

142 → 150

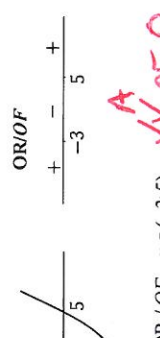
This marking guideline consists of 19 pages.
Hierdie nasienriglyne bestaan uit 19 bladsye.

NOTE/LET WEL:

- If a candidate answers a question TWICE, mark the FIRST attempt ONLY.
Indien 'n kandidaat 'n vraag TWEE keer beantwoord, merk SLEGS die EERSTE poging.
- Consistent accuracy applies in ALL aspects of the marking guideline.
Volgehoue akkuraatheid geld deurlopend in ALLE aspekte van die nasienriglyne.
- 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 vir substitusie in die korrekte formule toegeken.

QUESTION 1/VRAG 1

1.1.1	$x^2 - 3x - 4 = 0$ $(x + 1)(x - 4) = 0$ $x = -1$ or/of $x = 4$ Answers only: <i>Antwoorde alleen</i> (2/3)	✓ factors/faktore ✓ $x = -1$ ✓ $x = 4$	3		
OR/OF					
Can use quadratic formula / Kan kwadrateuse formule gebruik					
$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $= \frac{-(-3) \pm \sqrt{(-3)^2 - 4(1)(-4)}}{2(1)}$ $= \frac{3 \pm \sqrt{25}}{2}$ $\therefore x = 4$ or / of $x = -1$				✓ correct substitution / <i>korrekte vervanging</i> ✓✓ answers / antwoorde	(3)
1.1.2	$2x^2 - x - 7 = 0$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $x = \frac{-(-1) \pm \sqrt{(-1)^2 - (4)(2)(-7)}}{2(2)}$	✓ substitution/vervanging ✓ $x = 2,14$ ✓ $x = -1,64$	3		
$= \frac{1 \pm \sqrt{57}}{4}$ $x = 2,14$ or/of $x = -1,64$				Penalties 1 mark for incorrect rounding off <i>Penaltyser 1 punt vir verkeerde afronding</i>	(3)

<p>1.1.3</p> <p>$5^{x+1} - 5^x = 2500$ $5^x \cdot 5^1 - 5^x = 2500$ $5^x(5-1) = 2500$ $5^x \cdot 4 = 2500$ $5^x = 625$ $5^x = 5^4$ $\therefore x = 4$</p>	<p>✓ factorisation/faktorisering</p> <p>✓ $5^x = 625$</p> <p>✓ $x = 4$</p>
<p>1.1.4</p> <p>$(x-3)(x+1) < 12$ $x^2 - 2x - 3 - 12 < 0$ $x^2 - 2x - 15 < 0$ $(x-5)(x+3) < 0$</p>  <p>OR/OF</p> <p>$-3 < x < 5$ OR/OF $x \in (-3, 5)$</p>	<p>✓ standard form/standaardvorm</p> <p>✓ factorisation/faktorisering</p> <p>✓ $-3 < x < 5$ (accuracy) (akkuraatheid)</p>
<p>1.2</p> <p>$y = 2x - 1$(1) $3x^2 - xy - y^2 = 1$(2)</p> <p>(1) into (2)</p> <p>$3x^2 - x(2x-1) - (2x-1)^2 = 1$ $3x^2 - 2x^2 + x - (4x^2 - 4x + 1) = 1$ $3x^2 - 2x^2 + x - 4x^2 + 4x - 1 - 1 = 0$ $-3x^2 + 5x - 2 = 0$ $3x^2 - 5x + 2 = 0$ $(3x-2)(x-1) = 0$ $\therefore x = \frac{2}{3}$ or/of $x = 1$</p> <p>$y = 2\left(\frac{2}{3}\right) - 1$ or/of $y = 2(1) - 1$ $y = \frac{1}{3}$ or/of $y = 1$</p>	<p>✓ substitution/vervanging</p> <p>✓ standard form/standaardvorm</p> <p>✓ factorisation/faktorisering</p> <p>✓ x-values/waardes</p> <p>✓ y-values/waardes</p>

<p>OR/OF</p> <p>$x = \frac{y+1}{2}$(1) $3x^2 - xy - y^2 = 1$(2)</p> <p>(1) into (2),</p> <p>$3\left(\frac{y+1}{2}\right)^2 - y\left(\frac{y+1}{2}\right) - y^2 = 1$ $3\left(\frac{y^2+2y+1}{4}\right) - \frac{y^2+y}{2} - y^2 = 1$ $3y^2 + 6y + 3 - 2y^2 - 2y - 4y^2 - 4 = 0$ $-3y^2 + 4y - 1 = 0$ $3y^2 - 4y + 1 = 0$ $(3y-1)(y-1) = 0$ $\therefore y = \frac{1}{3}$ or $y = 1$ or/of $x = \left(\frac{1+1}{2}\right)$ $x = \frac{2}{3}$ or/of $x = 1$</p>	<p>✓ $x = \frac{y+1}{2}$</p> <p>✓ substitution/vervanging</p> <p>✓ standard form/standaardvorm</p> <p>✓ factorisation/faktorisering</p> <p>✓ y-values/waardes</p> <p>✓ x-values/waardes</p>
<p>1.3</p> <p>$f(x) = x^2 - 2px + 8 + 2p$</p> <p>Forequal roots: Vir gelyke wortels:</p> <p>$b^2 - 4ac = 0$ $(-2p)^2 - 4(1)(2p+8) = 0$ $4p^2 - 8p - 32 = 0$ $p^2 - 2p - 8 = 0$ $(p+2)(p-4) = 0$ $\therefore p = -2$ or/of $p = 4$ but/maar: $p < 0 \Rightarrow p = -2$</p> <p>So, $f(x) = x^2 + 4x + 4$ $\therefore h(x) = x^2 + 4x + 1$ $= x^2 + 4x + 4 - 4 + 1$ $= (x+2)^2 - 3$ $\therefore TP: (-2, -3)$</p>	<p>✓ $b^2 - 4ac = 0$</p> <p>✓ substitution/vervanging</p> <p>✓ p-values / waardes</p> <p>✓ $h(x) = x^2 + 4x + 1$</p> <p>✓ answer in coordinate form/antwoord in koördinaatvorm</p>

$f(x) = x^2 - 2(-2)x + 8 + 2(-2)$
 $= x^2 + 4x + 8 - 4$
 $= x^2 + 4x + 4 - 4 + 1$
 $= (x+2)^2 - 3$

2.3

$T_4 = a + 3d$ and/en $T_{10} = a + 9d$ $\therefore T_{10} - T_4 = 6d$ $6d = (8x - 2y) - (2x + y)$ $= 6x - 3y$ $\therefore d = x - \frac{1}{2}y$ $T_4 = a + 3d$ $2x + y = a + 3(x - \frac{1}{2}y)$ $2x + y = a + 3x - \frac{3}{2}y$ $\therefore a = \frac{5}{2}y - x$	$T_{10} - T_4 = 6d$ $6d = (8x - 2y) - (2x + y)$ $d = x - \frac{1}{2}y$ substitution/vervangung value of a / waarde van a
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(5) [19]

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QUESTION 3/VR44G 3

<p>3.1</p> $T_1 = (x-1)$ $T_2 = (x-1)^2$ $\therefore r = x-1$ for convergence: / vir konvergensie $-1 < r < 1$ $\therefore -1 < x-1 < 1$ $0 < x < 2$	$-1 < r < 1$ answer/antwoord
<p>3.2</p> When / Wanneer: $x = \frac{2}{3}$ $p = (\frac{2}{3}-1) + (\frac{2}{3}-1)^2 + (\frac{2}{3}-1)^3 + \dots$ $p = (-\frac{1}{3}) + (\frac{1}{9}) + (-\frac{1}{27}) + \dots$ $\therefore a = -\frac{1}{3}$ and/en $r = -\frac{1}{3}$ $\therefore S_{\infty} = \frac{a}{1-r}$ $= \frac{-\frac{1}{3}}{1-(-\frac{1}{3})}$ $= -\frac{1}{4}$	\checkmark substituting for x vervangung vir x \checkmark values for a and r waardes vir a en r \checkmark substituting into S_{∞} formula vervangung in S_{∞} formule answer/antwoord

2

4

2.3

$$T_4 = 2x + y$$

$$a + 3d = 2x + y \dots 1$$

$$T_{10} = 8x - 2y$$

$$a + 9d = 8x - 2y \dots 2$$

$$(1) \times -3: -3a - 9d = -6x - 3y$$

$$(2) \times 1: a + 9d = 8x - 2y$$

$$\begin{matrix} -3a - 9d = -6x - 3y \\ a + 9d = 8x - 2y \\ \hline -2a = 2x - 5y \\ a = -x + \frac{5}{2}y \end{matrix}$$

5

QUESTION 4/VR44G 4

<p>4.1</p> $x = -3$ $y = 1$	$\checkmark x = -3$ $\checkmark y = 1$	<p>(2)</p> substitution/vervangung
<p>4.2</p> $1 + \frac{2}{x+3} = 0$ $\frac{2}{x+3} = -1$ $2 = -x-3$ $x = -5$ $y = 1 + \frac{2}{0+3} = \frac{5}{3}$ 1,67	\checkmark substitution/vervangung \checkmark x-intercept/x-afsnit \checkmark y-intercept/y-afsnit	<p>(3)</p>
<p>4.3</p>	\checkmark asymptotes / asymptote \checkmark x-intercept / x-afsnit \checkmark y-intercept / y-afsnit \checkmark shape / vorm	<p>(4)</p>
<p>4.4</p> $h(x) = \frac{-2}{x+3} - 1$ point of intersection of asymptotes snytpunt van asymptote $(-3, -1)$ or/of $y = -(-x-p)+q$ $y = (x-(-3))-1$ or/of $y = -(x-3)-1$ $y = x+2$	$\checkmark h(x) = \frac{-2}{x+3} - 1$ \checkmark substitute point of intersection of asymptotes / vervang die snytpunt van asymptote \checkmark answer/antwoord	<p>(4)</p>

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f. $y = \frac{2}{x+3} + 1$
 or $y = -(x+3) - 1 = -x - 3 - 1 = -x - 4$
 h. $-y = \frac{2}{x+3} + 1$
 $y = -\frac{2}{x+3} - 1$
 reject

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<p>4.4</p>	<p>OR/OF</p> <p>$h(x) = \frac{-2}{x+3} - 1$</p> <p>point of intersection of asymptotes <i>snytpunt van asimptote</i> $(-3, -1)$</p> <p>$y = x + k$ $-1 = -3 + k$ $k = 2$</p> <p>$\therefore y = x + 2$</p> <p>(4) 113</p>
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QUESTION 5/PRAAG 5

<p>5.1</p>	<p>$(0, -8)$</p> <p>$y = mx + c$ $y = mx - 8$ $10 = 9m - 8$ $m = 2$</p> <p>$\therefore y = 2x - 8$</p> <p>OR/OF</p> <p>$m_{TQ} = \frac{10 - (-8)}{9 - 0}$</p> <p>$m = 2$</p> <p>$\therefore y = 2x - 8$</p>	<p>✓ answer / antwoord (1)</p> <p>✓ $c = -8$</p> <p>✓ substituting $T(9, 10)$ into equation of line / <i>vervang van $T(9, 10)$ in vergelyking van lyn</i></p> <p>✓ equation / vergelyking</p> <p>✓ substituting T and Q into m_{TQ} / <i>vervang van T en Q in m_{TQ}</i></p> <p>✓ $m = 2$</p> <p>✓ equation (3)</p>
<p>5.3</p>	<p>$y = x^2 - 7x - 8$</p> <p>$= x^2 - 7x + (-\frac{7}{2})^2 - 8 - (-\frac{7}{2})^2$</p> <p>$= (x - \frac{7}{2})^2 - \frac{81}{4}$</p> <p>$(\frac{7}{2}, -\frac{81}{4})$</p> <p>$(3, 5; -20, 25)$</p>	<p>✓ completing the square / <i>vierkantsvoltooiing</i></p> <p>✓ equation / vergelyking (2)</p> <p>✓ x- coordinate / <i>koördinaat</i></p> <p>✓ y- coordinate / <i>koördinaat</i> (2)</p>

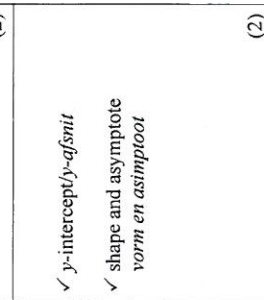
5.5

<p>Ave gradient/Gem. graadient</p> <p>$\frac{y-10}{x-9} = 1$</p> <p>$y - 10 = x - 9$ $y = x + 1$</p> <p>$f(x) = x^2 - 7x - 8$ $x + 1 = x^2 - 7x - 8$ $0 = x^2 - 8x - 9$ $0 = (x - 9)(x + 1)$ $\therefore x = 9$ or / of -1 $y = 10$ or / of 0 $\therefore W(-1; 0)$</p> <p>OR/OF</p> <p>$\frac{x^2 - 7x - 8 - (10) - 1}{x - (9)} = 1$</p> <p>$x^2 - 7x - 18 = x - 9$ $x^2 - 8x - 9 = 0$ $(x - 9)(x + 1) = 0$ $x = 9$ or / of $x = -1$ $y = 10$ or / of $y = 0$ $\therefore W(-1; 0)$</p>	<p>$T(9, 10)$</p> <p>W on f</p> <p>$y = x^2 - 7x - 8$</p> <p>(x, y)</p> <p>$x - 9 = 9$</p>	<p>✓ method/metode</p> <p>✓ making y the subject / <i>maak y die onderwerp</i></p> <p>✓ equating 2 equations / <i>gelykstel van 2 vergelykings</i></p> <p>✓ factors/faktore</p> <p>✓ specifying coordinates for W / <i>spesifiseer W se koördinate</i></p> <p>✓ $\frac{x^2 - 7x - 8 - (10)}{x - (9)}$</p> <p>✓ equating to 1 / <i>gelykstel aan 1</i></p> <p>✓ standard form/standaardvorm</p> <p>✓ factors/faktore</p> <p>✓ specifying coordinates for W. / <i>spesifiseer W se koördinate</i></p> <p>OR/OF</p> <p>$f'(x) = 2x - 7$ $f'(9) = 2(9) - 7 = 11$</p> <p>$\frac{f'(9) + f'(x)}{2} = 1$ $\frac{11 + 2x - 7}{2} = 1$ $\frac{2x + 4}{2} = 1$ $x + 1 = 1$ $x = -1$ $y = 0$ $\therefore W(-1; 0)$</p> <p>✓ coordinates of W / <i>koördinate van W</i> (5)</p>
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<p>5.6</p> $x^2 - 7x - 8 = 0$ $(x - 8)(x + 1) = 0$ $\therefore P(-1; 0) \text{ and } / \text{ en } R(8; 0)$ $y = 2x - 8$ $0 = 2x - 8$ $\therefore V(4; 0)$ $\therefore x < -1 \text{ or } / \text{ of } 4 < x < 8$ <p>OR / OF</p> $x \in (-\infty; -1) \cup (4; 8)$	<p>✓ x intercepts of f x-afsnitte van f</p> <p>✓ x intercept of g x-afsnit van g</p> <p>✓ $x < -1$ accuracy/akkuraathheid ✓ $4 < x < 8$ accuracy/akkuraathheid</p> <p>(4) (17)</p>
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QUESTION 6/VRAAG 6

<p>6.1</p> $f(x) = \log_m x$ $3 = \log_m 64$ $m^3 = 64$ $m = \sqrt[3]{64}$ $\therefore m = 4$	<p>✓ substitution/vervanging ✓ answer/antwoord</p> <p>(2)</p>
<p>6.2</p> $f(x) = \log_4 x$ $\therefore f^{-1}: x = \log_4 y$ $y = 4^x$	<p>✓ interchanging x and y omruiling van x en y</p> <p>✓ answer / antwoord</p> <p>(2)</p>
<p>6.3</p> 	<p>✓ y-intercept/y-afsmit ✓ shape and asymptote vorm en asymptoot</p> <p>(2)</p>
<p>6.4</p> $y > -2$ $y \in (-2; \infty)$	<p>OR / OF</p> $f^{-1} \downarrow 2$ <p>OR / OF</p> <p>answer/antwoord OR / OF answer/antwoord</p> <p>(1) (7)</p>

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1

QUESTION 7/VRAAG 7

No penalty for rounding off in this question.
Geen penaliserings vir afronding in hierdie vraag nie.

<p>7.1</p> $A = P(1 - i)^n$ $R26700 = R40000(1 - i)^5$ $\sqrt[5]{\frac{26700}{40000}} - 1 = -i$ $-0,0777 \approx -i$ $\therefore r = 7,77\% \text{ p.a.}$	<p>✓ substitution into correct formula vervanging in korrekte formule</p> <p>✓ simplification / vereenvoudiging</p> <p>✓ value for r / waarde van r</p> <p>(3)</p>
<p>7.2.1</p> $P = \frac{x[1 - (1 + i)^{-n}]}{i}$ $R1200000 = \frac{x[1 - (1 + \frac{0,115}{12})^{-180}]}{\frac{0,115}{12}}$ $\therefore x = \frac{1200000(\frac{0,115}{12})}{[1 - (1 + \frac{0,115}{12})^{-180}]}$ $= R14\ 018,28$	<p>✓ $i = \frac{0,115}{12}$ and/en $n = 180$</p> <p>✓ substituting into correct formula vervanging in korrekte formule</p> <p>✓ answer/antwoord</p> <p>(3)</p>
<p>7.2.2 (a)</p> $\text{Balance} = \frac{x[1 - (1 + i)^{-n}]}{i}$ $= \frac{R14\ 018,28[1 - (1 + \frac{0,115}{12})^{-105}]}{\frac{0,115}{12}}$ $= R925\ 435,98(1 + \frac{0,115}{12})^5$ $= R970\ 637,89$	<p>(Balans)</p> <p>✓ $n = 105$ for / vir P and/en $n = 5$ for / vir A</p> <p>✓ substituting into correct P formula vervanging in korrekte P formule</p> <p>✓ substituting into correct A formula vervanging in korrekte A formule</p> <p>✓ $P(1 + \frac{0,115}{12})^5$</p> <p>✓ answer/antwoord</p> <p>(5)</p>

PTO

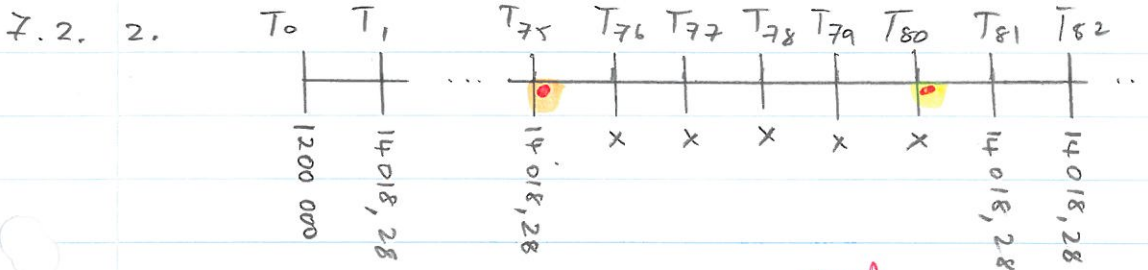
$$7.2.1. \quad P = \frac{x [1 - (1+i)^{-n}]}{i}$$

15x12

$$1200\ 000 = \frac{x [1 - (1 + \frac{11,5}{1200})^{-180}]}{\frac{11,5}{1200}}$$

= 180

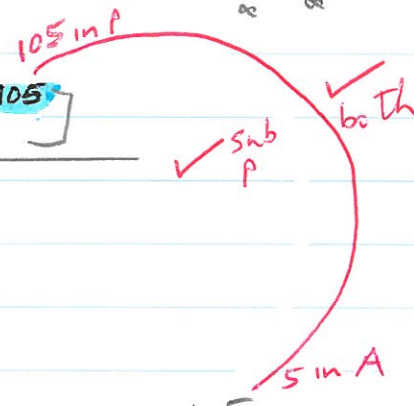
$$\therefore \underline{x = R\ 14\ 018,28} \rightarrow$$



(a)

$$P = \frac{14018,28 [1 - (1 + \frac{11,5}{1200})^{-105}]}{\frac{11,5}{1200}}$$

$$= \underline{925\ 435,97 \dots}$$



(NB)
Time remaining
= 180 - 75
= **105**

$$A = P(1+i)^n$$

$$= 925\ 435,97 \dots \left(1 + \frac{11,5}{1200}\right)^5$$

$$= \underline{R\ 970\ 637,89} \rightarrow$$

5
sub in A
method CB grow 5
T75

(OR)

n = 75 in both ✓

$$OB_{75} = 1200\ 000 \left(1 + \frac{11,5}{1200}\right)^{75} - \frac{14018,28 [(1 + \frac{11,5}{1200})^{75} - 1]}{\frac{11,5}{1200}}$$

$$= 2453828,34 - 1528392,76$$

$$= 925\ 435,57 \dots$$

$$OB_{80} = 925\ 435,57 \dots \left(1 + \frac{11,5}{1200}\right)^5$$

$$= \underline{R\ 970\ 637,47} \rightarrow$$

5

12.1.

7.2.2.(a)

$$(b) \quad 970\,637,89 = \frac{14018,28 \left[1 - \left(1 + \frac{11,5}{1200} \right)^{-n} \right]}{\frac{11,5}{1200}} \quad \checkmark$$

$$0,663 \dots = 1 - \left(\frac{2423}{2400} \right)^{-n}$$

$$\left(\frac{2423}{2400} \right)^{-n} = 0,336 \dots$$

$$-n = \frac{\log 0,336 \dots}{\log \frac{2423}{2400}} \quad \checkmark$$

$$= -114,21 \dots$$

$$n = 114,21 \dots$$

\therefore 115 full months \rightarrow

$$P = 970\,637,47 \quad n = 114,21 \dots \quad \text{also}$$

<p>OR/OF</p> <p>Outstanding Balance after 75 months: $= A - F_v$ $= 1200000 \left(1 + \frac{11,5\%}{12} \right)^{75} - \frac{14018,28 \left[\left(1 + \frac{11,5\%}{12} \right)^{75} - 1 \right]}{\frac{11,5\%}{12}}$ $= 2\,453\,828,34 - 1\,528\,392,76$ $= R\,925\,435,58$</p> <p>Outstanding Balance after 80 months: $= 925\,435,58 \left(1 + \frac{11,5\%}{12} \right)^5$ $= R\,970\,637,48$</p>	<p>✓ $n = 75$ for both formulae / vir albei formules</p> <p>✓ substituting into correct F formula / vervanging in korrekte F-formule</p> <p>✓ substituting into correct A formula / vervanging in korrekte A-formule</p> <p>✓ $P(1 + \frac{0,115}{12})^5$</p> <p>✓ answer/antwoord</p>
<p>7.2.2 (b)</p> <p>$P = \frac{x[1 - (1+i)^{-n}]}{i}$</p> <p>$R\,970\,637,89 = \frac{R\,140\,18,28[1 - (1 + \frac{0,115}{12})^{-n}]}{\frac{0,115}{12}}$</p> <p>$970\,637,89(\frac{0,115}{12})^{-n} - 1 = -(1 + \frac{0,115}{12})^{-n}$</p> <p>$-0,3364416715 = -(\frac{2423}{2400})^{-n}$</p> <p>$\therefore -n = \frac{\log 0,3364416715}{\log \frac{2423}{2400}}$</p> <p>$= -114,2130673$</p> <p>$\therefore n = 115$ months/maande</p>	<p>✓ $P = R\,970\,637,89$</p> <p>✓ substituting into correct formula / vervanging in korrekte formule</p> <p>✓ correct use of logs / korrekte gebruik van logs</p> <p>✓ final answer/finale antwoord</p>

<p>QUESTION 8/VRAG 8</p>	<p>Penalise once for notation in this question Penaliseer een keer vir notasie in hierdie vraag</p> <p>8.1</p> <p>$f(x) = 3 - 2x^2$</p> <p>$f(x+h) = 3 - 2(x+h)^2$ $= 3 - 2(x^2 + 2hx + h^2)$ $= 3 - 2x^2 - 4hx - 2h^2$</p> <p>$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ $= \lim_{h \rightarrow 0} \frac{3 - 2x^2 - 4hx - 2h^2 - (3 - 2x^2)}{h}$ $= \lim_{h \rightarrow 0} \frac{3 - 2x^2 - 4hx - 2h^2 - 3 + 2x^2}{h}$ $= \lim_{h \rightarrow 0} \frac{h(-4x - 2h)}{h}$ $= \lim_{h \rightarrow 0} (-4x - 2h)$ $= -4x + 2(0)$ $= -4x$</p> <p>8.2.1</p> <p>$D_x[x(x-2)^3]$ $= D_x[x(x^2 - 4x + 4)]$ $= D_x[x^3 - 4x^2 + 4x]$ $= 3x^2 - 8x + 4$</p> <p>8.2.2</p> <p>$y = ax^3 - \frac{2x}{\sqrt{x}}$ $y = ax^3 - \frac{2x}{x^{\frac{1}{2}}}$ $= ax^3 - 2x^{\frac{3}{2}}$</p> <p>$\frac{dy}{dx} = \frac{3}{1}ax^{2} - x^{\frac{1}{2}}$</p>
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num
 $\lim_{h \rightarrow 0} \frac{-4xh - h^2}{h}$

penalise notation once only
 $\frac{dy}{dx} = \frac{3}{1}ax^2 - x^{\frac{1}{2}}$

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3

QUESTION 9/VR4AG 9

9.1	$x = -\frac{1}{3}$ and/en $x = 1$	$\checkmark x = -\frac{1}{3}$ $\checkmark x = 1$	(2)
9.2	$x = (1 + (-\frac{1}{3})) \div 2$ $= \frac{1}{3}$	$\checkmark \checkmark$	(2)
9.3	$g(x)$ is increasing when $g'(x) > 0$ $g(x)$ is stygend wanneer $g'(x) > 0$	$\checkmark \checkmark$	(2)
9.4	$y = a(x-x_1)(x-x_2)$ $= a(x+\frac{1}{3})(x-1)$ $\therefore 1 = a(0+\frac{1}{3})(0-1)$ $1 = -\frac{1}{3}a$ $\therefore a = -3$	\checkmark \checkmark \checkmark \checkmark	(2)
	$y = -3(x+\frac{1}{3})(x-1)$ $= -3(x^2 - \frac{2}{3}x - \frac{1}{3})$ $g'(x) = -3x^2 + 2x + 1$	\checkmark \checkmark \checkmark	(4)
	OR/OF $y = a(x-x_1)(x-x_2)$ $= a(3x+1)(x-1)$ $\therefore 1 = a(3(0)+1)(0-1)$ $1 = -a$ $a = -1$	\checkmark \checkmark \checkmark \checkmark	(4)

2 2 2 4

9.5

$g(x) = ax^3 + bx^2 + cx + d$ $g'(x) = 3ax^2 + 2bx + c$ $= -3x^2 + 2x + 1$ $\therefore 3a = -3$ $2b = 2$ $c = 1$ $\therefore a = -1$ $b = 1$ $c = 1$ $\therefore y = -x^3 + x^2 + x + d + 1$ $0 = -0^3 + 0^2 + 0 + d + 1$ $\therefore d = -1$	$\checkmark g'(x) = 3ax^2 + 2bx + c$ $\checkmark 3a = -3$ $\checkmark 2b = 2$ $\checkmark a = -1; b = 1; c = 1$ \checkmark substitute (0;0) into $g(x)+1$ vervang van (0;0) in $g(x)+1$
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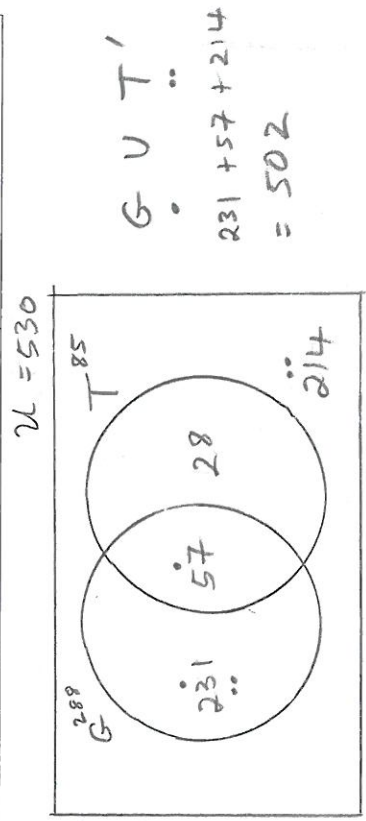
5

QUESTION 10/VRAAG 10

<p>10.1</p> <p>Let the two numbers be x and y <i>Laat die twee getalle x en y wees:</i></p> <p>$x + y = 18$ $\therefore y = 18 - x$</p> <p>Product/Product: $P(x) = yx^2$ $= (18 - x)x^2$ $= 18x^2 - x^3$</p> <p>Product is maximum when: $P'(x) = 0$ <i>Produkt is 'n maksimum wanneer: $P'(x) = 0$</i></p> <p>$P'(x) = 36x - 3x^2$ $36x - 3x^2 = 0$ $3x(12 - x) = 0$ $\therefore x = 0$ or $x = 12$ $\therefore y = 18 - 0 = 18$ or/of $y = 18 - 12 = 6$</p> <p>P is maximum when $x = 12$ <i>P is 'n maksimum wanneer $x = 12$</i></p> <p>\therefore the two numbers are: 12 and 6 <i>\therefore die twee getalle is: 12 en 6</i></p> <p>OR / OF</p> <p>Let the two numbers be x and y <i>Laat die twee getalle x en y wees</i></p> <p>$x + y = 18$ $\therefore y = 18 - x$</p> <p>Product/Product: $P(x) = xy^2$ $= x(18 - x)^2$ $= x(324 - 36x + x^2)$ $= 324x - 36x^2 + x^3$</p> <p>Product is maximum when: $P'(x) = 0$ <i>Produkt is 'n maksimum wanneer: $P'(x) = 0$</i></p> <p>$P'(x) = 324 - 72x + 3x^2$ $3x^2 - 72x + 324 = 0$ $x^2 - 24x + 108 = 0$ $(x - 18)(x - 6) = 0$ $\therefore x = 18$ or $x = 6$ $y = 18 - 18 = 0$ $y = 18 - 6 = 12$</p> <p>\therefore The two numbers are 12 and 6 <i>Die twee getalle is 12 en 6</i></p>	<p>$x + y = 18$ yx^2 substitution and simplification <i>vervang en vereenvoudig</i></p> <p>$P'(x)$ and equating to 0 <i>$P'(x)$ en gelykstel aan 0</i></p> <p>x-values/waardes y-values/waardes</p> <p>selection of the 2 numbers <i>keuse van die 2 getalle</i> (if/as $x = 0$, Product/Product = 0)</p> <p>$x + y = 18$ xy^2 substitution and simplification <i>vervang en vereenvoudig</i></p> <p>$P'(x)$ and equating to 0 <i>$P'(x)$ en gelykstel aan 0</i></p> <p>x-values/waardes y-values/waardes</p> <p>selection of the two numbers <i>keuse van die 2 getalle</i> ($P = 0$ when/wanneer $x = 18$)</p>
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QUESTION 11/VRAAG 11

<p>11.1.1</p> <p>$a = 111$ $b = 106$</p>	<p>\checkmark answer/antwoord \checkmark answer/antwoord</p>
<p>11.1.2 (a)</p> <p>P(a boy who plays cricket) / P'n seun wat krieket speel $= \frac{108}{530}$ or/of $\frac{54}{265}$</p>	<p>(2)</p> <p>\checkmark numerator/teller \checkmark denominator/hoener</p>
<p>11.1.2 (b)</p> <p>$P(A \text{ or } / \text{ of } B) = P(A) + P(B) - P(A \text{ and } / \text{ en } B)$ <i>P(girl or not a tennis player) / P(meisie of nie 'n tennispeleer nie)</i></p> <p>$= \frac{288}{530} + \frac{445}{530} - \frac{231}{530}$ $= \frac{502}{530}$ or/of $\frac{251}{265}$ or/of 94,72%</p> <p>OR/OF</p> <p>$P(\text{Girl or not Tennis})$ $= 1 - P(\text{Boy and Tennis})$ $= 1 - \frac{28}{530}$ $= \frac{502}{530}$ or/of $\frac{251}{265}$ or/of 94,72%</p>	<p>(2)</p> <p>\checkmark substitution into correct formula vervang in korrekte formule \checkmark answer / antwoord</p> <p>\checkmark method/metode \checkmark substitution/vervang \checkmark answer/antwoord</p>



11.2.1	9^9 or / of 387 420 489 ✓ If vowels are together / As die vokale saam is: $6! \times 4!$ ∴ If vowels are not all together: As die vokale nie almal saam is nie: $9! - (6! \times 4!) ✓$ $= 345 600 ✓$	✓ 9^9 ✓ $6! \times 4!$ ✓ subtracting from $9!$ ✓ aftrekking vanaf $9!$ ✓ answer/antwoord (3)
11.2.3	Vowels in odd spaces / Vokale in onevige spasies $= 4 \times 5 \times 3 \times 4 \times 2 \times 3 \times 1 \times 2$ $= (4 \times 3 \times 2 \times 1) \times (5 \times 4 \times 3 \times 2)$ $= 4! \times 120$ $= 2880$ ∴ Probability / Waarskynlikheid = $\frac{2880}{(9 \times 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2)}$ $= \frac{2880}{362880}$ $= \frac{1}{126} ✓$	✓ $4!$ ✓ $\times 120$ ✓ Vowels in odd spaces / Vokale in onevige spasies $\frac{(9 \times 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2)}{(9 \times 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2)}$ ✓ answer/antwoord (4) [15]

TOTAL/TOTAAL: 150

NUMER, A T O R₂
 i.e. all letters are different

Also accept :

$8^9 = 134\ 217\ 728 ✓$ $\frac{9!}{2!} - \frac{6! \times 4!}{2!} = 181\ 440 - 8640$ $= 172\ 800 ✓$	1
$4 \times 3 \times 2 \times 1 \times \frac{5 \times 4 \times 3 \times 2}{2!} = 1440$ Vowels odd ✓	
$\frac{9 \times 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2}{2!} = 181\ 440$ total ✓	4
∴ Probability = $\frac{1440}{181440} = \frac{1}{126} ✓$	

NUMERATOR
 i.e. 2 R's