NATIONAL
SENIOR CERTIFICATE/
NASIONALE
SENIOR SERTIFIKAAT

GRADE/*GRAAD* 12

SEPTEMBER 2022

TECHNICAL MATHEMATICS P1 MARKING GUIDELINE/
TEGNIESE WISKUNDE V1 NASIENRIGLYN

MARKS/*PUNTE:*** 150

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

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	$x(x + 7) + 10 = 0$ $x^2 + 7x + 10 = 0$ $x = \dfrac{-(7) \pm \sqrt{(7)^2 - 4(1)(10)}}{2(1)}$ **OR/OF** $(x + 7)(x + 5) = 0$ $\therefore x = \text{-2 or/}of\ x = \text{-5}$	✓ standard form/*standaardvorm* **A** ✓ substitution / factorisation *Substitusie / faktorisering* **SF** ✓ both x-values / *beide x-waardes* **CA** (3)
1.1.2	$2x - 1 = \dfrac{4}{x}$ $2x^2 - x = 4$ $2x^2 - x - 4 = 0$ $x = \dfrac{-(-1) \pm \sqrt{(-1)^2 - 4(2)(-4)}}{2(-2)}$ $x = -1,69\ \text{ or/}of\ \ x = 1,19$	✓ standard form/*standaardvorm* **CA** ✓ **SF** **CA** ✓ both x-values / *beide x-waardes* **CA** $\boxed{\text{R}}$ (3)
1.1.3	$x^2 + \dfrac{7x}{2} + 3 \leq 0$ $x = \dfrac{-\left(\frac{7}{2}\right) \pm \sqrt{\left(\frac{7}{2}\right)^2 - 4(1)(3)}}{2(1)}$ **OR / *OF*** $(2x + 3)\left(\dfrac{x}{2} + 1\right) = 0$ Critical Values / *Kritiese waardes*: -2 en $-\dfrac{3}{2} \approx -1,5$ $\therefore -2 \leq x \leq -1,5$ **OR/OF** $x \in [-2; -1,5]$ **OR/OF** $x \leq -2$ 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	$x - y - 1 = 0$ ....(1)	
	and/*en*	
	$xy + y^2 = x$.............(2)	
	$x = y + 1$.................(3)	✓ x subject/*onderwerp* **A**
	$(y+1)y + y^2 = y + 1$	✓ substitution/*vervanging* **CA**
	$y^2 + y + y^2 = y + 1$	
	$2y^2 - 1 = 0$	✓correct standard form/ *korrekte standaard vorm* **CA**
	$y = \dfrac{-0 \pm \sqrt{0^2 - 4(2)(-1)}}{2(2)}$ **OR**/*OF* $(\sqrt{2}y - 1)(\sqrt{2}y + 1) = 0$	
	$\therefore y = \pm\dfrac{1}{\sqrt{2}} = \pm 0,71$	✓ both/*beide y* –values/*-waardes* **CA**
	$x = 1 \pm \dfrac{1}{\sqrt{2}}$	
	$\therefore x = 1,71$ or/*of* $x = 0,29$	✓ both/*beide x* –values/*-waardes* **CA**
	OR/*OF*	**OR/*OF***
	$x - y - 1 = 0$ ....(1)	
	and /*en*	
	$xy + y^2 = x$.............(2)	
	$y = x - 1$.................(3)	
	$x(x-1) + (x-1)^2 = x$	
	$x^2 - x + x^2 - 2x + 1 = x$	
	$2x^2 - 4x + 1 = 0$	
	$x = \dfrac{-(-4) \pm \sqrt{(-4)^2 - 4(2)(1)}}{2(2)}$	
	$\therefore x = 1,71$ or / *of* $x = 0,29$	✓ y subject / *onderwerp* **A**
	$y = 1,71 - 1$ or/*of* $y = 0,29 - 1$	✓ substitution/ *vervanging* **CA**
	$\therefore y = \pm\dfrac{1}{\sqrt{2}} = \pm 0,71$	✓ correct standard form/ *korrekte standaardvorm* **CA**
		✓ both x –values /*beide x-waardes* **CA**
		✓ both y-values/ *beide y-waardes* **CA**
		NPR
		(5)
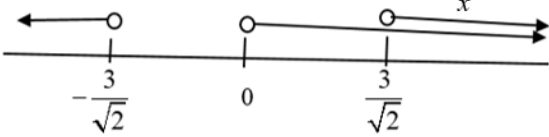
1.3	1.3.1	$\text{EBAC} = \dfrac{(\text{BWb} \times \text{SD}) \times C}{\text{GBW} \times \text{BWt}} - \text{GMR} \times \text{DP}$ $\text{EBAC}(\text{GBW} \times \text{BWt}) = (\text{BWb} \times \text{SD}) \times C - \text{GMR} \times \text{DP}(\text{GBW} \times \text{BWt})$ $\text{EBAC}(\text{GBW} \times \text{BWt}) + \text{GMR} \times \text{DP}(\text{GBW} \times \text{BWt}) = (\text{BWb} \times \text{SD}) \times C$ $\therefore \dfrac{\text{EBAC}(\text{GBW} \times \text{BWt}) + \text{GMR} \times \text{DP}(\text{GBW} \times \text{BWt})}{\text{BWb} \times C} = \text{SD}$ **OR/*OF*** $\text{EBAC} = \dfrac{(\text{BWb} \times \text{SD}) \times C}{\text{GBW} \times \text{BWt}} - \text{GMR} \times \text{DP}$ $\text{EBAC}(\text{GBW} \times \text{BWt}) = (\text{BWb} \times \text{SD}) \times C - \text{GMR} \times \text{DP}(\text{GBW} \times \text{BWt})$ $\text{EBAC} + \text{GMR} \times \text{DP} = \dfrac{(\text{BWb} \times \text{SD}) \times C}{\text{GBW} \times \text{BWt}}$ $\text{GBW} \times \text{BWt}(\text{EBAC} + \text{GMR} \times \text{DP}) = (\text{BWb} \times \text{SD}) \times C$ $\therefore \dfrac{\text{GBW} \times \text{BWt}(\text{EBAC} + \text{GMR} \times \text{DP})}{\text{BWb} \times C} = \text{SD}$	✓ $(\text{BWb} \times \text{SD}) \times C$ subject / *onderwerp* **A** ✓ SD **CA** **OR/*OF*** ✓ $(\text{BWb} \times \text{SD}) \times C$ subject / *onderwerp* **A** ✓ SD **CA** (2)
	1.3.2 (a)	$\text{EBAC} = 7 \times 10^{-2}$	✓ Form / *vorm* **A** (1)
	1.3.2 (b)	$\text{SD} = \dfrac{\text{GBW} \times \text{BWt}(\text{EBAC} + \text{GMR} \times \text{DP})}{\text{BWb} \times C}$ $= \dfrac{0{,}58 \times 140(0{,}07 + 0{,}18 \times 2)}{1{,}806 \times 3{,}2}$ $= 6 \text{ drinks/}\textit{drankies}$ **OR/*OF***	✓ Substitution /*substitusie* **A** ✓ 6 **CA** **OR/*OF***

		$\text{EBAC} = \dfrac{(\text{BWb} \times \text{SD}) \times C}{\text{GBW} \times \text{BWt}} - \text{GMR} \times \text{DP}$ $0,07 = \dfrac{(1,806 \times \text{SD}) \times 3,2}{0,58 \times 140} - 0,18 \times 2$ $\text{SD} = \dfrac{0,58 \times 140(0,07 + 0,18 \times 2)}{1,806 \times 3,2}$ $\text{SD} = 6 \text{ drinks} / drankie$	✓ Substitution /*substitusie* ✓ 6 (2)	**A** **CA**
	1.3.2 (c)	He will be punished for $6 - 4 = 2$ drinks / *Hy sal gestraf word vir 6 – 4 = 2 drankies*	✓ 2	**CA**
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 / *Ignoreer basis*** (1)	**A**
				[21]

QUESTION/*VRAAG* 2

2.1		$x = 5$ or/*of* $x = -5$	✓ 5 ✓ − 5 (2)	**A** **A**
	2.2.1	$\Delta = b^2 - 4ac = 0$	✓ 0 (1)	**A**
	2.2.2	Roots are Real and Equal / *Wortels is reëel en gelyk*	✓ Real /*reël* ✓ Equal /*gelyk* (2)	**A** **A**
	2.2.3	$k > 0$	✓ $k > 0$ (1)	**A**
				[6]
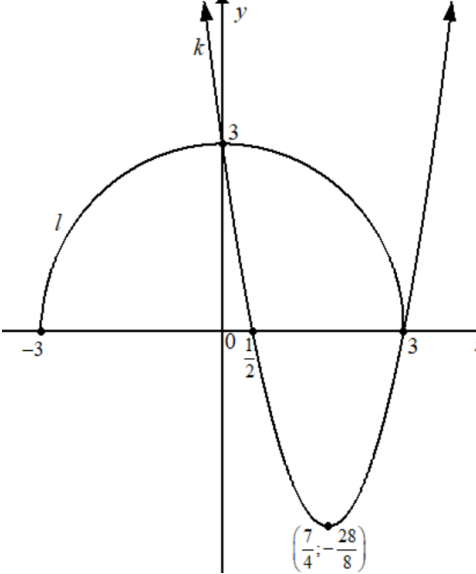
QUESTION/*VRAAG* **3**

3.1	3.1.1	$\dfrac{5^{x+1}.2^{2x-3}}{20^x}$ $= \dfrac{5^x.5.2^{2x}.2^{-3}}{\left(5.2^2\right)^x}$ $= 5.2^{-3}$ $= \dfrac{5}{2^3} = \dfrac{5}{8}$	✓ Exponential property / *eksponensiële eienskap* **A** ✓ Prime factorisation / *priemfaktore* **CA** ✓ $\dfrac{5}{2^3}$ **OR/***OF* $\dfrac{5}{8}$ **CA** **(3)**
	3.1.2	$\dfrac{\sqrt{405} - \sqrt{80}}{\sqrt{5}}$ $= \dfrac{\sqrt{3^4 \times 5} - \sqrt{2^4 \times 5}}{\sqrt{5}}$ $= \dfrac{9\sqrt{5} - 4\sqrt{5}}{\sqrt{5}}$ $= \dfrac{5\sqrt{5}}{\sqrt{5}}$ $= 5$ **OR/***OF* $\dfrac{\sqrt{405} - \sqrt{80}}{\sqrt{5}}$ $= \dfrac{\sqrt{81 \times 5} - \sqrt{16 \times 5}}{\sqrt{5}}$ $= \dfrac{9\sqrt{5} - 4\sqrt{5}}{\sqrt{5}}$ $= \dfrac{\sqrt{5}\left(9 - 4\right)}{\sqrt{5}}$ $= 5$	✓ Prime factorisation / *priem faktorisering* **A** ✓ Simplification / *vereenvoudiging* **CA** ✓ 5 **CA** **OR/***OF* ✓ Factorisation / *faktorisering* **A** ✓ Simplification / *vereenvoudiging* **CA** ✓ 5 **CA** **(3)**
3.2	3.2.1	$3x > 0$ and / *en* $2x^2 - 9 > 0$ $x > 0$ and / *en* $x < -\dfrac{3}{\sqrt{2}}$ or / *of* $x > \dfrac{3}{\sqrt{2}}$ $\therefore x > \dfrac{3}{\sqrt{2}}$	✓ log property/*eienskap* **A** ✓ $x > 0$ **CA** ✓ $x > \dfrac{3}{\sqrt{2}}$ **CA** **(3)**

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

QUESTION/*VRAAG* 4

4.1	4.1.1	$y = 1$	$\checkmark$ $y = 1$	**A** (1)
	4.1.2	$x = 0$	$\checkmark$ $x = 2$	**A** (1)
	4.1.3	$x = 2$	$\checkmark$ $x = 4$	**A** (1)
	4.1.4	$y = 2$	$\checkmark$ $y = 2$	**A** (1)
	4.1.5	$y \neq 1$ **OR** / *OF* $-\infty < y < 1$ or / *of* $1 < y < \infty$ **OR** / *OF* $"_>\ y \in \left(-\infty;1\right)$ or / *of* $y \in \left(1;\infty\right)$	$\checkmark$ critical values / *kritiese waardes* **A** $\checkmark$ correct notation / *korrekte notasie* **A**	(2)
	4.1.6	$x < -2$ or / *of* $0 < x < 2$ **OR** / *OF* $x \in \left(-\infty;-2\right)$ or / *of* $x \in \left(0;2\right)$	$\checkmark$ $x < 2$ **A** $\checkmark$ critical values / *kritiese waardes* **A** $\checkmark$ notation / *notasie* **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. / *Aangesien dit 'n halfsirkel is, sal 'n vertikale lyn wat oor die grafiek getrek word, die grafiek een keer sny.* **OR/*OF*** The function is a many to one relationship / *Die funksie is 'n baie tot een verwantskap*	$\checkmark$ Explanation / *verduideliking* **A**	(1)
	4.2.2	$y = 3$	$\checkmark$ $y = 3$ **A**	(1)
	4.2.3	$y = 3$	$\checkmark$ $y = 3$ **A**	(1)
	4.2.4	$2x^2 - 7x + 3 = 0$ $x = \dfrac{7 \pm \sqrt{49 - 4(2)(3)}}{2(2)}$ or/*of* $(2x-1)(x-3) = 0$ $x = \dfrac{1}{2}$ or/*of* $x = 3$	$\checkmark$ Factors / Substitution *Faktore / vervanging* **A** $\checkmark$ $x = 0,5$ or/*of* 3 **A**	(2)
	4.2.5	$x = \pm 3$	$\checkmark$ $x = \pm 3$ **A**	(1)

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

QUESTION/*VRAAG* 5

5.1	5.1.1	Percentage/*Persentasie* $= \dfrac{350}{2\ 960} \times 100 = 11{,}82\%$	✓ 11,82% **Accept/***Aanvaar*	**A** (1)
	5.1.2	HP = R2 960 − R350 = R2 610	✓ R2 610	**A** (1)
	5.1.3	Money Melody paid /*Geld Melody betaal* = R145 × 24 = R3 480 $A = P(1 + in)$ R3 480 = R2 610$(1 + 2i)$ $2i = \dfrac{\text{R3 480}}{\text{R2 610}} - 1$ $i = \dfrac{1}{6}$ ∴ Interest Rate / *Re ntekoers* = 16,67% **OR/***OF* $\dfrac{3480 - 2610}{2 \times 2680} \times 100\%$ $= 16{,}67$	✓ R3 480 **A** ✓SF **CA** ✓ Interest rate /*rentekoers* **CA** **OR/***OF* ✓ R3 480 **A** ✓SF **CA** ✓ Interest rate /*rentekoers* **CA** (3)	
5.2	5.2.1	$A = P(1 + i)^n$ $A_3 = \text{R20 000}\left(1 + \dfrac{0{,}06}{12}\right)^{3 \times 12} = \text{R23 933,6105}$ $A_7 = \text{R23 933,6105}\left(1 + \dfrac{0{,}075}{4} \times 16\right) = \text{R31 113,69365}$ **OR** / *OF* $A = \text{R20 000}\left(1 + \dfrac{0{,}06}{12}\right)^{3 \times 12}\left(1 + \dfrac{0{,}075}{4} \times 16\right) = \text{R31 113,69365}$	✓ **SF** **A** ✓ R23 933,6105 **CA** ✓ **SF** **CA** ✓ R31 113,69365 **CA** **OR/***OF* ✓ **SF** **A** ✓ *i* and /*en* *n* **A** ✓ **SF** **CA** ✓ R31 113,69365 **CA** (4)	
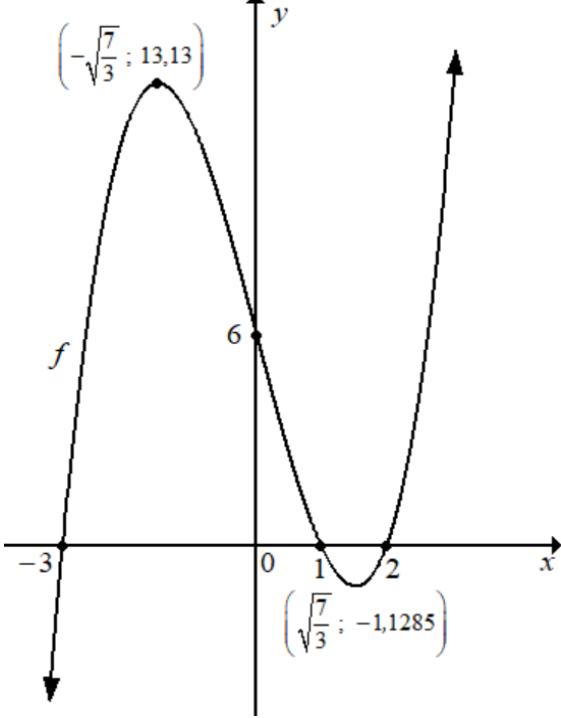
5.2.2	$\text{R31 113,69365} - \begin{pmatrix} \text{Amount withdrawn and interests/} \\ \textit{Bedrag onttrek en rente} \end{pmatrix}$	✓ Equation / *vergelyking* **CA**
	$= \text{R30 000}$	✓ Substitution / *vervanging* **CA**
	$P(1+in) = \text{R31 113,69365} - \text{R30 000}$	
	$P\left(1+\dfrac{0,075}{4}\times 4\times 4\right) = \text{R1113,69365}$	✓ P subject / *onderwerp* **CA**
	$P = \dfrac{\text{R1113,69365}}{\left(1+\dfrac{0,075}{4}\times 4\times 4\right)}$	✓ R856,69 **CA**
	$\therefore P = \text{R856,69}$	
	OR / *OF*	**OR / *OF***
	$\left(\text{R23 933,6105} - P\right)\left(1+\dfrac{0,075}{4}\times 4\times 4\right) = \text{R30 000}$	
	$\text{R23 933,6105} - P = \dfrac{\text{R30 000}}{\left(1+\dfrac{0,075}{4}\times 4\times 4\right)}$	✓ Substitution / *vervanging* **CA** ✓ Substitution / *vervanging* **CA**
	$P = \text{R23 933,6105} - \dfrac{\text{R30 000}}{\left(1+\dfrac{0,075}{4}\times 4\times 4\right)}$	✓ P subject / *onderwerp* **CA**
	$\therefore P = \text{R856,69}$	✓ R856,69 **CA** (4) **[13]**

QUESTION/*VRAAG* 6

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

QUESTION/*VRAAG* **7**

7.1	$y = 6$ **OR/***OF* $(0 ; 6)$	✓ y-intercept/ *afsnit* **A** (1)
7.2	$f(x) = x^3 - 7x + 6$ $f(1) = (1)^3 - 7(1) + 6 = 0$ $1 \ : \ \begin{array}{cccc} 1 & 0 & -7 & 6 \\ & 0 & 1 & 1 \ -6 \\ \hline 1 & 1 & -6 & 0 \end{array}$ $f(x) = (x-1)(x^2 + x - 6)$ $\therefore f(x) = (x-1)(x-2)(x+3) = 0$ $x = 1$ or/*of* $x = 2$ or / *of* $x = -3$	✓ $f(x) = 0$ **A** ✓ First root of/ *eerste wortel van* f. **A** ✓ Quadratic factor / *kwadratiese faktor* **CA** ✓ Factors / *faktore* ✓ two other x-intercepts. / *twee ander x-afsnitte* **CA** (5)
7.3	$f(x) = x^3 - 7x + 6$ $f'(x) = 3x^2 - 7 = 0$ $x = \pm\sqrt{\dfrac{7}{3}}$ $f\left(\sqrt{\dfrac{7}{3}}\right) = \left(\sqrt{\dfrac{7}{3}}\right)^3 - 7\left(\sqrt{\dfrac{7}{3}}\right) + 6 = -1,13$ $f\left(-\sqrt{\dfrac{7}{3}}\right) = \left(-\sqrt{\dfrac{7}{3}}\right)^3 - 7\left(-\sqrt{\dfrac{7}{3}}\right) + 6 = 13,13$ $\left(\sqrt{\dfrac{7}{3}} ; -1,13\right)$ and $\left(-\sqrt{\dfrac{7}{3}} ; 13,13\right)$	✓ $f'(x) = 3x^2 - 7$ **A** ✓ $f'(x) = 0$ **CA** ✓ $x = \pm\sqrt{\dfrac{7}{3}}$ **CA** ✓ $f\left(\sqrt{\dfrac{7}{3}}\right) = -1,13$ **CA** ✓ $f\left(-\sqrt{\dfrac{7}{3}}\right) = 13,13$ **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/*duisend* = 1 500	✓ 1 500	**A**
			(1)
8.2	$P(x) = -x^2 + 5x = 0$	✓ $P(x) = 0$	**A**
		✓ Factors/*faktore* / **SF**	**A**
	$0 = x(-x+5)$ **OR/***OF* $x = \dfrac{-5 \pm \sqrt{5^2 - 4(-1)(0)}}{2(-1)}$		
		✓ 0	**CA**
	$\therefore x = 0$ **OR/***OF* $x = 5$	✓ 5	**CA**
			(4)
8.3	$P(x) = -x^2 + 5x = 0$		
	$P(1) = -(1)^2 + 5(1)$	✓ $P(1)$	**A**
	$P(x) = \$4\,000$	✓ 4 000	**CA**
		$\boxed{\textbf{NP}}$	
			(2)
8.4	$x = \dfrac{0+5}{2} = \dfrac{5}{2} = 2,5$	✓ Method / *metode*	**A**
	OR / *OF*	✓ 2,5	**A**
		OR/*OF*	
	$x = -\dfrac{5}{2(-1)} = \dfrac{5}{2} = 2,5$	✓ Method / *metode*	**A**
	OR / *OF*	✓ 2,5	**A**
		OR/ *OF*	
	$P'(x) = -2x + 5 = 0$	✓ Method / *metode*	**A**
	$\therefore x = \dfrac{5}{2} = 2,5$	✓ 2,5	**A**
			(2)
8.5	$P(2,5) = -(2,5)^2 + 5(2,5)$	✓ 6,25	**A**
		✓ 6 250	**CA**
	$P(2,5) = 6,25 = \$6\,250$	$\boxed{\textbf{NP}}$	
			(2)
			[11]

QUESTION/*VRAAG* 9

9.1	9.1.1	$= \int x^{\frac{1}{2}} \, dx$ $= \frac{2}{3} x^{\frac{3}{2}} + c$	$\checkmark \dfrac{2}{3} x^{\frac{3}{2}} \quad x$ $\checkmark C$	**A** **A** (2)
	9.1.2	$\int \left(x^{-2} - \dfrac{\pi}{x} \right) dx$ $= -x^{-1} - \pi \ln x + c$	$\checkmark \; -x^{-1}$ $\checkmark \; -\pi \ln x + c$	**A** **A** (2)
9.2		$\int_a^2 \left(5x^2 - 20 \right) dx$ $= \left[\dfrac{5x^3}{3} - 20x \right]_a^2$ $= \dfrac{5(2)^3}{3} - 20(2) - \dfrac{5a^3}{3} + 20a$ $45 = \dfrac{40}{3} - 40 - \dfrac{5a^3}{3} + 20a$ $45 = -\dfrac{80}{3} - \dfrac{5a^3}{3} + 20a$ $5a^3 - 60a + 80 - 135 = 0$ $a^3 - 12a - 11 = 0$ $(a+1)(a^2 - a - 11) = 0$ $a = -1 \;$ or/*of* $\; a = \dfrac{-(-1) \pm \sqrt{(-1)^2 - 4(1)(-11)}}{2(1)}$ $a = -1 \;$ or/*of* $\; a = -2{,}86 \;$ or/*of* $\; a = 3{,}85$ $\therefore a = -1$	$\checkmark$ Area in integral notation / *Oppervlakte in integrasie notasie* **A** $\checkmark$ Integral / *Integraal* **CA** $\checkmark\checkmark$ **SF** **CA** $\checkmark$ Equating to / *Gelykstelling aan* 45 **CA** $\checkmark$ **S** **CA** $\checkmark$ Factors / *faktore* **CA** $\checkmark a = -1$ **CA** (8) **[12]**

TOTAL/*TOTAAL*: 150