



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

**SENIOR CERTIFICATE EXAMINATIONS/
NATIONAL SENIOR CERTIFICATE EXAMINATIONS
*SENIORSERTIFIKAAT-EKSAMEN/
NASIONALE SENIORSERTIFIKAAT-EKSAMEN***

**TECHNICAL MATHEMATICS P1/*TEGNIESE WISKUNDE V1*
MAY/JUNE/*MEI/JUNIE* 2025
FINAL MARKING GUIDELINES/*FINALE NASIENRIGLYNE***

MARKS/PUNTE: 150

Marking Codes/ <i>Nasienkode</i> s	
A	Accuracy/ <i>Akkuraatheid</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 Penaliserings vir Afronding nie</i>
NPU	No Penalty for Units omitted/ <i>Geen Penaliserings vir Eenhede Weggelaat nie</i>
S	Simplification/ <i>Vereenvoudiging</i>
SF	Substitution in Correct Formula/ <i>Vervanging in Korrekte Formule</i>
F	Use of correct Formula/ <i>Gebruik van korrekte Formule</i>
AO	Answer Only/ <i>Slegs antwoord</i>

**These marking guidelines consist of 22 pages.
*Hierdie nasienriglyne bestaan uit 22 bladsye.***

NOTE:

- If a candidate answers a question **TWICE**, only mark the **FIRST** attempt.
- Consistent accuracy applies in all aspects of the marking guidelines where indicated.
- # Shows questions where a Tolerance Range will be applied:

Q 3.1.3 ; Q 5.3 ; Q 6.5.3 & Q 7.4

LET WEL:

- Indien 'n kandidaat 'n vraag **TWEE KEER** beantwoord, sien slegs die **EERSTE** poging
- Volgehoue akkuraatheid is deurgaans op alle aspekte van die nasienriglyne waar aangedui.
- # Toon vrae waar Toleransie wydte (Verdraagsaamheids omvang) toegepas word:

V 3.1.3 ; V 5.3 ; V 6.5.3 & V 7.4

QUESTION/VRAAG 1

1.1.1	$(4x + 1)(5 - x) = 0$ $x=5$ or/of $x = -\frac{1}{4}$ OR / OF $-0,25$	$\checkmark -\frac{1}{4}$ A $\checkmark 5$ A (2)
1.1.2	$x(7x - 9) - 8 = 0$ $7x^2 - 9x - 8 = 0$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $= \frac{-(-9) \pm \sqrt{(-9)^2 - 4(7)(-8)}}{2(7)}$ $= \frac{9 \pm \sqrt{305}}{14}$ $\therefore x \approx 1,89$ or/of $x \approx -0,60$	\checkmark std form/vorm A \checkmark SF CA $\checkmark\checkmark$ each x -value/elke x -waarde CA AO: Full marks/Volpunte NPR (4)

1.1.3	$-x^2 + 5x + 6 > 0$ $-(x - 6)(x + 1) > 0$ OR/OF $x^2 - 5x - 6 < 0$ $(x - 6)(x + 1) < 0$ OR/OF $\frac{-(5) \pm \sqrt{(5)^2 - 4(-1)(6)}}{2(-1)}$ Critical values/Kritiese waardes: 6 and/en -1 $\therefore x \in (-1; 6)$	✓ factors/faktore/SF A ✓ critical values/kritieke waardes CA ✓ correct notation/korrekte notasie A AO: Full marks/Volpunte (3)
1.2.1	$y = 2x + 1$	✓ subject/onderwerp A (1)
1.2.2	$y = 2x + 1$ $x^2 - xy + y^2 = 7$ $x^2 - x(2x + 1) + (2x + 1)^2 = 7$ $x^2 - 2x^2 - x + 4x^2 + 4x + 1 = 7$ $3x^2 + 3x - 6 = 0$ $x^2 + x - 2 = 0$ $(x + 2)(x - 1) = 0$ OR/OF $x = \frac{-(-1) \pm \sqrt{(-1)^2 - 4(1)(-2)}}{2(1)}$ $\therefore x = -2$ or/of $x = 1$ $\therefore y = 2(-2) + 1 = -3$ or/of $y = 2(1) + 1 = 3$	✓ subst./vervang. CA ✓ std form/vorm CA ✓ factors/faktore/SF CA ✓ both x-values/beide x-wrdes CA ✓ both y-values/beide y-wrdes CA OR/OF

	$x = \frac{y-1}{2}$ $x^2 - xy + y^2 = 7$ $\left(\frac{y-1}{2}\right)^2 - \left(\frac{y-1}{2}\right)y + y^2 = 7$ $\frac{y^2 - 2y + 1}{4} - \frac{y^2 - y}{2} + y^2 = 7$ $3y^2 - 27 = 0$ $y^2 - 9 = 0$ $(y+3)(y-3) = 0 \text{ OR/OF } y = \pm\sqrt{9}$ $\therefore y = -3 \text{ or/of } y = 3$ $\therefore x = -2 \text{ or/of } x = 1$	<p>✓subst./vervang A</p> <p>✓std form/vorm CA</p> <p>✓ factors/faktore/SF CA</p> <p>✓ both y-values/beide y-wrdes CA</p> <p>✓ both x-values/beide x-wrdes CA (5)</p>
1.3.1	$N_s = \frac{60 \times f}{P}$ $P = \frac{60 \times f}{N_s}$	<p>✓ P subject/onderwerp A (1)</p>
1.3.2	$P = \frac{60 \times f}{N_s}$ $= \frac{60 \times 63}{540} \times 60$ $= 7 \times 60 = 420 \text{ poles / pale}$ <p style="text-align: center;">OR/OF</p> $N_s = \frac{60 \times f}{P}$ $540 = \frac{60 \times 63}{P} \times 60$ $P = 7 \times 60 = 420 \text{ poles / pale}$ <p>Accept / Aanvaar 7 poles / pale</p>	<p>✓ SF CA</p> <p>✓ S CA</p> <p style="text-align: center;">OR/OF</p> <p>✓ SF A</p> <p>✓ S CA (2)</p>

1.4	$R = 4 \times 15 = 60$ $= \frac{60}{110_2}$ $= \frac{111100_2}{110_2}$ $= 1010_2$ <p style="text-align: center;">OR/OF</p> $R = 4 \times 15 = 60$ $\frac{R}{110_2}$ $= \frac{60}{110_2}$ $= \frac{60}{6}$ $= 10$ $= 1010_2$	$\checkmark R = 60$ A \checkmark binary form/binêre vorm CA $\checkmark 1010_2$ CA <p style="text-align: center;">OR/OF</p> $\checkmark R = 60$ A $\checkmark 6$ A $\checkmark 1010_2$ CA AO: Full marks/Volpunte (3)
		[21]

QUESTION/VRAAG 2

2.1.1	$\Delta = b^2 - 4ac$ $= (0)^2 - 4(1)(-4)$ $= 16$	✓SF ✓16	A CA (2)
2.1.2	Rational and unequal <i>Rasionaal en ongelyk</i>	✓ rational/rasionaal ✓ unequal/ongelyk	CA CA (2)
2.2	$px^2 - 6x + 1 = 0$ $\Delta = 0$ $(-6)^2 - 4(p)(1) = 0$ $36 - 4p = 0$ $\therefore p = 9$	✓ $\Delta = 0$ ✓SF ✓S ✓ value of/waarde van p	A A CA CA (4)
			[8]

QUESTION/VRAAG 3

3.1.1	$\log_2 2^b$ $= b$	✓ b	A (1)
3.1.2	$\frac{5^{3n} - 5^{3n-1}}{5^{3n+1}}$ $= \frac{5^{3n} - 5^{3n} \times 5^{-1}}{5^{3n} \times 5} \quad \text{OR/OF} \quad \frac{5^{3n}}{5^{3n+1}} - \frac{5^{3n-1}}{5^{3n+1}}$ $= \frac{5^{3n}(1 - 5^{-1})}{5^{3n} \times 5} \quad \text{OR/OF} \quad 5^{3n-3n-1} - 5^{3n-1-3n-1}$ $= \frac{1 - 5^{-1}}{5} \quad \text{OR/OF} \quad 5^{-1} - 5^{-2}$ $= \frac{4}{25}$ <p style="text-align: center;">OR/OF</p> $\frac{5^{3n} - 5^{3n-1}}{5^{3n+1}}$ $= \frac{125^n - 125^n \times \frac{1}{5}}{125^n \times 5}$ $= \frac{\frac{4}{5} \times 125^n}{5 \times 125^n}$ $= \frac{4}{25}$	<p>✓ exp. property/eks eienskap</p> <p>✓ S</p> <p>✓ S</p> <p style="text-align: center;">OR/OF</p> <p>✓ exp. property/eks eienskap</p> <p>✓ S</p> <p>✓ S</p>	<p>A</p> <p>CA</p> <p>CA</p> <p>A</p> <p>CA</p> <p>CA (3)</p>
3.1.3 #	$\frac{\sqrt{20x} \left(\sqrt{5x^3} + 3\sqrt[4]{625x^{12}} \right)}{2x}$ $= \frac{\sqrt{20x}(\sqrt{5x^3} + 3\sqrt{5x^3})}{2x}$ $= \frac{\sqrt{100x^4} + \sqrt{900x^4}}{2x}$ $= \frac{10x^2 + 30x^2}{2x} \quad \text{OR/OF} \quad = \frac{40x^2}{2x}$ $= 20x$ <p style="text-align: center;">OR/OF</p>	<p>✓ $3\sqrt{5x^3}$</p> <p>✓ $\sqrt{100x^4}$</p> <p>✓ $\sqrt{900x^4}$</p> <p>✓ S</p> <p>✓ S</p> <p style="text-align: center;">OR/OF</p>	<p>A</p> <p>A</p> <p>CA</p> <p>CA</p> <p>CA</p>

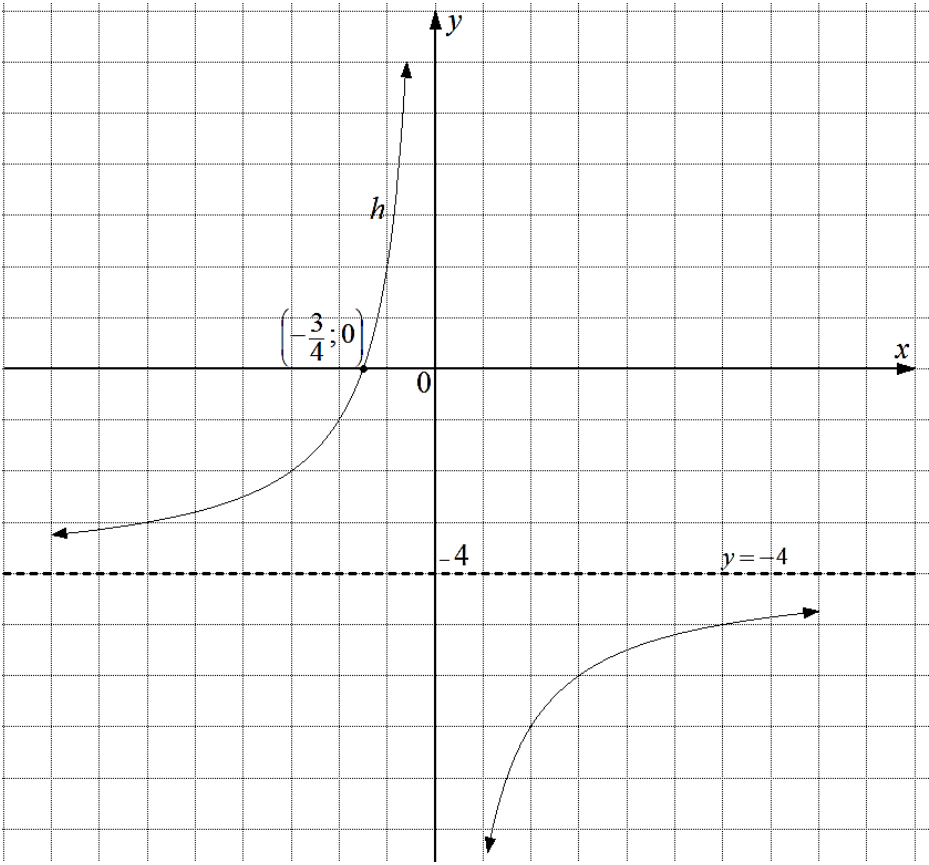
$\frac{\sqrt{20x} \left(\sqrt{5x^3} + 3\sqrt[4]{625x^{12}} \right)}{2x}$ $= \frac{\sqrt{5 \times 4x} \left(\sqrt{5x^3} + 3\sqrt{5x^3} \right)}{2x}$ $= \frac{2\sqrt{5x} \left(4\sqrt{5x^3} \right)}{2x}$ $= \frac{40x^2}{2x}$ $= 20x$ <p style="text-align: center;">OR/OF</p> $\frac{\sqrt{20x} \left(\sqrt{5x^3} + 3\sqrt[4]{625x^{12}} \right)}{2x}$ $= \frac{\sqrt{20x} \left(\sqrt{5x^3} + 3\sqrt{5x^3} \right)}{2x}$ $= \frac{\sqrt{20} x^{\frac{1}{2}} \left(\sqrt{5} x^{\frac{3}{2}} + 3 \times \sqrt{5} x^{\frac{3}{2}} \right)}{2x}$ $= \frac{2\sqrt{5} x^{\frac{1}{2}} \left(4\sqrt{5} x^{\frac{3}{2}} \right)}{2x}$ $= \frac{40x^2}{2x}$ $= 20x$ <p style="text-align: center;">OR/OF</p> $\frac{\sqrt{20x} \left(\sqrt{5x^3} + 3\sqrt[4]{625x^{12}} \right)}{2x}$ $= \frac{\sqrt{4 \cdot 5x} \left(\sqrt{5x \cdot x^2} + 3\sqrt{5x \cdot x^2} \right)}{2x}$ $= \frac{2\sqrt{5x} \left(x\sqrt{5x} + 3x\sqrt{5x} \right)}{2x}$ $= \frac{2\sqrt{5x} \left(4x\sqrt{5x} \right)}{2x}$ $= 4 \times 5x$ $= 20x$ <p style="text-align: center;">OR/OF</p>	$\checkmark 3\sqrt{5x^3}$ <p style="text-align: right;">A</p> $\checkmark 2\sqrt{5x}$ <p style="text-align: right;">A</p> $\checkmark 4\sqrt{5x^3}$ <p style="text-align: right;">CA</p> $\checkmark S$ <p style="text-align: right;">CA</p> $\checkmark S$ <p style="text-align: right;">CA</p> <p style="text-align: center;">OR/OF</p> $\checkmark 3\sqrt{5x^3}$ <p style="text-align: right;">A</p> $\checkmark 2\sqrt{5} x^{\frac{1}{2}}$ <p style="text-align: right;">A</p> $\checkmark 4\sqrt{5} x^{\frac{3}{2}}$ <p style="text-align: right;">CA</p> $\checkmark S$ <p style="text-align: right;">CA</p> $\checkmark S$ <p style="text-align: right;">CA</p> <p style="text-align: center;">OR/OF</p> $\checkmark 3\sqrt{5x \times x^2}$ <p style="text-align: right;">A</p> $\checkmark 2\sqrt{5x}$ <p style="text-align: right;">A</p> $\checkmark 4x\sqrt{5x}$ <p style="text-align: right;">CA</p> $\checkmark S$ <p style="text-align: right;">CA</p> $\checkmark S$ <p style="text-align: right;">CA</p> <p style="text-align: center;">OR/OF</p>
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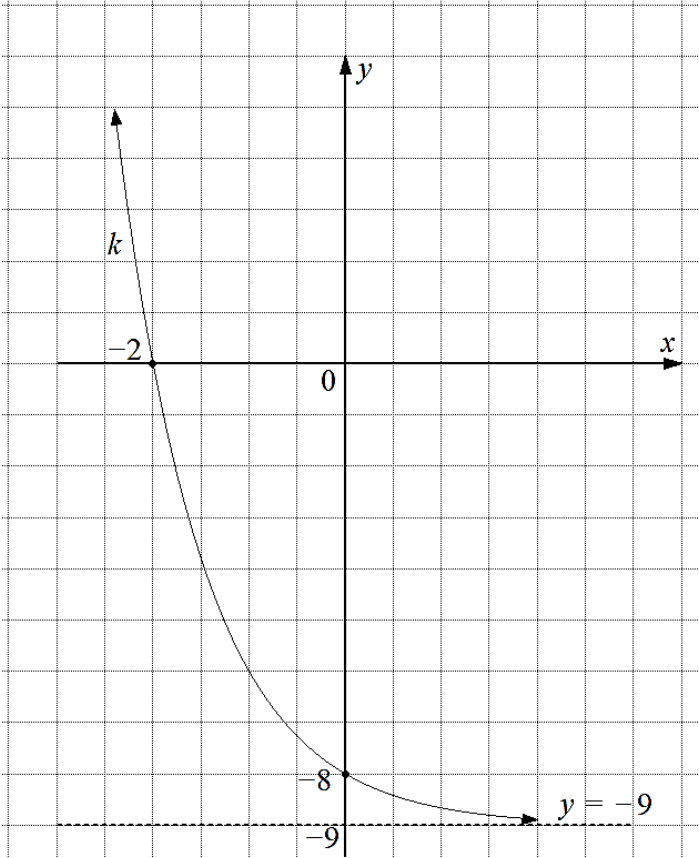
$\frac{\sqrt{20x} \left(\sqrt{5x^3} + 3\sqrt[4]{625x^{12}} \right)}{2x}$ $= \frac{(5 \cdot 2^2 x)^{\frac{1}{2}} \left((5x^3)^{\frac{1}{2}} + 3(5^4 x^{12})^{\frac{1}{8}} \right)}{2x}$ $= \frac{5^{\frac{1}{2}} \cdot 2x^{\frac{1}{2}} \left(5^{\frac{1}{2}} x^{\frac{3}{2}} + 3 \cdot 5^{\frac{1}{2}} x^{\frac{3}{2}} \right)}{2x}$ $= \frac{2 \cdot 5^{\frac{1}{2}} x^{\frac{1}{2}} \left(4 \cdot 5^{\frac{1}{2}} x^{\frac{3}{2}} \right)}{2x}$ $= \frac{8 \cdot 5 \cdot x^2}{2x}$ $= 20x$ <p style="text-align: center;">OR/OF</p> $\frac{\sqrt{20x} \left(\sqrt{5x^3} + 3\sqrt[4]{625x^{12}} \right)}{2x}$ $= 2\sqrt{5x} \left(\frac{\sqrt{5x^{\frac{3}{2}}}}{2x} + \frac{3\sqrt{5x^{\frac{3}{2}}}}{2x} \right)$ $= 2\sqrt{5x} \left(\frac{\sqrt{5}}{2} x^{\frac{1}{2}} + \frac{3\sqrt{5}}{2} x^{\frac{1}{2}} \right)$ $= 2\sqrt{5x} (2\sqrt{5x})$ $= 4 \times 5x$ $= 20x$	$\checkmark 3(5^4 x^{12})^{\frac{1}{8}} \quad \text{A}$ $\checkmark 2 \cdot 5^{\frac{1}{2}} x^{\frac{1}{2}} \quad \text{A}$ $\checkmark 4 \cdot 5^{\frac{1}{2}} x^{\frac{3}{2}} \quad \text{CA}$ $\checkmark \text{S} \quad \text{CA}$ $\checkmark \text{S} \quad \text{CA}$ <p style="text-align: center;">OR/OF</p> $\checkmark 3\sqrt{5x^{\frac{3}{2}}} \quad \text{A}$ $\checkmark 2\sqrt{5x} \quad \text{A}$ $\checkmark \frac{\sqrt{5}}{2} x^{\frac{1}{2}} + \frac{3\sqrt{5}}{2} x^{\frac{1}{2}} \quad \text{CA}$ $\checkmark \text{S} \quad \text{CA}$ $\checkmark \text{S} \quad \text{CA}$ <p style="text-align: right;">(5)</p>
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3.2	$\log(x + 3) = 1 + \log x$ $\log(x + 3) - \log x = 1$ $\log \frac{(x + 3)}{x} = 1$ $\log \frac{(x + 3)}{x} = \log 10 \quad \textbf{OR/OF} \quad \frac{x+3}{x} = 10^1$ $10x = x + 3$ $9x = 3$ $x = \frac{1}{3}$ <p style="text-align: center;">OR/OF</p> $\log(x + 3) = 1 + \log x$ $\log(x + 3) = \log 10 + \log x$ $\log(x + 3) = \log 10x$ $x + 3 = 10x$ $9x = 3$ $x = \frac{1}{3}$ <p style="text-align: center;">OR/OF</p> $\log(x + 3) = 1 + \log x$ $-1 = \log x - \log(x + 3)$ $-1 = \log \frac{x}{x + 3}$ $10^{-1} = \frac{x}{x + 3}$ $\frac{1}{10} = \frac{x}{x + 3}$ $x + 3 = 10x$ $9x = 3$ $x = \frac{1}{3}$	$\checkmark \log \text{ prop/eienskap} \quad \textbf{A}$ $\checkmark \log 10 \quad \textbf{OR/OF} \quad \text{exponent prop/eksponent eienskap} \quad \textbf{A}$ $\checkmark \text{ S} \quad \textbf{CA}$ $\checkmark \text{ S} \quad \textbf{CA}$ $\checkmark \text{ S} \quad \textbf{CA}$ <p style="text-align: center;">OR/OF</p> $\checkmark \log 10 \quad \textbf{A}$ $\checkmark \log \text{ prop/eienskap} \quad \textbf{CA}$ $\checkmark \text{ S} \quad \textbf{CA}$ $\checkmark \text{ S} \quad \textbf{CA}$ $\checkmark \text{ S} \quad \textbf{CA}$ <p style="text-align: center;">OR/OF</p> $\checkmark \log \text{ prop/eienskap} \quad \textbf{A}$ $\checkmark \text{ exponent prop/ eksponent eienskap} \quad \textbf{CA}$ $\checkmark \text{ S} \quad \textbf{CA}$ $\checkmark \text{ S} \quad \textbf{CA}$ $\checkmark \text{ S} \quad \textbf{CA}$ <p style="text-align: right;">(5)</p>
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3.3	$\sqrt{-16} + 3i^2$ $= 4i + 3(-1)$ $= -3 + 4i$	$\checkmark -3$ $\checkmark 4i$	A A (2)
3.4.1	$z = i^7 + \sqrt{3}$ $= \sqrt{3} - i$	$\checkmark z = \sqrt{3} - i$	A (1)
3.4.2	$\text{modulus} = \sqrt{(\sqrt{3})^2 + (-1)^2} = 2$	\checkmark SF $\checkmark 2$ AO: Full marks/Volpunte	A CA (2)
3.4.3	$\tan \theta = \frac{-1}{\sqrt{3}}$ Ref. Angle / Ver.Hoek = 30° $\therefore \theta = 360^\circ - 30^\circ = 330^\circ$ $\therefore z = 2 \text{cis } 330^\circ$ OR/OF $z = 2 \text{cis } \frac{11}{6}\pi$ OR/OF $2 \angle 330^\circ$ OR/OF $z = 2(\cos 330^\circ + i \cdot \sin 330^\circ)$ OR/OF $z = 2\left(\cos \frac{11}{6}\pi + i \cdot \sin \frac{11}{6}\pi\right)$	$\checkmark \tan \theta = \frac{-1}{\sqrt{3}}$ $\checkmark \theta = 330^\circ$ \checkmark polar form / polêre vorm	CA CA CA AO: Full marks/Volpunte (3)
			[22]

QUESTION/VRAAG 4

4.1.1	$x = 0$ $y = -4$	$\checkmark x = 0$ A $\checkmark y = -4$ A (2)
4.1.2	$-\frac{3}{x} - 4 = 0$ $-\frac{3}{x} = 4$ $4x = -3$ $x = -\frac{3}{4}$ OR / OF $-0,75$ Accept/Aanvaar: $\left(-\frac{3}{4}; 0\right)$	$\checkmark h(x) = 0$ A $\checkmark x\text{-value/waarde}$ CA (2)
4.1.3		
	\checkmark shape/vorm \checkmark x-intercept/afsnit \checkmark horizontal asymptote/horizontale asimptoot	A CA CA (3)

4.2		<ul style="list-style-type: none"> ✓ shape/vorm A ✓ x-intercept/afsnit A ✓ y-intercept/afsnit A ✓ asymptote/asimptoot A <p style="text-align: right;">(4)</p>
4.3.1	C(0 ; -5)	<ul style="list-style-type: none"> ✓ 0 A ✓ -5 A <p style="text-align: right;">(2)</p>
4.3.2	$x^2 - 4x - 5 = 0$ $(x - 5)(x + 1) = 0$ $x = 5$ or/of $x = -1$ AB = 6 units / eenhede	<ul style="list-style-type: none"> ✓ $f(x) = 0$ A ✓ factors/faktore A ✓ both/beide x-values/ waardes CA ✓ length of/lengte van AB CA <p style="text-align: right;">AO: Full marks/Volpunte (4)</p>
4.3.3	$x = -\frac{b}{2a}$ $x = -\frac{-4}{2(1)}$ OR/OF $x = \frac{5-1}{2}$ OR/OF $f'(x) = 2x - 4 = 0$ $\therefore x = 2$ $y = (2)^2 - 4(2) - 5$ OR/OF $y = \frac{4(1)(-5) - (-4)^2}{4(1)}$ $y = -9$ $\therefore D(2; -9)$	<ul style="list-style-type: none"> ✓ SF/M A ✓ x-value/waarde CA ✓ y-value/waarde CA <p style="text-align: right;">AO: Full marks/Volpunte (3)</p>

4.3.4	$y \geq -9$ OR/OF $y \in [-9; \infty)$ OR/OF $-9 \leq y < \infty$	✓ range/waardevers/terrein CA (1)
4.3.5	$m = \frac{0+5}{5-0}$ $= 1$ $y = x - 5$	✓ SF CA ✓ value/waarde CA ✓ equation/vergelyking CA AO: Full marks/Volpunte (3)
4.3.6	$y_E = (2) - 5 = -3$ \therefore ED = 6 units/eenhede	✓ y-coord. of E/y-koör v E CA ✓ length/lengte ED CA AO: Full marks/Volpunte (2)
		[26]

QUESTION/VRAAG 5

5.1.1	$A = R464,48 \times 24 + R1\,000$ $= R12\,147,52$	✓ value / waarde A (1)
5.1.2	$A = P(1 + ni)$ $11\,147,52 = 9\,063(1 + 2i)$ $\therefore 1 + 2i \approx 1,2300\dots$ $\therefore 2i \approx 0,23\dots$ $\therefore i \approx 0,115$ OR/OF $r \approx 11,50\%$ OR/OF Simple interest = Pni $2\,084,52 = 9\,063 \times 2 \times i$ $\therefore i \approx 0,115$ OR/OF $r \approx 11,50\%$ OR/OF $n \times \text{Interest \%} = \frac{V_{\text{final}} - V_{\text{initial}}}{V_{\text{initial}}} \times 100\%$ $2r = \frac{11\,147,52 - 9\,063}{9\,063} \times 100\%$ $r \approx 11,50\%$	✓ F A ✓ 11 147,52 A ✓ 9 063 A ✓ value of/waarde van i CA OR/OF ✓ F A ✓ 2 084,52 A ✓ 9 063 A ✓ value of/waarde van i CA OR/OF ✓ F A ✓ 11 147,52 A ✓ 9 063 A ✓ value of/waarde van r CA NPR (4)
5.2	$A = P(1 - i)^n$ $= R220\,000(1 - 0,23)^3$ $= R100\,437,26$ OR/OF Year/Jaar 1 : $220\,000 - 0,23 \times 220\,000 = R169\,400$ Year/Jaar 2 : $169\,400 - 0,23 \times 169\,400 = R130\,438$ Year/Jaar 3 : $130\,438 - 0,23 \times 130\,438 = R100\,437,26$	✓ F A ✓ SF A ✓ value/waarde CA OR/OF ✓ R169 400 A ✓ R130 438 CA ✓ R100 437,26 CA NPR (3)

<p>5.3 #</p>	<p>Value of investment at end of 4 years / <i>Waarde van die belegging aan die einde van 4 jaar:</i></p> $A = R40\,000 \left(1 + \frac{6,5\%}{4}\right)^{16}$ $\approx R\,51\,768,90$ <p>Value of investment at end of 7 years/ <i>Waarde van die belegging aan die einde van 7 jaar</i></p> $A = R\,51\,768,90 \left(1 + \frac{8\%}{2}\right)^6$ $\approx R\,65\,504,17$ <p>\therefore Interest / <i>Rente</i> $\approx R\,25\,504,17$</p> <p>$\therefore R\,25\,504,17 > \frac{1}{2}(R\,40\,000)$</p> <p>$\therefore$ The interest earned was NOT less than half the original amount. /<i>Die rente verdien was NIE minder as die helfte van die oorspronklike bedrag NIE</i></p> <p style="text-align: center;">OR/OF</p> $A = R40\,000 \left(1 + \frac{6,5\%}{4}\right)^{16} \times \left(1 + \frac{8\%}{2}\right)^6$ $\approx R\,65\,504,17$ <p>\therefore Interest / <i>Rente</i> $\approx R\,25\,504,17$</p> <p>$\therefore R\,25\,504,17 > \frac{1}{2}(R\,40\,000)$</p> <p>$\therefore$ The interest earned was NOT less than half the original amount. /<i>Die rente verdien was NIE minder as die helfte van die oorspronklike bedrag NIE</i></p>	$\checkmark 40\,000 \left(1 + \frac{6,5\%}{4}\right)^{16}$ <p style="text-align: right;">A</p> $\checkmark R\,51\,768,90$ <p style="text-align: right;">CA</p> $\checkmark 51\,768,90 \left(1 + \frac{8\%}{2}\right)^6$ <p style="text-align: right;">CA</p> $\checkmark R\,65\,504,17$ <p style="text-align: right;">CA</p> $\checkmark R\,25\,504,17$ <p style="text-align: right;">CA</p> $\checkmark \text{ conclusion/gevolgtrekking}$ <p style="text-align: right;">CA</p> <p style="text-align: center;">OR/OF</p> $\checkmark 40\,000 \left(1 + \frac{6,5\%}{4}\right)^{16}$ <p style="text-align: right;">A</p> $\checkmark \text{M} \checkmark \times \left(1 + \frac{8\%}{2}\right)^6$ <p style="text-align: right;">A</p> $\checkmark R\,65\,504,17$ <p style="text-align: right;">CA</p> $\checkmark R\,25\,504,17$ <p style="text-align: right;">CA</p> $\checkmark \text{ conclusion/gevolgtrekking}$ <p style="text-align: right;">CA (6)</p> <p>NPR</p> <p style="text-align: right;">[14]</p>
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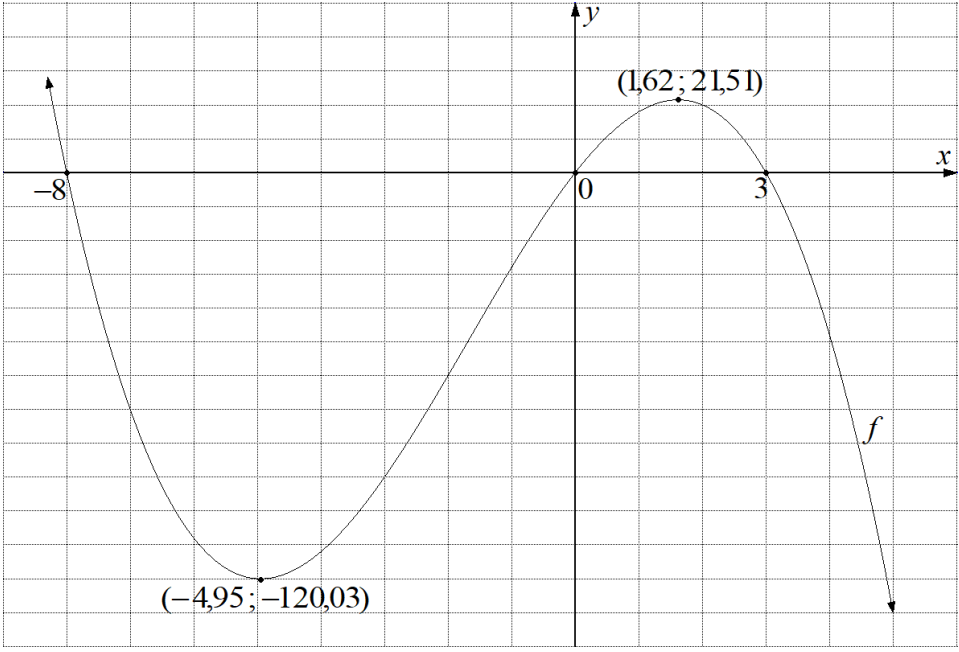
QUESTION/VRAAG 6

6.1	$f(x) = -8x$ $f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ $= \lim_{h \rightarrow 0} \frac{-8(x+h) - (-8x)}{h}$ $= \lim_{h \rightarrow 0} \frac{-8x - 8h + 8x}{h}$ $= \lim_{h \rightarrow 0} \frac{-8h}{h}$ $= \lim_{h \rightarrow 0} (-8)$ $\therefore f'(x) = -8$	<p>✓ definition/definisie A</p> <p>✓ SF A</p> <p>✓ S CA</p> <p>✓ S CA</p> <p>✓ -8 CA</p> <p>Penalty: 1 mark for incorrect notation/ Penaliseer : 1 punt vir foutiewe notasie</p> <p>AO: only 1 mark/ slegs 1 punt</p> <p>(5)</p>
6.2	$D_x [-2]$ $= 0$	<p>✓ 0 A</p> <p>(1)</p>
6.3	$f(x) = x^{\frac{3}{2}} - 4x^{-7}$ $f'(x) = \frac{3}{2}x^{\frac{1}{2}} + 28x^{-8}$	<p>✓ $\frac{3}{2}x^{\frac{1}{2}}$ A</p> <p>✓ $28x^{-8}$ A</p> <p>(2)</p>
6.4.1	$y - yx = x^2 - 1$ $y(1-x) = (x-1)(x+1)$ $y = \frac{(x-1)(x+1)}{-(x-1)}$ $y = -x - 1$ <p style="text-align: center;">OR/OF</p> $y - yx = x^2 - 1$ $-y(x-1) = (x-1)(x+1)$ $-y = \frac{(x-1)(x+1)}{(x-1)}$ $-y = x + 1$ $y = -x - 1$	<p>✓ factor LHS/faktor LK A</p> <p>✓ factors RHS/faktore RK A</p> <p>✓ divide by /deel deur $(1-x)$ CA</p> <p>✓ S CA</p> <p style="text-align: center;">OR/OF</p> <p>✓ factor LHS/faktor LK A</p> <p>✓ factors RHS/faktore RK A</p> <p>✓ divide by /deel deur $(x-1)$ CA</p> <p>✓ S CA</p> <p>(4)</p>
6.4.2	$\frac{dy}{dx} = -1$	<p>✓ -1 CA</p> <p>(1)</p>

6.5.1	$g'(x) = 6x + 5$	✓ 6x ✓ 5	A A (2)
6.5.2	$g'(-4) = 6(-4) + 5 = -19$	✓ grad value/waarde	CA (1)
6.5.3 #	$g(-4) = 3(-4)^2 + 5(-4) = 28$ $y = -19x + c$ OR/OF $y - y_1 = -19(x - x_1)$ $28 = -19(-4) + c$ $y - 28 = -19[x - (-4)]$ $-48 = c$ $y - 28 = -19x - 76$ $y = -19x - 48$	✓ 28 ✓ SF ✓ Eqn of tangent/vergl van raaklyn	A CA CA (3)
6.6	Av. Grad./ Gemid.grad. $= \frac{y_2 - y_1}{x_2 - x_1}$ $5 = \frac{k - 3 - (-6)}{k - 1}$ OR/OF $5 = \frac{-6 - (k - 3)}{1 - k}$ $5k - 5 = k + 3$ $5 - 5k = -3 - k$ $4k = 8$ $-4k = -8$ $\therefore k = 2$	✓ SF ✓ S ✓ value of/ waarde van k	A CA CA (3)
			[22]

QUESTION/VRAAG 7

7.1	$y = 0$ OR/OF $(0;0)$	✓ y- intercept/afsnit A (1)
7.2	$g(x) = -x^3 - 5x^2 + 24x$ $= -x(x^2 + 5x - 24)$ $= -x(x+8)(x-3)$ OR/OF $g(x) = -x^3 - 5x^2 + 24x$ $= x(-x^2 - 5x + 24)$ $= x(-x-8)(x-3)$ OR/OF $= x(x+8)(-x+3)$	✓ common factor/gemene faktor A ✓ further factorisation/verdere faktorisering CA OR/OF ✓ common factor/gemene faktor A ✓ further factorisation/verdere faktorisering CA (2)
7.3	$x = 0$ or/of $x = -8$ or/of $x = 3$	✓ all 3 x-intercepts/ al 3 afsnitte CA (1)
7.4 #	$f'(x) = -3x^2 - 10x + 24 = 0$ $x = \frac{-(-10) \pm \sqrt{(-10)^2 - 4(-3)(24)}}{2(-3)}$ $\therefore x \approx 1,62$ or/of $x \approx -4,95$ $f(1,62) = -(1,62)^3 - 5(1,62)^2 + 24(1,62) \approx 21,51$ $f(-4,95) = -(-4,95)^3 - 5(-4,95)^2 + 24(-4,95) \approx -120,03$ $\therefore (1,62 ; 21,51)$ and/en $(-4,95 ; -120,03)$	✓ derivative/afgeleide A ✓ $f'(x) = 0$ A ✓ SF CA ✓ both values of/beide waardes van x CA ✓ both values of/beide waardes van y CA AO: Full marks/Volpunte NPR (5)

7.5		<p>✓ shape/vorm A</p> <p>✓ x- and y-intercepts/x- en y-afsnitte CA</p> <p>✓ both turning points/beide draaipunte CA</p> <p>(3)</p>
7.6	<p>$x < -4,95$ or/of $0 < x < 1,62$</p> <p>OR/OF</p> <p>$x \in (-\infty; -4,95) \cup (0; 1,62)$</p> <p>OR/OF</p> <p>$x < -4,95$ or/of $x > 0$ and/en $x < 1,62$</p>	<p>✓ $x < -4,95$ CA</p> <p>✓✓ $0 < x < 1,62$ CA</p> <p>OR/OF</p> <p>✓ $x \in (-\infty; -4,95)$ CA</p> <p>✓✓ $\cup (0; 1,62)$ CA</p> <p>OR/OF</p> <p>✓ $x < -4,95$ CA</p> <p>✓✓ $x > 0$ and/en $x < 1,62$ CA</p> <p>(3)</p> <p>[15]</p>

QUESTION/VRAAG 8

8.1	$x+1$ Accept/ Aanvaar: $\frac{2x+2}{2}$ OR/OF $\frac{1}{2}(2x+2)$	✓ height/hoogte A (1)
8.2	$V(x) = (10-2x)(2x+2)(x+1)$ $= (10-2x)(2x^2+4x+2)$ OR/OF $(2x+2)(-2x^2+8x+10)$ OR/OF $(x+1)(-4x^2+16x+20)$ $\therefore V(x) = -4x^3+12x^2+36x+20$	✓ SF CA ✓ trinomial/drieterm CA (2)
8.3	$V'(x) = -12x^2+24x+36$	✓ derivative/afgeleide A (1)
8.4	For maximum/Vir maksimum: $V'(x) = 0$ $-12x^2+24x+36 = 0$ $-x^2+2x+3 = 0$ OR/OF $x^2-2x-3 = 0$ $-(x-3)(x+1) = 0$ OR/OF $(x-3)(x+1) = 0$ OR/OF $x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(-1)(3)}}{2(-1)}$ OR/OF $x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(1)(-3)}}{2(1)}$ $\therefore x = 3$ or/of $x = -1$ $\therefore x = 3$	✓ equating derivative to/stel afgeleide aan 0 A ✓ factors/faktore/SF CA ✓ both values of/beide waardes van x CA ✓ applicable value of/toepaslike waarde van x CA (4) [8]

QUESTION/VRAAG 9

9.1	$\int -5x^9 dx$ $= -\frac{1}{2}x^{10} + C$ <p>Accept/ Aanvaar: $-\frac{5}{9+1}x^{9+1} + C$</p>	$\checkmark -\frac{1}{2}x^{10}$ A $\checkmark C$ A (2)
9.2.1	$\frac{2 - 8x^{-3} + x}{x}$ $= \frac{2}{x} - 8x^{-4} + 1$	$\checkmark -8x^{-4}$ A $\checkmark 1$ A (2)
9.2.2	$\int \frac{2}{x} - 8x^{-4} + 1 dx$ $= 2\ln x + \frac{8}{3}x^{-3} + x + C$	$\checkmark 2\ln x$ A $\checkmark \frac{8}{3}x^{-3}$ CA $\checkmark x$ CA (3)
9.3	$A = \int_k^{2k} f(x) dx$ $= \int_k^{2k} 4x^3 dx$ $= \left[x^4 \right]_k^{2k} \quad \text{OR/OF} \quad = \left[\frac{4x^{3+1}}{3+1} \right]_k^{2k}$ $(2k)^4 - (k)^4 = 36\,015$ $15k^4 = 36\,015$ $k^4 = 2\,401$ $k = \sqrt[4]{2\,401} = 7$ $\therefore 2k = 14$ $\therefore 10 < 2k < 20$ $\therefore \text{The claim is } \mathbf{VALID} /$ $\therefore \text{Die bewering is } \mathbf{GELDIG}.$	\checkmark Area notation using integrals/Oppervlak-notasie met gebruik van integrale A $\checkmark x^4$ A \checkmark subst./vervang. CA $\checkmark A = 36\,015$ CA $\checkmark S$ CA \checkmark value of/waarde van k CA \checkmark Conclusion/Gevolgt CA (7) [14]

TOTAL/TOTAAL: 150