SOLUTIONS

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

$3x^2 - 7x = 0$ ✓
$x(3x - 7) = 0$ ✓
$x = 0$ or/of $x = \frac{7}{3}$ ✓

OR/OF

$3x^2 - 7x = 0$
$x = \frac{-(-7) \pm \sqrt{(-7)^2 - 4(3)(0)}}{2(3)}$ ✓ substitution/*substitusie*
$x = 0$ or/of $x = \frac{7}{3}$ ✓ x-values/*waardes*

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*

(2) **2**

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) **4**

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*

3

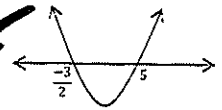
$3x^{\frac{2}{3}} - 13x^{\frac{1}{3}} - 10 = 0$
Let/*stel* $x^{\frac{1}{3}} = m$
$3m^2 - 13m - 10 = 0$
$(3m + 2)(m - 5) = 0$
$m = \frac{-2}{3}$ or/*of* $m = 5$
$x^{\frac{1}{3}} = \frac{-2}{3}$ or/*of* $x^{\frac{1}{3}} = 5$
$x = \frac{-8}{27}$ or/*of* $x = 125$

✓ factors/*faktore*
✓ $x^{\frac{1}{3}} = \frac{-2}{3}$ or/of $x^{\frac{1}{3}} = 5$
✓ answer/*antwoord*

(3)

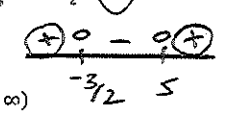
1.2.1

$2x^2 - 7x - 15 \geq 0$
$(2x + 3)(x - 5) \geq 0$ ✓
$x \leq \frac{-3}{2}$ or/*of* $x \geq 5$ ✓ ✓

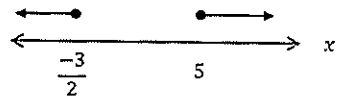


OR/OF

$x \in \left(-\infty; \frac{-3}{2}\right]$ 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.*

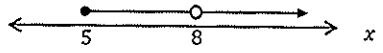
✓ factors/*faktore*
✓ $\frac{-3}{2}$; 5
✓✓ answer/*antwoord*

(4) **4**

1.2.2

$x \geq 5$; $x \neq 8$ ✓ ✓

OR/OF



✓ $x \geq 5$
✓ $x \neq 8$

(2) **2**

[15]

QUESTION 2/*VRAAG 2*

2.1

$4^{x+y} = 2^{y+4}$
$2^{2x+2y} = 2^{y+4}$
$2x + 2y = y + 4$
$y = -2x + 4$

✓ 2^{2x+2y}

✓ $y = -2x + 4$

$2x^2 - 3xy = -4$
$2x^2 - 3x(-2x + 4) = -4$
$2x^2 + 6x^2 - 12x + 4 = 0$
$8x^2 - 12x + 4 = 0$
$2x^2 - 3x + 1 = 0$
$(2x - 1)(x - 1) = 0$

✓ substitution/*substitusie*

✓ standard form/*standaardvorm*

✓ factors/*faktore*

$x = \frac{1}{2}$ or/*of* $x = 1$
$y = 3$ or/*of* $y = 2$

✓ x-values/*waardes*
✓ y-values/*waardes*

If a candidate makes a mistake and both equations become linear, max. 3 marks.

Indien 'n kandidaat 'n fout begaan en beide vergelykings word lineër, maks. 3 punte.

OR/*OF*

$4^{x+y} = 2^{y+4}$
$2^{2x+2y} = 2^{y+4}$
$2x + 2y = y + 4$
$x = \frac{-y}{2} + 2$

✓ 2^{2x+2y}

✓ $x = \frac{-y}{2} + 2$

$2x^2 - 3xy = -4$
$2\left(\frac{-y}{2} + 2\right)^2 - 3y\left(\frac{-y}{2} + 2\right) = -4$
$\frac{y^2}{2} - 4y + 8 + \frac{3y^2}{2} - 6y = -4$
$4y^2 - 20y + 24 = 0$
$y^2 - 5y + 6 = 0$
$(y - 3)(y - 2) = 0$
$y = 3$ or/*of* $y = 2$
$x = \frac{1}{2}$ or/*of* $x = 1$

✓ 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*

✓ -11

✓ conclusion/*gevolgtrekking*

(2)

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.

[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* $= -4$

$2a = -4$
$a = -2$

✓ Second difference/ *Tweede verskil*

✓ a-value/*waarde*

$3a + b = 8$
$-6 + b = 8$
$b = 14$

✓ b-value/*waarde*

$a + b + c = 2$
$-2 + 14 + c = 2$
$c = -10$

✓ c-value/*waarde*

$T_n = -2n^2 + 14n - 10$

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) $5a + b = 4$

✓ method/*metode*

$2a = -4$
$a = -2$
$b = 14$
$c = -10$

✓ a-value/*waarde*
✓ b-value/*waarde*
✓ c-value/*waarde*

$T_n = -2n^2 + 14n - 10$

(4)
[5]

QUESTION 4/VRAAG 4

4.1.1	$3 ; \frac{64}{250}$	✓ 3 ✓ $\frac{64}{250}$ $\frac{32}{125}$ (2)	2
4.1.2	$3 ; \frac{1}{2} ; 3 ; \frac{4}{10} ; 3 ; \frac{16}{50} ; \ldots$ 3; 3; 3; ... (18 terms/*terme*) $\frac{1}{2} ; \frac{4}{10} ; \frac{16}{50} ; \ldots$ (GS/MR 17 terms/*terme*) 18 ; 17 $S_{35} = 18(3) + \frac{\frac{1}{2}\left(\left(\frac{4}{5}\right)^{17}-1\right)}{\frac{4}{5}-1}$ $S_{35} = 54 + 2{,}44\ldots$ $S_{35} = 56{,}44$	✓ identifies two patterns/ *identifiseer twee patrone* ✓ substitution/*substitusie* ✓ 54 ✓ 2,44... ✓ answer/*antwoord* (5)	5
4.2	$T_1 = 5.3^{1-3} = 5.3^{-2} = \frac{5}{9}$; $T_2 = 5.3^{1-4} = 5.3^{-3} = \frac{5}{27}$ $a = \frac{5}{9}$; $r = \frac{1}{3}$ $S_\infty = \frac{a}{1-r}$ $S_\infty = \frac{\frac{5}{9}}{1-\frac{1}{3}}$ $S_\infty = \frac{5}{6}$ or/*of* 0,83	Answer ONLY: 1 mark / *SLEGS antwoord: 1 punt* ✓ a-value/*waarde* ✓ r-value/*waarde* If a candidate substitutes incorrect r-value, CA only if $-1 < r < 1$. / *Indien kandidaat verkeerde r-waarde vervang, CA slegs as* $-1 < r < 1$. ✓ substitution/*substitusie* ✓ answer/*antwoord* (4) [11]	4

From (1): $k - md + d = a$

Into (2): $m = k - md + d + kd - d$

$m - k = d(-m + k)$

$\frac{m-k}{-m+k} = d$

$\frac{m-k}{-(m-k)} = d$

$-1 = d$

QUESTION 5/VRAAG 5

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

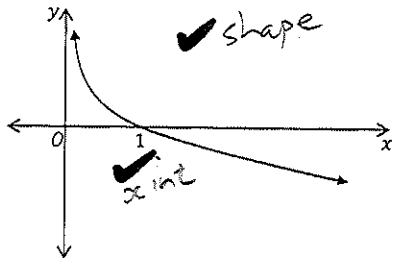
QUESTION 6/*VRAAG 6*

6.1	$A = P(1-i)^n$ $83\,543 = 245\,000(1-0{,}13)^n$ $(0{,}34\ldots) = 0{,}87^n$ Wrong formula: 0 marks *Verkeerde formule: 0 punte* $n = \frac{\log(0{,}34\ldots)}{\log(0{,}87)}$ $n = 7{,}73$ years/*jare* 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	$P = \frac{x[1-(1+i)^{-n}]}{i}$ $405\,000 = \frac{x\left[1-\left(1+\frac{0{,}08}{12}\right)^{-240}\right]}{\frac{0{,}08}{12}}$ Wrong formula: max 1 mark (*i*) *Verkeerde formule:* *maks. 1 punt (i)* $x = R3\,387{,}58$	✓ *i* ✓ correct formula/*formule* ✓ substitution/*substitusie* ✓ answer/*antwoord* (4)
6.2.3	Balance/*balans* $= \frac{x[1-(1+i)^{-n}]}{i}$ $= \frac{3\,387{,}58\left[1-\left(1+\frac{0{,}08}{12}\right)^{-36}\right]}{\frac{0{,}08}{12}}$ $= R108\,103{,}79$ If no rounding from 6.2.2 balance = R108 103,87 *Indien geen afronding uit 6.2.2* *balans* = R108 103,87 OR/*OF* Bal. $= 405\,000\left(1+\frac{0{,}08}{12}\right)^{204} - \frac{3\,387{,}58\left[\left(1+\frac{0{,}08}{12}\right)^{204}-1\right]}{\frac{0{,}08}{12}}$ $= R108\,104{,}85$	✓ 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* $x = 0$ $y = \frac{2}{5} - 2 = -1\frac{3}{5}$ $(0\,;\,-1\frac{3}{5})$ 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* $(-5\,;\,-2)$, $(0\,;\,-1\frac{3}{5})$ $m = \frac{-2-\left(-\frac{8}{5}\right)}{-5} = \frac{2}{25}$ $y = \frac{2}{25}x - \frac{8}{5}$	✓ $c = -\frac{8}{5}$ ✓ 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* $(-10\,;\,-\frac{12}{5})$	✓ setting up equation/*opstel van vergelyking* ✓ standard form/*standaardvorm* ✓ factors/*faktore* ✓ answer/*antwoord* (4)

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* (2)	✓ decreasing/*afnemend* ✓ reason/*rede*
7.2.2	$y > -2$ $y \in (-2; \infty)$ (1)	✓ answer/*antwoord*
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* $y = \frac{-\log x}{\log 5}$ (2)	✓ interchange x and y / *ruil x en y* ✓ equation/*vergelyking*
7.2.4	 (2)	✓ 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.*
7.2.5	$0 < x \leq 5$ $x \in (0; 5]$ (2) [21]	✓ $x > 0$ ✓ $x \leq 5$

$f^{-1}(x) \geq -1$

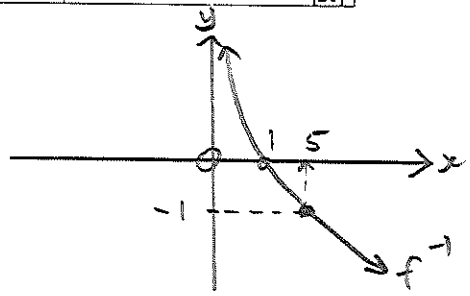
$f^{-1}(x) = -1$

$\log_{\frac{1}{5}} x = -1$

$\left(\frac{1}{5}\right)^{-1} = x$

$5 = x$

$\therefore \quad x \in (0; 5]$



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* $x = 3$ (3)	✓ $f(x) = 0$ ✓ factors/*faktore* ✓ both/*albei x*
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* $12\frac{1}{4}$ (2)	✓ x-value/*waarde* ✓ y-value/*waarde* $R\left(-\frac{1}{2}; \frac{49}{4}\right)$ 12; 25 ✓ x-value/*waarde* ✓ y-value/*waarde* ✓ x-value/*waarde* ✓ y-value/*waarde* ✓ x-value/*waarde* ✓ y-value/*waarde*
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* $x = \frac{-5}{2}$ $M\left(\frac{-5}{2}; 0\right)$ (4)	✓ setting up equation/*opstel van vergelyking* ✓ standard form/*standaardvorm* ✓ factors/*faktore* ✓ answer/*antwoord*

$y_K - y_L = \frac{27}{4}$

8.4	$x < -4$ or/*of* $0 < x < 3$ $x \in (-\infty; -4)$ or $(0; 3)$	✓ $x < -4$ ✓ $0 < x < 3$ (2)	2
8.5	$-x^2 - x + 12 = k$ $-x^2 - x + 12 - k = 0$ $\frac{-1}{4} < 12 - k < 0$ $-12\frac{1}{4} < -k < -12$ $12 < k < 12\frac{1}{4}$ $\frac{49}{4} > k > 12$	✓ $\frac{-1}{4} < 12 - k < 0$ ✓ $12 < k < 12\frac{1}{4}$ (2)	2
8.6	$h(x) = -\left(x - 2\frac{1}{2}\right)^2 + 12\frac{1}{4}$ • y same : $y = \frac{49}{4}$ •	✓ $-\left(x - 2\frac{1}{2}\right)^2$ ✓ $12\frac{1}{4}$ (2) [15]	2

$x_R = -\frac{1}{2}$ $x = 1$ x_{new}

$\frac{-\frac{1}{2} + x_{new}}{2} = 1$ ∴ new tp $\left(\frac{5}{2}; \frac{49}{4}\right)$

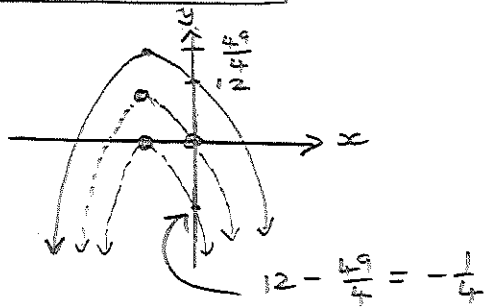
$x_{new} = \frac{5}{2}$

8.5. $-x^2 - x + 12 = k$

$-x^2 - x + 12 - k = 0$

$-x^2 - x + 12 - k = y$

$c = 12 - k$ ↑↓



$-\frac{1}{4} < c < 0$

$-\frac{1}{4} < 12 - k < 0$

$-\frac{49}{4} < -k < -12$

$\frac{49}{4} > k > 12$

QUESTION 9/*VRAAG 9*

9.1	$f(x) = -5x^2 + 2x$ $f'(x) = \lim_{h\to 0}\frac{f(x+h) - f(x)}{h}$ $= \lim_{h\to 0}\frac{-5(x+h)^2 + 2(x+h) - (-5x^2 + 2x)}{h}$ $= \lim_{h\to 0}\frac{-5(x^2 + 2xh + h^2) + 2x + 2h + 5x^2 - 2x)}{h}$ $= \lim_{h\to 0}\frac{-5x^2 - 10xh - 5h^2 + 2x + 2h + 5x^2 - 2x}{h}$ $= \lim_{h\to 0}\frac{-10xh - 5h^2 + 2h}{h}$ $= \lim_{h\to 0}\frac{h(-10x - 5h + 2)}{h}$ cf $= \lim_{h\to 0}(-10x - 5h + 2)$ $= -10x + 2$ Penalise 1 mark for incorrect use of formula. Must show $f'(x)$. *Penaliseer 1 punt vir verkeerde gebruik van formule. Moet $f'(x)$ toon.* Answer ONLY: 0 marks *SLEGS antwoord: 0 punte*	✓ formula/*formule* ✓ substitution of/*substitusie van* $(x+h)$ ✓ simplification to/ *vereenvoudiging na* $(-10xh - 5h^2 + 2h)$ ✓ common factor/*gemene faktor* ✓ answer/*antwoord* (5)	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)	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]	5

$9x^2 - 1 = 0$

$x^2 = \frac{1}{9}$ ✓

$x = \pm\sqrt{\frac{1}{9}}$ ✓

$= \pm\frac{1}{3}$ ✓

QUESTION 10/*VRAAG 10*

10.1.1	$f(x) = x^3 - 5x^2 - 8x + 12$ $f(1) = 0 \therefore x - 1$ is factor $(x-1)(x^2 - 4x + 12) = 0$ $(x-1)(x-6)(x+2) = 0$ $\therefore x = 1; 6$ or -2 $\therefore A(-2;0)$ and $B(1;0)$	✓ $(x-6)$ ✓ $(x^2+x-2)=0$ ✓ $(x+2)(x-1)$ ✓ 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	$\frac{dA}{dx} = 100 - 4x = 0$	✓ $100 - 4x = 0$

	$-4x = -100$ $x = 25$ $A = 100(25) - 2(25)^2$ $= 1\,250\ cm^2$	✓ *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)	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)	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]	2
		TOTAL/*TOTAAL*:	**150**