answer/*antwoord* (4)
6.2.3	Balance/*balans* $= \frac{x[1-(1+i)^{-n}]}{i}$ $= \frac{3\,387{,}58\left[1-\left(1+\frac{0{,}08}{12}\right)^{-36}\right]}{\frac{0{,}08}{12}}$ $= R108\,103{,}79$ **OR/*OF*** Bal. = $405\,000\left(1+\frac{0{,}08}{12}\right)^{204} - \frac{3\,387{,}58\left[\left(1+\frac{0{,}08}{12}\right)^{204}-1\right]}{\frac{0{,}08}{12}}$ $= R108\,104{,}85$ If no rounding from 6.2.2 balance = $R108\,103{,}87$ *Indien geen afronding uit 6.2.2* *balans* = $R108\,103{,}87$	✓ method/*metode* ✓ substitution/*substitusie* ✓ answer/*antwoord* (3) **[13]**

QUESTION 7/*VRAAG 7*

7.1.1	$f(x) = \frac{2}{x+5} - 2$	✓ $+5$ ✓ -2 (2)
7.1.2	Let/*stel* $x = 0$ $y = \frac{2}{5} - 2 = -1\frac{3}{5}$ $\left(0\ ;\ -1\frac{3}{5}\right)$ **OR/*OF*** $\left(0\ ;\ \frac{-8}{5}\right)$ **OR/*OF*** $(0\ ;\ -1{,}6)$	✓ $x = 0$ ✓ $-1\frac{3}{5}$ (2)
7.1.3	$y = mx - \frac{8}{5}$ $(-5\ ;\ -2)$ $-2 = -5m - \frac{8}{5}$ $-10 = -25m - 8$ $25m = 2$ $m = \frac{2}{25}$ $y = \frac{2}{25}x - \frac{8}{5}$ **OR/*OF*** $(-5\ ;\ -2)\ ,\ \left(0\ ;\ -1\frac{3}{5}\right)$ $m = \frac{-2-\left(-\frac{8}{5}\right)}{-5} = \frac{2}{25}$ $y = \frac{2}{25}x - \frac{8}{5}$	✓ $c = -\frac{8}{5}$ ✓ substitution/*substitusie* $(-5\ ;\ -2)$ ✓ m-value/*waarde* ✓ equation/*vergelyking* ✓ substitution/*substitusie* *A* and *B* ✓ m-value/*waarde* ✓ $c = -\frac{8}{5}$ ✓ equation/*vergelyking* (4)
7.1.4	$\frac{2}{x+5} - 2 = \frac{2}{25}x - \frac{8}{5}$ $\times 25(x+5)$ $50 - 50x - 250 = 2x^2 + 10x - 40x - 200$ $2x^2 + 20x = 0$ $2x(x+10) = 0$ $x = 0$ or/of $x = -10$ $\therefore \left(-10; -2\frac{2}{5}\right)$ Answer ONLY: Full marks *SLEGS antwoord: Volpunte*	✓ setting up equation/*opstel van vergelyking* ✓ standard form/*standaardvorm* ✓ factors/*faktore* ✓answer/*antwoord* (4)

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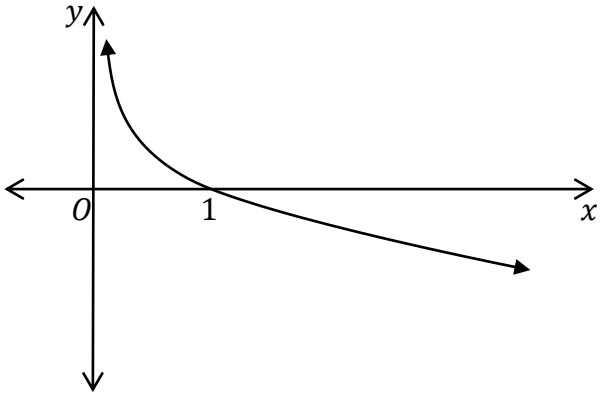
7.2.1	Decreasing function/*afnemende funksie* y decreases as x increases/y *neem af soos wat* x *toeneem.* If sketch is given as reason: Max 1 mark *As skets as rede gegee is: Maks 1 punt*	✓ decreasing/*afnemend* ✓ reason/*rede* (2)
7.2.2	$y > -2$	✓ answer/*antwoord* (1)
7.2.3	$y = \left(\frac{1}{5}\right)^x$ $x = \left(\frac{1}{5}\right)^y$ $y = log_{\frac{1}{5}}x$ **OR/*OF*** $y = -log_5 x$ **OR/*OF*** $y = \frac{-logx}{log5}$	✓ interchange x and y *ruil* x en y ✓ equation/*vergelyking* (2)
7.2.4		✓ x-intercept/x-*afsnit* ✓ shape/*vorm* Do not award shape-mark if graph is not asymptotic. *Moenie vormpunt toeken as grafiek nie asimptoties is nie.* (2)
7.2.5	$0 < x \leq 5$	✓ $x > 0$ ✓ $x \leq 5$ (2) **[21]**

QUESTION 8/VRAAG 8

8.1	$-x^2 - x + 12 = 0$ $x^2 + x - 12 = 0$ $(x + 4)(x - 3) = 0$ $x = -4$ or/of $x = 3$	✓ $f(x) = 0$ ✓ factors/*faktore* ✓ both/*albei x* (3)
8.2	$x = \frac{-b}{2a} = \frac{-(-1)}{2(-1)} = \frac{-1}{2}$ $f\left(\frac{-1}{2}\right) = -\left(\frac{-1}{2}\right)^2 - \left(\frac{-1}{2}\right) + 12 = 12\frac{1}{4}$ **OR/*OF*** $x = \frac{-4+3}{2} = \frac{-1}{2}$ $f\left(\frac{-1}{2}\right) = -\left(\frac{-1}{2}\right)^2 - \left(\frac{-1}{2}\right) + 12 = 12\frac{1}{4}$ **OR/*OF*** $f'(x) = -2x - 1 = 0$ $x = \frac{-1}{2}$ $f\left(\frac{-1}{2}\right) = -\left(\frac{-1}{2}\right)^2 - \left(\frac{-1}{2}\right) + 12 = 12\frac{1}{4}$ **OR/*OF*** $x = \frac{-1}{2}$ $y = \frac{4ac-b^2}{4a}$ $= \frac{4(-1)(12)-(-1)^2}{4(-1)}$ $= \frac{49}{4}$ or/*of* $12\frac{1}{4}$	✓ x-value/*waarde* ✓ y-value/*waarde* ✓ x-value/*waarde* ✓ y-value/*waarde* ✓ x-value/*waarde* ✓ y-value/*waarde* (2)
8.3	$-x^2 - x + 12 - (x + 4) = \frac{27}{4}$ $-x^2 - 2x + 8 = \frac{27}{4}$ $-4x^2 - 8x + 32 = 27$ $4x^2 + 8x - 5 = 0$ $(2x - 1)(2x + 5) = 0$ $x = \frac{1}{2}$ or/*of* $x = \frac{-5}{2}$ $M\left(\frac{-5}{2}; 0\right)$	✓ setting up equation/*opstel van vergelyking* ✓ standard form/*standaardvorm* ✓ factors/*faktore* ✓ answer/*antwoord* (4)

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8.4	$x < -4$ or/*of* $0 < x < 3$	✓ $x < -4$ ✓ $0 < x < 3$ (2)
8.5	$-x^2 - x + 12 = k$ $-x^2 - x + 12 - k = 0$ $\frac{-1}{4} < 12 - k < 0$ $-12\frac{1}{4} < -k < -12$ $12 < k < 12\frac{1}{4}$	 ✓ $\frac{-1}{4} < 12 - k < 0$ ✓ $12 < k < 12\frac{1}{4}$ (2)
8.6	$h(x) = -\left(x - 2\frac{1}{2}\right)^2 + 12\frac{1}{4}$	✓ $-\left(x - 2\frac{1}{2}\right)^2$ ✓ $12\frac{1}{4}$ (2) **[15]**

QUESTION 9/*VRAAG 9*

9.1	$f(x) = -5x^2 + 2x$ $f'(x) = \lim_{h\to 0}\frac{f(x+h)-f(x)}{h}$ $= \lim_{h\to 0}\frac{-5(x+h)^2 + 2(x+h) - (-5x^2 + 2x)}{h}$ $= \lim_{h\to 0}\frac{-5(x^2 + 2xh + h^2) + 2x + 2h + 5x^2 - 2x)}{h}$ $= \lim_{h\to 0}\frac{-5x^2 - 10xh - 5h^2 + 2x + 2h + 5x^2 - 2x}{h}$ $= \lim_{h\to 0}\frac{-10xh - 5h^2 + 2h}{h}$ $= \lim_{h\to 0}\frac{h(-10x - 5h + 2)}{h}$ $= \lim_{h\to 0}(-10x - 5h + 2)$ $= -10x + 2$ Answer ONLY: 0 marks *SLEGS antwoord: 0 punte* Penalise 1 mark for incorrect use of formula. Must show $f'(x)$. *Penaliseer 1 punt vir verkeerde gebruik van formule. Moet $f'(x)$ toon.*	✓ formula/*formule* ✓ substitution of/*substitusie van* $(x+h)$ ✓ simplification to/ *vereenvoudiging na* $(-10xh - 5h^2 + 2h)$ ✓ common factor/*gemene faktor* ✓ answer/*antwoord* (5)
9.2	$y = \frac{8}{x^4} + \sqrt[3]{x^2}$ $y = 8x^{-4} + x^{\frac{2}{3}}$ $\frac{dy}{dx} = -32x^{-5} + \frac{2}{3}x^{\frac{-1}{3}}$ Penalise 1 mark for incorrect notation. *Penaliseer 1 punt vir verkeerde notasie.*	✓ $8x^{-4}$ ✓$x^{\frac{2}{3}}$ ✓ $-32x^{-5}$ ✓$\frac{2}{3}x^{\frac{-1}{3}}$ (4)
9.3	$f(x) = -x^3 + 3x - 2$ $f'(x) = -3x^2 + 3 = \frac{8}{3}$ $-9x^2 + 9 = 8$ $9x^2 - 1 = 0$ $(3x-1)(3x+1) = 0$ $x = \frac{1}{3}$ or/of $x = \frac{-1}{3}$	✓ $f'(x)$ ✓ $f'(x) = \frac{8}{3}$ ✓ standard form/*standaardvorm* ✓ factors/*faktore* ✓ answer/*antwoord* (5) **[14]**

QUESTION 10/*VRAAG 10*

10.1.1	$f(x) = x^3 - 5x^2 - 8x + 12$ $(x-6)(x^2+x-2) = 0$ $(x-6)(x+2)(x-1) = 0$ $x = 6$ or/*of* $x = -2$ or/of $x = 1$ $A(-2;0)$ and/*en* $B(1;0)$	✓ $(x-6)$ ✓(x^2+x-2) ✓ $(x+2)(x-1)$ ✓ coordinates of A and B/ *koördinate van A en B* (4)
10.1.2	$f'(x) = 3x^2 - 10x - 8 = 0$ $(3x+2)(x-4) = 0$ $x = \frac{-2}{3}$ or/*of* $x = 4$ $D\left(\frac{-2}{3};\ 14\frac{22}{27}\right)$ and/*en* $E(4;\ -36)$	✓ $f'(x)$ ✓$f'(x) = 0$ ✓ factors/*faktore* ✓ D coordinates/*koördinate* ✓ E coordinates/*koördinate* (5)
10.2.1	$f(2) = 0$ $\therefore g(0) = -5$ **OR/*OF*** $f'(x) = 3ax^2 + 2bx - 5$ $f'(0) = -5$ Answer ONLY: Full marks *SLEGS antwoord: Volpunte*	✓ $f(2) = 0$ ✓ $g(0) = -5$ ✓ $f'(x) = 3ax^2 + 2bx - 5$ ✓ $f'(0) = -5$ (2)
10.2.2	$m = \frac{50-0}{0-(-5)} = 10$ Answer ONLY: Full marks *SLEGS antwoord: Volpunte*	✓ $\frac{50-0}{0-(-5)}$ ✓ answer/*antwoord* (2)
10.2.3	Point of inflection/*Infleksiepunt at/by* $x = -2\frac{2}{3}$ $f''(x) < 0$ if/*as* $x > -2\frac{2}{3}$ Answer ONLY: Full marks *SLEGS antwoord: Volpunte*	✓ $x = -2\frac{2}{3}$ ✓ answer/*antwoord* (2) **[15]**

QUESTION 11/*VRAAG 11*

11.1	$SP = \sqrt{2x^2} = \sqrt{2}x$ $LP = LQ = (50-x)$ $PQ^2 = (50-x)^2 + (50-x)^2$ $= 2(50-x)^2$ $PQ = \sqrt{2}(50-x)$ $A = \sqrt{2}(50-x) \times \sqrt{2}x$ $= 2x(50-x)$ $= 100x - 2x^2$	✓ $SP = \sqrt{2x^2}$ ✓ $PQ^2 = (50-x)^2 + (50-x)^2$ ✓ $PQ = \sqrt{2}(50-x)$ ✓ $A = 2x(50-x)$ (4)
11.2	$\frac{dA}{dx} = 100 - 4x = 0$	✓ $100 - 4x = 0$

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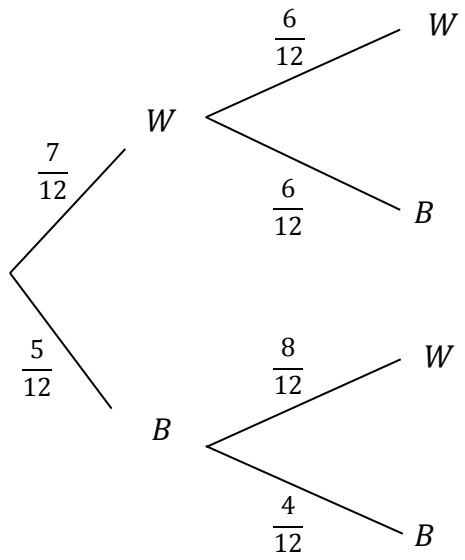
	$-4x = -100$ $x = 25$ $A = 100(25) - 2(25)^2$ $= 1\,250\ cm^2$	✓ x-value/*waarde* ✓ answer/*antwoord* (3) **[7]**

QUESTION 12/*VRAAG 12*

12.1.1	$x = 8$	✓ answer/*antwoord* (1)
12.1.2	$y = 13$ If incorrect x-value/*Indien verkeerde x-waarde:* CA: $y = x + 5$	✓ answer/*antwoord* (1)
12.2.1	P(first client takes a loaf of white bread) = $\frac{7}{12}$ P(*eerste kliënt vat 'n witbrood*) = $\frac{7}{12}$	✓ answer/*antwoord* (1)
12.2.2	$P(BB) = \frac{5}{12} \times \frac{4}{11}$ $= \frac{20}{132}$ or/*of* $\frac{5}{33}$	✓ $\frac{5}{12}$ ✓ $\frac{4}{11}$ ✓ $\frac{20}{132}$ or/*of* $\frac{5}{33}$ (3)
12.2.3	 $P(WB)$ or/*of* $P(BW) = \left(\frac{7}{12} \times \frac{6}{12}\right) + \left(\frac{5}{12} \times \frac{8}{12}\right)$ $= \frac{41}{72}$ or/*of* 0,57	✓ $\left(\frac{7}{12} \times \frac{6}{12}\right)$ ✓ $\left(\frac{5}{12} \times \frac{8}{12}\right)$ ✓ answer/*antwoord* (3)

12.3.1	$9! = 362\ 880$	✓ answer/*antwoord* (1)
12.3.2	n(E's next to each other/*E's langs mekaar*) $= 8 \times 7! \times 2$ $= 80\ 640$ P(E's next to each other/*E's langs mekaar*) $= \frac{80\ 640}{362\ 880}$ or/*of* $\frac{2}{9}$	✓ $8 \times 7! \times 2$ ✓ 80 640 ✓ $\frac{80\ 640}{362\ 880}$ or/*of* $\frac{2}{9}$ (3)
12.3.3	n(starting with P; repeating letters the same) n(*begin met P*; *herhaalde letters dieselfde*) $= \frac{8!}{2!2!}$ $= 10\ 080$	✓ $\frac{8!}{2!2!}$ ✓ 10 080 (2) **[15]**
		TOTAL/*TOTAAL*: 150