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GRADE/GRAAD 12

SEPTEMBER 2022

**TECHNICAL MATHEMATICS P1 MARKING GUIDELINE/
TEGNIJSE WISKUNDE V1 NASIENRIGLYN**

MARKS/PUNTE: 150

MARKING CODES / NASIENKODES	
A	Accuracy/ <i>Akkuraatheid</i>
AO	Answer only / <i>Slegs antwoord</i>
CA	Consistent accuracy / <i>Volgehoue akkuraatheid</i>
M	Method / <i>Metode</i>
R	Rounding / <i>Afronding</i>
NPR	No penalty for rounding / <i>Geen penalisering vir afronding nie</i>
NPU	No penalty for units omitted / <i>Geen penalisering vir weglating van eenhede nie</i>
S	Simplification / <i>Vereenvoudiging</i>
F	Correct formula / <i>Korrekte formule</i>
SF	Substitution in the correct formula / <i>Vervanging in die korrekte formule</i>

This marking guideline consists of 16 pages. /
Hierdie nasienriglyn bestaan uit 16 bladsye.

NOTE:

- If a candidate answers a question TWICE, only mark the FIRST attempt.
- The method of consistent accuracy marking must be applied to all aspects of the marking guideline where applicable as indicated with the marking code CA.
- If a candidate strikes off a response to a question and does not attempt the question again, then the struck off question should be marked.

LET WEL:

- Indien 'n kandidaat 'n vraag TWEE keer beantwoord, sien slegs die EERSTE poging na.
- Die metode van volgehoue akkuraatheid-nasien moet waar moontlik op alle aspekte van die nasienriglyn toegepas word soos aangedui deur die nasienkode CA.
- Indien 'n kandidaat 'n antwoord deurhaal en nie poog om die vraag weer te beantwoord nie, dan moet die deurgehaalde antwoord gemerk word.

1.1.1	$x(x + 7) + 10 = 0$ $x^2 + 7x + 10 = 0$ $x = \frac{-7 \pm \sqrt{7^2 - 4(1)(10)}}{2(1)} \text{ OR/OF } (x + 7)(x + 5) = 0$ $\therefore x = -2 \text{ or/of } x = -5$	✓ standard form/standaardvorm A ✓ substitution / factorisation Substitusie / faktorisering SF ✓ both x-values / beide x-waardes CA (3)
1.1.2	$2x - 1 = \frac{4}{x}$ $2x^2 - x = 4$ $2x^2 - x - 4 = 0$ $x = \frac{-(-1) \pm \sqrt{(-1)^2 - 4(2)(-4)}}{2(-2)}$ $x = -1,69 \text{ or/of } x = 1,19$	✓ standard form/standaardvorm CA ✓ SF CA ✓ both x-values / beide x-waardes CA R (3)
1.1.3	$x^2 + \frac{7x}{2} + 3 \leq 0$ $x = \frac{-\left(\frac{7}{2}\right) \pm \sqrt{\left(\frac{7}{2}\right)^2 - 4(1)(3)}}{2(1)} \text{ OR / OF } (2x + 3)\left(\frac{x}{2} + 1\right) = 0$ Critical Values / Kritiese waardes: -2 en $-\frac{3}{2} \approx -1,5$ $\therefore -2 \leq x \leq -1,5 \text{ OR/OF } x \in [-2; -1,5] \text{ OR/OF}$ $x \leq -2 \text{ and/en } x \leq -1,5$	✓ factorisation/substitution Faktorisering / substitusie A ✓ both critical values/ beide kritiese waardes CA ✓ correct notation/ korrekte notasie A (3)

1.2	$x - y - 1 = 0 \dots\dots\dots(1)$ and/en $xy + y^2 = x \dots\dots\dots(2)$ $x = y + 1 \dots\dots\dots(3)$ $(y + 1)y + y^2 = y + 1$ $y^2 + y + y^2 = y + 1$ $2y^2 - 1 = 0$ $y = \frac{-0 \pm \sqrt{0^2 - 4(2)(-1)}}{2(2)} \text{ OR / OF } (\sqrt{2}y - 1)(\sqrt{2}y + 1) = 0$ $\therefore y = \pm \frac{1}{\sqrt{2}} = \pm 0,71$ $x = 1 \pm \frac{1}{\sqrt{2}}$ $\therefore x = 1,71 \text{ or/of } x = 0,29$ OR/OF $x - y - 1 = 0 \dots\dots\dots(1)$ and /en $xy + y^2 = x \dots\dots\dots(2)$ $y = x - 1 \dots\dots\dots(3)$ $x(x - 1) + (x - 1)^2 = x$ $x^2 - x + x^2 - 2x + 1 = x$ $2x^2 - 4x + 1 = 0$ $x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(2)(1)}}{2(2)}$ $\therefore x = 1,71 \text{ or / of } x = 0,29$ $y = 1,71 - 1 \text{ or/of } y = 0,29 - 1$ $\therefore y = \pm \frac{1}{\sqrt{2}} = \pm 0,71$	✓ <i>x</i> subject/<i>onderwerp</i> A ✓ substitution/<i>vervanging</i> CA ✓ correct standard form/ <i>korrekte standaard vorm</i> CA ✓ both/<i>beide</i> <i>y</i> –values/<i>-waardes</i> CA ✓ both/<i>beide</i> <i>x</i> –values/<i>-waardes</i> CA OR/OF ✓ <i>y</i> subject / <i>onderwerp</i> A ✓ substitution/ <i>vervanging</i> CA ✓ correct standard form/ <i>korrekte standaardvorm</i> CA ✓ both <i>x</i> –values /<i>beide x-waardes</i> CA ✓ both <i>y</i>-values/ <i>beide y-waardes</i> CA NPR (5)
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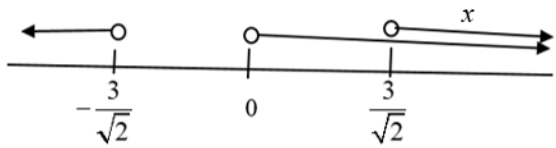
1.3	1.3.1	$EBAC = \frac{(BWb \times SD) \times C}{GBW \times BWt} - GMR \times DP$ $EBAC(GBW \times BWt) = (BWb \times SD) \times C - GMR \times DP(GBW \times BWt)$ $EBAC(GBW \times BWt) + GMR \times DP(GBW \times BWt) = (BWb \times SD) \times C$ $\therefore \frac{EBAC(GBW \times BWt) + GMR \times DP(GBW \times BWt)}{BWb \times C} = SD$ OR/OF $EBAC = \frac{(BWb \times SD) \times C}{GBW \times BWt} - GMR \times DP$ $EBAC(GBW \times BWt) = (BWb \times SD) \times C - GMR \times DP(GBW \times BWt)$ $EBAC + GMR \times DP = \frac{(BWb \times SD) \times C}{GBW \times BWt}$ $GBW \times BWt(EBAC + GMR \times DP) = (BWb \times SD) \times C$ $\therefore \frac{GBW \times BWt(EBAC + GMR \times DP)}{BWb \times C} = SD$	✓ (BWb × SD) × C subject / onderwerp A ✓ SD CA OR/OF ✓ (BWb × SD) × C subject / onderwerp A ✓ SD CA (2)
	1.3.2 (a)	$EBAC = 7 \times 10^{-2}$	✓ Form / vorm A (1)
	1.3.2 (b)	$SD = \frac{GBW \times BWt(EBAC + GMR \times DP)}{BWb \times C}$ $= \frac{0,58 \times 140(0,07 + 0,18 \times 2)}{1,806 \times 3,2}$ $= 6 \text{ drinks/drankies}$ OR/OF	✓ Substitution / substitusie A ✓ 6 CA OR/OF

		$EBAC = \frac{(BWb \times SD) \times C}{GBW \times BWt} - GMR \times DP$ $0,07 = \frac{(1,806 \times SD) \times 3,2}{0,58 \times 140} - 0,18 \times 2$ $SD = \frac{0,58 \times 140(0,07 + 0,18 \times 2)}{1,806 \times 3,2}$ $SD = 6 \text{ drinks / drankie}$	✓ Substitution / <i>substitusie</i> ✓ 6	A CA (2)
	1.3.2 (c)	He will be punished for $6 - 4 = 2$ drinks / <i>Hy sal gestraf word vir $6 - 4 = 2$ drankies</i>	✓ 2	CA (1)
1.4	$\begin{array}{r} 1110_2 \\ + 11_2 \\ \hline 10001_2 \end{array}$ $110001_2 = 14 + 3 = 17 = 10001_2$	✓ 10001_2 Ignore base / <i>Ignoreer basis</i>	A (1)	[21]

QUESTION/VRAAG 2

2.1	$x = 5$ or/of $x = -5$		✓ 5 ✓ -5	A A (2)
	2.2.1	$\Delta = b^2 - 4ac = 0$	✓ 0	A (1)
	2.2.2	Roots are Real and Equal / <i>Wortels is reëel en gelyk</i>	✓ Real / <i>reëel</i> ✓ Equal / <i>gelyk</i>	A A (2)
	2.2.3	$k > 0$	✓ $k > 0$	A (1) [6]

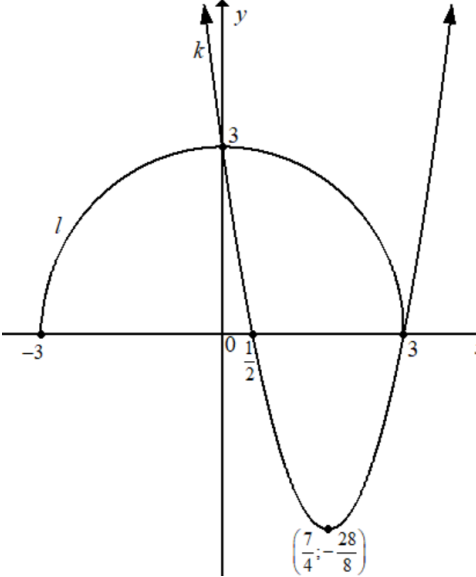
QUESTION/VRAAG 3

3.1	3.1.1	$\frac{5^{x+1} \cdot 2^{2x-3}}{20^x}$ $= \frac{5^x \cdot 5 \cdot 2^{2x} \cdot 2^{-3}}{(5 \cdot 2^2)^x}$ $= 5 \cdot 2^{-3}$ $= \frac{5}{2^3} = \frac{5}{8}$	✓ Exponential property / <i>eksponensiële eienskap</i> A ✓ Prime factorisation / <i>priemfaktore</i> CA ✓ $\frac{5}{2^3}$ OR/OF $\frac{5}{8}$ CA (3)
	3.1.2	$\frac{\sqrt{405} - \sqrt{80}}{\sqrt{5}}$ $= \frac{\sqrt{3^4 \times 5} - \sqrt{2^4 \times 5}}{\sqrt{5}}$ $= \frac{9\sqrt{5} - 4\sqrt{5}}{\sqrt{5}}$ $= \frac{5\sqrt{5}}{\sqrt{5}}$ $= 5$ OR/OF $\frac{\sqrt{405} - \sqrt{80}}{\sqrt{5}}$ $= \frac{\sqrt{81 \times 5} - \sqrt{16 \times 5}}{\sqrt{5}}$ $= \frac{9\sqrt{5} - 4\sqrt{5}}{\sqrt{5}}$ $= \frac{\sqrt{5}(9-4)}{\sqrt{5}}$ $= 5$	✓ Prime factorisation / <i>priemfaktoriserings</i> A ✓ Simplification / <i>vereenvoudiging</i> CA ✓ 5 CA OR/OF ✓ Factorisation / <i>faktoriserings</i> A ✓ Simplification / <i>vereenvoudiging</i> CA ✓ 5 CA (3)
3.2	3.2.1	$3x > 0$ and / en $2x^2 - 9 > 0$ $x > 0$ and / en $x < -\frac{3}{\sqrt{2}}$ or / of $x > \frac{3}{\sqrt{2}}$  $\therefore x > \frac{3}{\sqrt{2}}$	✓ log property/eienskap A ✓ $x > 0$ CA ✓ $x > \frac{3}{\sqrt{2}}$ CA (3)

	3.2.2	$\log_a 3x = \log_a (2x^2 - 9)$ $3x = 2x^2 - 9$ $2x^2 - 3x - 9 = 0$ $x = \frac{-(-3) \pm \sqrt{(-3)^2 - 4(2)(-9)}}{2(2)} \quad \text{OR / OF } (2x+3)(x-3) = 0$ $\therefore x = 3 \text{ or / of } x \neq -\frac{3}{2}$	$\checkmark 3x = 2x^2 - 9$ A $\checkmark$ Standard form/vorm CA $\checkmark$ Substitution / Factors <i>Substitusie / faktore</i> CA $\checkmark x = 3$ CA $\checkmark x \neq -\frac{3}{2}$ CA (5)
3.3	3.3.1	$\frac{z_1}{z_2} = \frac{2-5i}{1+i}$ $\frac{z_1}{z_2} = \frac{2-5i}{1+i} \times \frac{1-i}{1-i}$ $\frac{z_1}{z_2} = \frac{2-5i-2i+5i^2}{1-i^2}$ $\frac{z_1}{z_2} = \frac{2-7i+5(-1)}{1-(-1)}$ $\frac{z_1}{z_2} = \frac{-3-7i}{2}$	$\checkmark$ Conjugate ratio / <i>toegevoegde verhouding</i> CA $\checkmark$ Simplification / <i>vereenvoudiging</i> CA $\checkmark i^2 = -1$ CA $\checkmark$ Simplification / <i>vereenvoudiging</i> CA (4)
	3.3.2	$ z = \sqrt{\left(\frac{-3}{2}\right)^2 + \left(\frac{-7}{2}\right)^2}$ $\therefore z = \frac{\sqrt{58}}{2} = 3,81$	$\checkmark$ Substitution / <i>vervanging</i> CA $\checkmark \frac{\sqrt{58}}{2} = 3,81$ CA (2)
	3.3.3	$\tan \theta = \frac{7}{2} \div \frac{3}{2}$ $\theta = \tan^{-1}\left(\frac{7}{3}\right)$ Ref / <i>Verw</i> $\angle$: $\theta = 66,80^\circ$ $\therefore \theta = 66,80^\circ + 180^\circ = 246,80^\circ$	$\checkmark$ tan ratio / <i>verhouding</i> CA $\checkmark$ reference angle / <i>verwysingshoek</i> CA $\checkmark 246,80^\circ$ CA (3)
	3.3.4	$\frac{\sqrt{58}}{2} \text{cis} 246,80^\circ$	$\checkmark$ Form / <i>vorm</i> CA (1)
3.4		$x = -3$ and / <i>en</i> $y = 0$	$\checkmark x = -3$ A $\checkmark y = 0$ A (2) [26]

QUESTION/VRAAG 4

4.1	4.1.1	$y = 1$	✓ $y = 1$	A (1)
	4.1.2	$x = 0$	✓ $x = 2$	A (1)
	4.1.3	$x = 2$	✓ $x = 4$	A (1)
	4.1.4	$y = 2$	✓ $y = 2$	A (1)
	4.1.5	$y \neq 1$ OR / OF $-\infty < y < 1$ or / of $1 < y < \infty$ OR / OF $_{>} y \in (-\infty; 1)$ or / of $y \in (1; \infty)$	✓ critical values / kritiese waardes ✓ correct notation / korrekte notasie	A A (2)
	4.1.6	$x < -2$ or / of $0 < x < 2$ OR / OF $x \in (-\infty; -2)$ or / of $x \in (0; 2)$	✓ $x < 2$ ✓ critical values / kritiese waardes ✓ notation / notasie	A A A (3)
4.2	4.2.1	Since it is a semi circle, a vertical line drawn across the graph will cut the graph once. / <i>Aangesien dit 'n halfsirkel is, sal 'n vertikale lyn wat oor die grafiek getrek word, die grafiek een keer sny.</i> OR/OF The function is a many to one relationship / <i>Die funksie is 'n baie tot een verwantskap</i>	✓ Explanation / verduideliking	A (1)
	4.2.2	$y = 3$	✓ $y = 3$	A (1)
	4.2.3	$y = 3$	✓ $y = 3$	A (1)
	4.2.4	$2x^2 - 7x + 3 = 0$ $x = \frac{7 \pm \sqrt{49 - 4(2)(3)}}{2(2)}$ or/of $(2x - 1)(x - 3) = 0$ $x = \frac{1}{2}$ or/of $x = 3$	✓ Factors / Substitution <i>Faktore / vervanging</i> ✓ $x = 0,5$ or/of 3	A A (2)
	4.2.5	$x = \pm 3$	✓ $x = \pm 3$	A (1)

	4.2.6	$x = -\left(\frac{-7}{2 \times 2}\right) \text{ OR / OF } x = \frac{1}{2} + 3 \text{ OR / OF } k'(x) = 4x - 7 = 0$ $x = \frac{7}{4}$ $f\left(\frac{7}{4}\right) = 2\left(\frac{7}{4}\right)^2 - 7\left(\frac{7}{4}\right) + 3$ $f\left(\frac{7}{4}\right) = -\frac{25}{8} = -3,125$	✓ Method /metode A ✓ Axis of symmetry / <i>simmetries-as</i> CA ✓ Substitution / <i>vervang</i> CA ✓ Minimum turning point / <i>Minimum draaipunt</i> CA (4)
	4.2.7		<i>k</i> : ✓ Shape / <i>vorm</i> A ✓ Intercepts / <i>afsnitte</i> CA ✓ Turning Point / <i>draaipunte</i> CA <i>l</i> : ✓ Shape / <i>vorm</i> A ✓ Intercepts / <i>afsnitte</i> CA (5)
4.3	4.3.1	$y = 1$	✓ $y = 1$ A (1)
	4.3.2	$4 = a^2$ $2^2 = a^2$ $\therefore a = 2$	✓ Substitution / <i>vervang</i> A ✓ Simplification / <i>vereenvoudiging</i> CA ✓ 2 CA (3) [28]

QUESTION/VRAAG 5

5.1	5.1.1	Percentage/ <i>Persentasie</i> $= \frac{350}{2\,960} \times 100 = 11,82\%$	✓ 11,82% Accept/<i>Aanvaar</i> (1)	A
	5.1.2	HP = R2 960 – R350 = R2 610	✓ R2 610 (1)	A
	5.1.3	Money Melody paid /<i>Geld Melody betaal</i> $= R145 \times 24 = R3\,480$ $A = P(1 + in)$ $R3\,480 = R2\,610(1 + 2i)$ $2i = \frac{R3\,480}{R2\,610} - 1$ $i = \frac{1}{6}$ $\therefore$ Interest Rate / <i>Rente koers</i> = 16,67% OR/OF $\frac{3480 - 2610}{2 \times 2680} \times 100\% = 16,67$	✓ R3 480 ✓ SF ✓ Interest rate /<i>rente koers</i> OR/OF ✓ R3 480 ✓ SF ✓ Interest rate /<i>rente koers</i> (3)	A CA CA CA A CA CA (4)
5.2	5.2.1	$A = P(1 + i)^n$ $A_3 = R20\,000 \left(1 + \frac{0,06}{12}\right)^{3 \times 12} = R23\,933,6105$ $A_7 = R23\,933,6105 \left(1 + \frac{0,075}{4} \times 16\right) = R31\,113,69365$ OR / OF $A = R20\,000 \left(1 + \frac{0,06}{12}\right)^{3 \times 12} \left(1 + \frac{0,075}{4} \times 16\right) = R31\,113,69365$	✓ SF ✓ R23 933,6105 ✓ SF ✓ R31 113,69365 OR/OF ✓ SF ✓ <i>i</i> and /<i>en n</i> ✓ SF ✓ R31 113,69365 (4)	A CA CA CA A A CA CA (4)

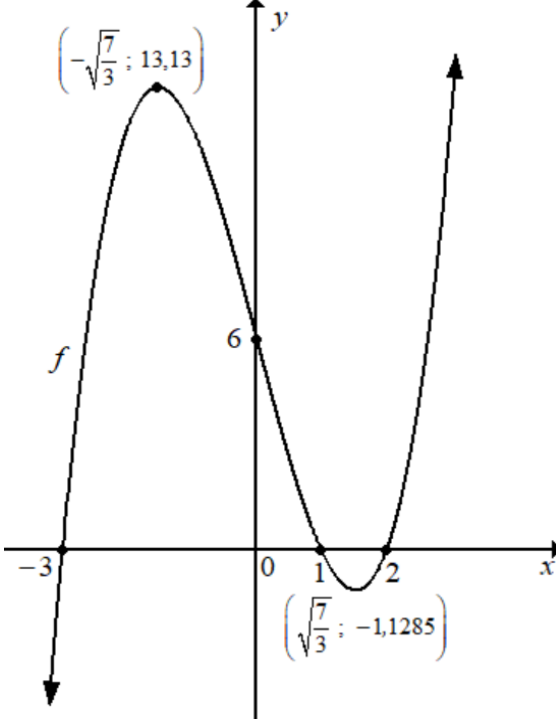
	5.2.2	$R31\,113,69365 - \left(\begin{array}{l} \text{Amount withdrawn and interests/} \\ \text{Bedrag onttrek en rente} \end{array} \right)$ $= R30\,000$ $P(1+in) = R31\,113,69365 - R30\,000$ $P\left(1 + \frac{0,075}{4} \times 4 \times 4\right) = R1113,69365$ $P = \frac{R1113,69365}{\left(1 + \frac{0,075}{4} \times 4 \times 4\right)}$ $\therefore P = R856,69$ OR / OF $(R23\,933,6105 - P)\left(1 + \frac{0,075}{4} \times 4 \times 4\right) = R30\,000$ $R23\,933,6105 - P = \frac{R30\,000}{\left(1 + \frac{0,075}{4} \times 4 \times 4\right)}$ $P = R23\,933,6105 - \frac{R30\,000}{\left(1 + \frac{0,075}{4} \times 4 \times 4\right)}$ $\therefore P = R856,69$	✓ Equation / vergelyking ✓ Substitution / vervanging ✓ <i>P</i> subject / onderwerp ✓ R856,69 CA CA CA CA OR / OF ✓ Substitution / vervanging ✓ Substitution / vervanging ✓ <i>P</i> subject / onderwerp ✓ R856,69 CA CA CA CA (4) [13]
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QUESTION/VRAAG 6

6.1	$f(x) = -1 - 2x$ $f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ $= \lim_{h \rightarrow 0} \frac{-1 - 2(x+h) - (-1 - 2x)}{h}$ $= \lim_{h \rightarrow 0} \frac{-1 - 2x - 2h + 1 + 2x}{h}$ $= \lim_{h \rightarrow 0} \frac{-2h}{h}$ $= \lim_{h \rightarrow 0} (-2)$ $\therefore f'(x) = -2$	✓ definition/definisie A ✓ SF CA ✓ S CA ✓ S CA ✓ -2 CA Penalty of one mark for incorrect notation Penaliseer een punt indien notasie foutief is. AO: 1 mark/punt (5)
6.2.1	$D_x(x^2 + x - 2)$ $= 2x + 1$	✓ $2x$ A ✓ 1 A (2)
6.2.2	$\frac{dy}{dx}$ if / as $xy = x\sqrt{x} - 9x^2 - 1$ $y = \frac{x\sqrt{x} - 9x^2 - 1}{x}$ $y = \sqrt{x} - 9x - \frac{1}{x}$ $y = x^{\frac{1}{2}} - 9x - x^{-1}$ $\frac{dy}{dx} = \frac{1}{2}x^{-\frac{1}{2}} - 9 + x^{-2}$	✓ y subject / onderwerp A ✓ Exponential form / eksponensiële vorm CA $\frac{1}{2}x^{-\frac{1}{2}}$ ✓ $\frac{1}{2}$ CA ✓ -9 CA ✓ x^{-2} CA (5)
6.3	Average gradient / gemid grad $= \frac{5-0}{2-(-3)}$ $\therefore$ Average grad. / gemid grad $= 1$	✓ Substitution / vervanging A ✓ 1 CA (2) [14]

QUESTION/VRAAG 7

7.1	$y = 6$ OR/OF $(0;6)$	✓ y -intercept/ <i>afsnit</i> A (1)
7.2	$f(x) = x^3 - 7x + 6$ $f(1) = (1)^3 - 7(1) + 6 = 0$ $\begin{array}{rcccc} 1 & : & 1 & 0 & -7 & 6 \\ & & 0 & 1 & 1 & -6 \\ \hline & & 1 & 1 & -6 & 0 \end{array}$ $f(x) = (x-1)(x^2 + x - 6)$ $\therefore f(x) = (x-1)(x-2)(x+3) = 0$ $x = 1$ or/of $x = 2$ or / of $x = -3$	✓ $f(x) = 0$ A ✓ First root of/ <i>eerste wortel van f.</i> A ✓ Quadratic factor / <i>kwadratiese faktor</i> CA ✓ Factors / <i>faktore</i> ✓ two other x -intercepts. / <i>twee ander x-afsnitte</i> CA (5)
7.3	$f(x) = x^3 - 7x + 6$ $f'(x) = 3x^2 - 7 = 0$ $x = \pm\sqrt{\frac{7}{3}}$ $f\left(\sqrt{\frac{7}{3}}\right) = \left(\sqrt{\frac{7}{3}}\right)^3 - 7\left(\sqrt{\frac{7}{3}}\right) + 6 = -1,13$ $f\left(-\sqrt{\frac{7}{3}}\right) = \left(-\sqrt{\frac{7}{3}}\right)^3 - 7\left(-\sqrt{\frac{7}{3}}\right) + 6 = 13,13$ $\left(\sqrt{\frac{7}{3}}; -1,13\right)$ and $\left(-\sqrt{\frac{7}{3}}; 13,13\right)$	✓ $f'(x) = 3x^2 - 7$ A ✓ $f'(x) = 0$ CA ✓ $x = \pm\sqrt{\frac{7}{3}}$ CA ✓ $f\left(\sqrt{\frac{7}{3}}\right) = -1,13$ CA ✓ $f\left(-\sqrt{\frac{7}{3}}\right) = 13,13$ CA (5)

7.4		✓ Shape / vorm A ✓ All x – intercepts / alle x-afsnitte CA ✓ y –intercept / afsnit CA ✓ Both turning points / beide draaipunte CA (4)
7.5	$f'(x) = 3x^2 - 7$ $f'(-2) = 3(-2)^2 - 7$ $f'(2) = 5$ $f(-2) = (-2)^3 - 7(-2) + 6$ $f(-2) = 12$ $y = mx + c$ $12 = 5(-2) + c$ $c = 22$ $\therefore y = 5x + 22$	✓ $f'(-2) = 5$ A ✓ $f(-2) = 12$ CA ✓ $c = 22$ CA ✓ $y = 5x + 22$ CA (4) [19]

QUESTION/VRAAG 8

8.1	1,5 thousand/ <i>duisend</i> = 1 500	✓ 1 500	A (1)
8.2	$P(x) = -x^2 + 5x = 0$ $x = \frac{-5 \pm \sqrt{5^2 - 4(-1)(0)}}{2(-1)}$ $0 = x(-x + 5)$ OR/OF $\therefore x = 0$ OR/OF $x = 5$	✓ $P(x) = 0$ ✓ Factors/ <i>faktore</i> / SF ✓ 0 ✓ 5	A A CA CA (4)
8.3	$P(x) = -x^2 + 5x = 0$ $P(1) = -(1)^2 + 5(1)$ $P(x) = \$4\,000$	✓ $P(1)$ ✓ 4 000 NP	A CA (2)
8.4	$x = \frac{0+5}{2} = \frac{5}{2} = 2,5$ OR / OF $x = -\frac{5}{2(-1)} = \frac{5}{2} = 2,5$ OR / OF $P'(x) = -2x + 5 = 0$ $\therefore x = \frac{5}{2} = 2,5$	✓ Method / <i>metode</i> ✓ 2,5 OR/OF ✓ Method / <i>metode</i> ✓ 2,5 OR/ OF ✓ Method / <i>metode</i> ✓ 2,5	A A A A A (2)
8.5	$P(2,5) = -(2,5)^2 + 5(2,5)$ $P(2,5) = 6,25 = \$6\,250$	✓ 6,25 ✓ 6 250 NP	A CA (2) [11]

QUESTION/VRAAG 9

9.1	9.1.1	$= \int x^{\frac{1}{2}} dx$ $= \frac{2}{3} x^{\frac{3}{2}} + c$	$\checkmark \frac{2}{3} x^{\frac{3}{2}}$ $\checkmark C$	A A (2)
	9.1.2	$\int \left(x^{-2} - \frac{\pi}{x} \right) dx$ $= -x^{-1} - \pi \ln x + c$	$\checkmark -x^{-1}$ $\checkmark -\pi \ln x + c$	A A (2)
9.2		$\int_a^2 (5x^2 - 20) dx$ $= \left[\frac{5x^3}{3} - 20x \right]_a^2$ $= \frac{5(2)^3}{3} - 20(2) - \frac{5a^3}{3} + 20a$ $45 = \frac{40}{3} - 40 - \frac{5a^3}{3} + 20a$ $45 = -\frac{80}{3} - \frac{5a^3}{3} + 20a$ $5a^3 - 60a + 80 - 135 = 0$ $a^3 - 12a - 11 = 0$ $(a + 1)(a^2 - a - 11) = 0$ $a = -1 \text{ or/of } a = \frac{-(-1) \pm \sqrt{(-1)^2 - 4(1)(-11)}}{2(1)}$ $a = -1 \text{ or/of } a = -2,86 \text{ or/of } a = 3,85$ $\therefore a = -1$	$\checkmark \text{Area in integral notation / Oppervlakte in integrasie notasie } \mathbf{A}$ $\checkmark \text{Integral / Integraal } \mathbf{CA}$ $\checkmark \checkmark \text{ SF } \mathbf{CA}$ $\checkmark \text{Equating to / Gelykstelling aan 45 } \mathbf{CA}$ $\checkmark \mathbf{S} \mathbf{CA}$ $\checkmark \text{Factors / faktore } \mathbf{CA}$ $\checkmark a = -1 \mathbf{CA}$	 <

TOTAL/TOTAAL: 150