



Province of the
EASTERN CAPE
EDUCATION

Iphondo leMpuma Kapa: Ishebe leMfundo
Provinsie van die Oos Kaap: Departement van Onderwys
Porafensio Ya Kapa Botjhabela: Lefapha la Thuto

**NATIONAL
SENIOR CERTIFICATE/
NASIONALE
SENIOR SERTIFIKAAT**

GRADE/*GRAAD* 12

JUNE/*JUNIE* 2026

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

MARKS/*PUNTE*: 150

This marking guideline consists of 17 pages./
Hierdie nasienriglyn bestaan uit 17 bladsye.

NOTE:

- Continuous accuracy (CA) applies only where indicated in this marking guideline.
- Assuming values/answers in order to solve a problem is unacceptable.

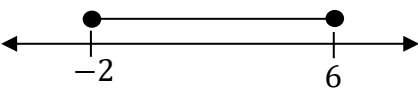
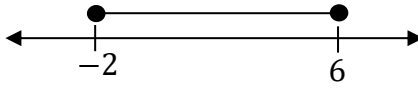
LET WEL:

- *Volgehoue akkuraatheid (CA) is slegs van toepassing soos aangedui in hierdie nasienriglyn.*
- *Aanvaarding van waardes/antwoorde om 'n probleem op te los, is onaanvaarbaar.*

MARKING CODES / NASIENKODES	
M	Method/Metode
A	Accuracy/Akkuraatheid
AO	Answer only/Slegs antwoord
CA	Consistent accuracy/Deurlopende akkuraatheid
F	Formula/Formule
I	Identity/Identiteit
R	Rounding/Afronding
S	Simplification/Vereenvoudiging
ST	Statement/Bewering
RE	Reason/Rede
ST RE	Statement and correct reason/Bewering en korrekte rede
SF	Substitution correctly in correct formula/Korrekte vervanging in die korrekte formule
NPU	No penalty for omitting units/Geen penalisering vir eenhede uitgelaat

QUESTION/VRAAG 1

1.1.1	$2x^2 + 7x - 15 = 0$ $(x + 5)(2x - 3) = 0$ $x = -5$ or/of $x = \frac{3}{2}$ OR/OF $2x^2 + 7x - 15 = 0$ $x = \frac{- (7) \pm \sqrt{(7)^2 - 4(2)(-15)}}{2(2)}$ $x = -5$ or/of $x = \frac{3}{2}$	✓ Factors/ <i>Faktore</i> ✓ Both values of x / <i>Albei waardes van x</i> OR/OF ✓ SF ✓ Both values of x / <i>Albei waardes van x</i> (2)	A CA A CA
1.1.2	$\frac{x^2}{3} - 2x - 5 = 0$ $x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4\left(\frac{1}{3}\right)(-5)}}{2\left(\frac{1}{3}\right)}$ $x = 7,9$ or/of $x = -1,9$ OR/OF $x^2 - 6x - 15 = 0$ $x = \frac{-(-6) \pm \sqrt{(-6)^2 - 4(1)(-15)}}{2(1)}$ $x = 7,9$ or/of $x = -1,9$	✓ SF ✓✓ Each value of x / <i>Elke waarde van x</i> OR/OF ✓ SF ✓✓ Each value of x / <i>Elke waarde van x</i> NPR	A CA A CA (3)

1.1.3	$12 + 4x > x^2$ $x^2 - 4x - 12 < 0$ $(x + 2)(x - 6) < 0$ CV: $x = -2$ and/en $x = 6$ $\therefore -2 < x < 6$  OR/OF $12 + 4x > x^2$ $x^2 - 4x - 12 < 0$ $x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(1)(-12)}}{2(1)}$ CV: $x = -2$ and/en $x = 6$ $\therefore -2 < x < 6$ 	✓ Standard form/<i>Standaard vorm</i> ✓ Factors/<i>Faktore</i> ✓ Answer/<i>Antwoord</i> ✓ Representation/<i>Voorstelling</i> OR/OF ✓ Standard form/<i>Standaard vorm</i> ✓ SF ✓ Answer/<i>Antwoord</i> ✓ Representation/<i>Voorstelling</i> (4)
1.2	$x - y - 1 = 0 \dots \text{eqn 1}$ $x^2 + y^2 = 5 \dots \text{eqn 2}$ $x = y + 1 \dots \text{eqn 3}$ Sub./<i>Vervang</i> eqn. 3 into/in eqn. 2: $(y + 1)^2 + y^2 = 5$ $y^2 + 2y + 1 + y^2 = 5$ $2y^2 + 2y - 4 = 0$ $y^2 + y - 2 = 0$ $(y + 2)(y - 1) = 0$ $y = -2$ or/of $y = 1$ Sub./<i>Vervang</i> $y = -2$ in eqn. 3: $x = -2 + 1 = -1$ Sub./<i>Vervang</i> $y = 1$ in eqn. 3: $x = 1 + 1 = 2$ OR/OF	✓ Subject/<i>Onderwerp</i> ✓ Sub/<i>Vervang</i> ✓ Standard form/<i>Standaard vorm</i> ✓ Factors/<i>Faktore</i> ✓ Both values of y/<i>Albei waardes van y</i> ✓ Both values of x/<i>Albei waardes van x</i> OR/OF

	$x - y - 1 = 0 \dots \text{eqn 1}$ $x^2 + y^2 = 5 \dots \text{eqn 2}$ $y = x - 1 \dots \text{eqn 3}$ Sub./Vervang eqn. 3 into/in eqn. 2: $x^2 + (x - 1)^2 = 5$ $x^2 + x^2 - 2x + 1 = 5$ $2x^2 - 2x - 4 = 0$ $x^2 - x - 2 = 0$ $(x - 2)(x + 1) = 0$ $x = 2$ or/of $x = -1$ Sub./Vervang $x = 2$ in eqn. 3: $y = 2 - 1 = 1$ Sub./Vervang $x = -1$ in eqn. 3: $y = -1 - 1 = -2$	✓ Subject/Onderwerp A ✓ Sub/Vervang CA ✓ Standard form/Standaard vorm CA ✓ Factors/Faktore CA ✓ Both values of y /Albei waardes van y CA ✓ Both values of x /Albei waardes van x CA (6)
1.3.1	$s = ut + \frac{1}{2}at^2$ $s - ut = \frac{1}{2}at^2$ OR / OF $2s - 2ut = at^2$ $\frac{s - ut}{\frac{1}{2}t^2} = a$ $a = \frac{2s - 2ut}{t^2}$	✓ M A ✓ Make a the subj./Maak a die onderwerp CA (2)
1.3.2	$a = \frac{2(25-0)}{5}$ $a = 10 \text{ m/s}$	✓ Sub./ Vervang A ✓ Answer/Antwoord CA (2)
1.4	$\begin{array}{r} 1\ 0\ 0\ 0\ 1\ 1\ 1 \\ +\ 1\ 0\ 1\ 1\ 1\ 0 \\ \hline 1\ 1\ 1\ 0\ 1\ 0\ 1_2 \\ \therefore 1\ 1\ 1\ 0\ 1\ 0\ 1_2 = 117 \end{array}$	✓ Answer/Antwoord A ✓ Conversion/Herleiding CA (2)
		[21]

QUESTION/VRAAG 2

2.1.1	$1 - x = 0$ $\therefore x = 1$	✓ Answer/Antwoord A (1)
2.1.2	$b^2 - 4ac = (-1)^2 - 4(1)(1)$ $b^2 - 4ac = -3$ $\therefore \Delta < 0$ $\therefore p$ is non-real for all $x \in \mathbb{R}; x \neq 1$ $\therefore p$ is nie-reëel vir alle $x \in \mathbb{R}; x \neq 1$	✓ Answer/Antwoord A ✓ Conclusion/ Gevolgtrekking CA (2)
2.2	$b^2 - 4ac = 0$ $(-k)^2 - 4(1)(k + 3) = 0$ $k^2 - 4k - 12 = 0$ $(k - 6)(k + 2) = 0$ $k = 6$ or/of $x = -2$	$\Delta = 0$ A ✓ SF A ✓ Standard form/ Standaard vorm A ✓ Factors/Faktore CA ✓ Both values of k / Albei waardes van k CA (5)
		[8]

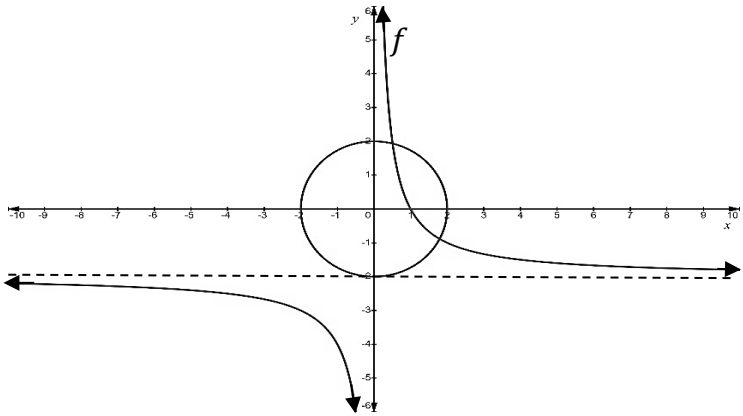
QUESTION/VRAAG 3

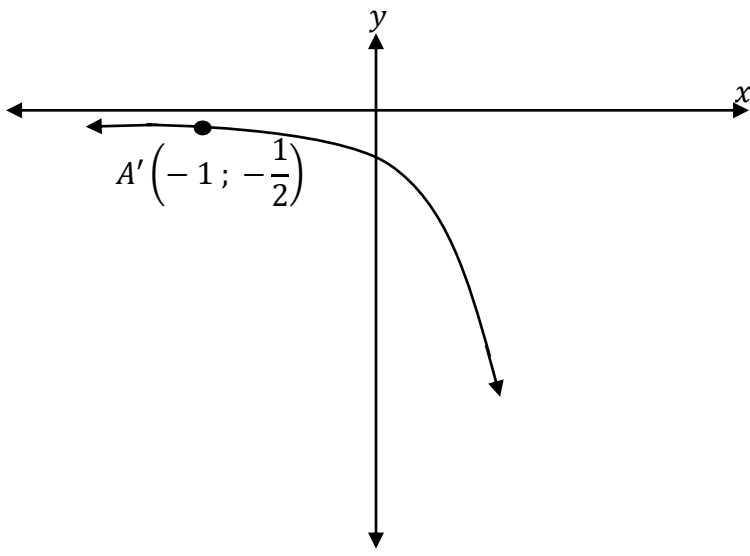
3.1.1	$\frac{\sqrt{20} - \sqrt[3]{8}}{\sqrt{5} - 1}$ $= \frac{\sqrt{2^2 \cdot 5} - \sqrt[3]{2^3}}{\sqrt{5} - 1} \quad \text{OR / OF} \quad \frac{\sqrt{4 \cdot 5} - \sqrt[3]{8}}{\sqrt{5} - 1}$ $= \frac{2\sqrt{5} - 2}{\sqrt{5} - 1}$ $= \frac{2(\sqrt{5} - 1)}{\sqrt{5} - 1}$ $= 2$	✓ Exp. Form/ Eksp. vorm A ✓ Common factor/gemene faktor CA ✓ Answer/Antwoord CA AO: 1 mark/punt (3)
3.1.2	$\frac{5 \cdot 2^{x+1} - 2^x}{2^{x-1}}$ $= \frac{2^x (5 \cdot 2 - 1)}{2^x \cdot 2^{-1}}$ $= \frac{10 - 1}{\frac{1}{2}} \quad \text{OR / OF} \quad (10 - 1) \times 2$ $= 9 \times \frac{2}{1}$ $= 18$	✓ Exp.prop /Eksp.eienskap A ✓ Common factor / Gemene faktor CA ✓ Answer/Antwoord CA AO: 1 mark/punt (3)

3.1.3	$\log_2 \frac{1}{8} + \log_4 1 + \log_9 3$ $= \log_2 2^{-3} + 0 + \log_9 9^{\frac{1}{2}}$ $= -3\log_2 2 + \frac{1}{2}\log_9 9$ $= -3(1) + \frac{1}{2}(1)$ $= -3 + \frac{1}{2}$ $= -\frac{5}{2}$	✓ Exp. Form/ <i>Eksp. vorm</i> ✓ log rule/reël ✓ Answer/antwoord	A CA CA (3)
3.2	$\log_x 8 = 2$ $8 = x^2$ $\sqrt{4 \cdot 2} = x$ $2\sqrt{2} = x$ OR/OF $\log_x 2^3 = 2$ $2^3 = x^2$ $2^{3 \times \frac{1}{2}} = x$ $x = \sqrt{8} \text{ or } x = 2\sqrt{2}$	✓ Log. prop/log <i>eienskap</i> ✓ Answer/Antwoord OR/OF ✓ Log. prop/log <i>eienskap</i> ✓ Answer/Antwoord	A CA (2) A CA (2)
3.3.1	$\text{mod}(r) = \sqrt{a^2 + b^2}$ $(r) = \sqrt{(-2)^2 + (-2)^2}$ $(r) = 2\sqrt{2}$	✓ Sub./Vervang ✓ Answer/Antwoord AO: Full marks/vol punte	A CA (2)

3.3.2	$\tan \theta = \frac{b}{a}$ $\tan \theta = -\frac{2}{2}$ $ref \angle = \tan^{-1} \left(\frac{2}{2} \right)$ $ref \angle = 45^\circ$ $\theta = 180^\circ - 45^\circ$ $\theta = 135^\circ$ OR/OF $\tan \theta = -\frac{2}{2}$ $\theta = 180^\circ - \tan^{-1} \left(\frac{2}{2} \right)$ $\theta = 135^\circ$	✓ Tan ratio/verhouding A ✓ Ref./verw. $\angle$ CA ✓ $\theta = 135^\circ$ CA OR/OF ✓ Tan ratio/verhouding A ✓ $\theta = 180^\circ - \tan^{-1} \left(\frac{2}{2} \right)$ CA ✓ $\theta = 135^\circ$ CA (3)
3.3.3	$z = 2\sqrt{2}cis135^\circ$ OR/OF $z = 2\sqrt{2}(\cos 135^\circ + i \sin 135^\circ)$	✓ Answer/Antwoord CA OR/OF ✓ Answer/Antwoord CA (1)
3.4	$x + y + ix - iy = 5 - 3i$ $x + y + i(x - y) = 5 - 3i$ $x + y = 5$ and/en $x - y = -3$ $y = 5 - x$ Sub./Vervang $y = 5 - x$ into/in $x - y = -3$: $x - (5 - x) = -3$ $x - 5 + x = -3$ $2x = 2$ $x = 1$ Sub./Vervang. $x = 1$ into/in $y = 5 - x$: $y = 5 - 1$ $y = 4$	✓ Common factor/gemene faktor A ✓ Make y the subj./Maak y die onderwerp A ✓ Value of x/waarde van x CA ✓ Value of y/waarde van y CA (4)
		[21]

QUESTION/VRAAG 4

4.1.1	$x = 0$ $y = -2$	$\checkmark x = 0$ $\checkmark y = -2$	A A (2)
4.1.2	x -intercept/afsnit: $y = 0$ $0 = \frac{2}{x} - 2$ $2 = \frac{2}{x}$ $2x = 2$ $x = 1$ $\therefore (1; 0)$ y -intercept/afsnit: $x = 0$ $f(x) = \frac{2}{0} - 2$ $\therefore$ undefined/ongedefinieerd	$\checkmark y = 0$ $\checkmark x = 1$ $\checkmark x = 0$ $\checkmark$ Conclusion/ gevolgtrekking	A CA A CA (4)
4.1.3		f : $\checkmark$ Shape/vorm $\checkmark$ Asymptote/ asimptoot $\checkmark$ x -intercept/afsnit Circle/Sirkel: $\checkmark$ Shape/vorm $\checkmark$ x -intercepts/afsnitte $\checkmark$ y -intercepts/afsnitte	A CA CA A A (6)
4.1.4	$y = -x - 2$	$\checkmark m = -1$ $\checkmark c = -2$	A A (2)
4.1.5	$y \in \mathbb{R}; y \neq -2$	$\checkmark y \in \mathbb{R}$ $\checkmark y \neq -2$	A A (2)
4.1.6	$x \in [-2; 2]$ OR/OF $-2 \leq x \leq 2$	$\checkmark$ values/waardes $\checkmark$ notation/notasie	A A (2)
4.2.1	$h(x) = a^x$ $sub.A\left(-1; \frac{1}{2}\right)$ $\frac{1}{2} = a^{-1}$ $2^{-1} = a^{-1}$ $\therefore a = 2$	$\checkmark$ Substitution / vervanging $\checkmark$ value of a /waarde van a	A CA (2)

4.2.2	$p(x) = h(-x)$ $p(x) = (2)^{-x}$ $p(x) = \left(\frac{1}{2}\right)^x$	$\checkmark -x$ A $\checkmark p(x) = \left(\frac{1}{2}\right)^x$ CA (2)
4.2.3		$\checkmark$ any coordinate indicated/enige koordinaat aangedui A $\checkmark$ Correct reflection/korrekte refleksie A (2)
4.3.1	C and/en D are/is x-intercepts/afsnitte: $y = 0$ $0 = -x^2 + 3x + 10$ $x^2 - 3x - 10 = 0$ $(x - 5)(x + 2) = 0$ $x = 5$ or/of $x = -2$ $\therefore C(-2; 0)$ and/en $D(5; 0)$ OR/OF C and/en D are/is x-intercepts/afsnitte: $y = 0$ $0 = -x^2 + 3x + 10$ $x^2 - 3x - 10 = 0$ $x = \frac{-(3) \pm \sqrt{(3)^2 - 4(-1)(10)}}{2(-1)}$ $x = 5$ or/of $x = -2$ $\therefore C(-2; 0)$ and/en $D(5; 0)$	$\checkmark y = 0$ A $\checkmark$ Standard form/ Standaard vorm CA $\checkmark$ Factors/Faktore CA $\checkmark C(-2; 0)$ CA $\checkmark D(5; 0)$ CA OR/OF $\checkmark y = 0$ A $\checkmark$ Standard form/ Standaard vorm CA $\checkmark$ SF CA $\checkmark C(-2; 0)$ CA $\checkmark D(5; 0)$ CA (5)

4.3.2	$y = mx + c$ $c = 10$ (same y-intercept as <i>g/dieselfde y-afsnit as g</i>) Sub./vervang $D(5; 0)$: $0 = m(5) + 10$ $-10 = 5m$ $-2 = m$ $\therefore y = -2x + 10$ OR/OF $m = \frac{10-0}{0-5}$ $m = -2$ $y = mx + c$ OR / OF $y - 0 = -2(x - 5)$ $y = -2x + 10$	$\checkmark c = 10$ A $\checkmark$ Sub./vervang CA $\checkmark m = -2$ CA $\checkmark$ equation/vergelijking CA OR/OF $\checkmark$ SF A $\checkmark m = -2$ CA $\checkmark$ Sub m and point/vervang m en punt CA $\checkmark$ Equation/vergelijking CA (4)
4.3.3	$0 < x < 5$	$\checkmark$ values/waardes CA $\checkmark$ notation/notasie A (2)
		[35]

QUESTION/VRAAG 5**NB Incorrect formula: NO MARKS/LW Verkeerde formule: GEEN PUNTE**

5.1	$i_{\text{eff}} = \left(1 + \frac{i_{\text{nom}}}{m}\right)^m - 1$ $i_{\text{eff}} = \left(1 + \frac{17\%}{4}\right)^4 - 1$ or/of $i_{\text{eff}} = \left(1 + \frac{0,017}{4}\right)^4 - 1$ $i_{\text{eff}} = 0,18111\dots$ $r_{\text{eff}} = 18,11\%$	$\checkmark$ F A $\checkmark$ SF CA $\checkmark$ Answer/antwoord CA (3)
5.2.1	R 250 000	$\checkmark$ Answer/Antwoord A (1)
5.2.2	Depreciating/depresiasie/vermindering	$\checkmark$ Answer/antwoord A (1)
5.2.3	$A = P(1-i)^n$ $R81\,920 = R250\,000(1-i)^5$ $0,32768 = (1-i)^5$ $0,8 = 1-i$ $-0,2 = -i$ $i = 0,2$ $r = 20\%$	$\checkmark$ F A $\checkmark$ SF A $\checkmark$ Simplification/Vereenvoudiging CA $\checkmark$ Answer/antwoord CA (4)

5.3	$A = P(1 + i)^n$ $A_1 = R\ 75\ 000 \left(1 + \frac{8,2\%}{4}\right)^{\frac{18}{12} \times 4} \left(1 + \frac{6,5\%}{12}\right)^{\frac{18}{12} \times 12} - R\ 5\ 500$ $A_1 = R\ 87\ 861,70219$ $A_2 = R\ 87\ 861,70219 \left(1 + \frac{6,5\%}{12}\right)^{1 \times 12} + R\ 6\ 000$ $A_2 = R\ 99\ 745,9631$ $A_F = R\ 99\ 745,9631 \left(1 + \frac{6,5\%}{12}\right)^{1 \times 12}$ $A_F = R\ 106\ 426,13$ OR/OF $A = P(1 + i)^n$ $A = R75000 \left(1 + \frac{8,2\%}{4}\right)^{1,5 \times 4} \left(1 + \frac{6,5\%}{12}\right)^{3,5 \times 12} - R5500 \left(1 + \frac{6,5\%}{12}\right)^{2 \times 12}$ $+ R6000 \left(1 + \frac{6,5\%}{12}\right)^{1 \times 12}$ $A = R\ 106\ 426,13$	$\checkmark \mathbf{F} \quad \mathbf{A}$ $\checkmark \left(1 + \frac{8,2\%}{4}\right)^{\frac{18}{12} \times 4} \quad \mathbf{A}$ $\checkmark \left(1 + \frac{6,5\%}{12}\right)^{\frac{18}{12} \times 12} \quad \mathbf{A}$ $\checkmark R\ 87\ 861,70219 \left(1 + \frac{6,5\%}{12}\right)^{1 \times 12} \quad \mathbf{CA}$ $\checkmark R\ 99\ 745,9631 \left(1 + \frac{6,5\%}{12}\right)^{1 \times 12} \quad \mathbf{CA}$ $\checkmark R\ 106\ 426,13 \quad \mathbf{CA}$ OR/OF $\checkmark \mathbf{F} \quad \mathbf{A}$ $\checkmark \left(1 + \frac{8,2\%}{4}\right)^{\frac{18}{12} \times 4} \quad \mathbf{A}$ $\checkmark \left(1 + \frac{6,5\%}{12}\right)^{\frac{18}{12} \times 12} \quad \mathbf{A}$ $\checkmark -R5\ 500 \left(1 + \frac{6,5\%}{12}\right)^{2 \times 12} \quad \mathbf{CA}$ $\checkmark +R6\ 000 \left(1 + \frac{6,5\%}{12}\right)^{1 \times 12} \quad \mathbf{CA}$ $\checkmark R\ 106\ 426,13 \quad \mathbf{CA}$ (6)
		[15]

QUESTION/VRAAG 6

6.1	$f(x) = 4 - 2x$ $f(x + h) = 4 - 2(x + h)$ $f(x + h) = 4 - 2x - 2h$ $f(x + h) - f(x) = 4 - 2x - 2h - (4 - 2x)$ $f(x + h) - f(x) = 4 - 2x - 2h - 4 + 2x$ $f(x + h) - f(x) = -2h$ $f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h)-f(x)}{h}$ $f'(x) = \lim_{h \rightarrow 0} \frac{-2h}{h}$ $f'(x) = \lim_{h \rightarrow 0} -2$ $f'(x) = -2$ OR/OF $f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h)-f(x)}{h}$ $f'(x) = \lim_{h \rightarrow 0} \frac{4-2(x+h)-(4-2x)}{h}$ $f'(x) = \lim_{h \rightarrow 0} \frac{4-2x-2h-4+2x}{h}$ $f'(x) = \lim_{h \rightarrow 0} \frac{-2h}{h}$ $f'(x) = \lim_{h \rightarrow 0} -2$ $f'(x) = -2$	✓ F A ✓ SF A ✓ Simplification/ vereenvoudiging CA ✓ Simplification/ vereenvoudiging CA ✓ Answer/antwoord CA OR/OF ✓ F A ✓ SF A ✓ Simplification/ vereenvoudiging CA ✓ Simplification/ vereenvoudiging CA ✓ Answer/antwoord CA (5)
6.2.1	$D_x \left[(x^3 - 3)(x^3 - 3) \right]$ $= D_x \left[x^6 - 3x^3 - 3x^3 + 9 \right]$ $= D_x \left[x^6 - 6x^3 + 9 \right]$ $= 6x^5 - 18x^2$	✓ Expansion/uitbreiding A ✓ Simplification/ vereenvoudiging CA ✓ $6x^5$ CA ✓ $-18x^2$ CA (4)
6.2.2	$3x = y + x^2 - 6$ $y = -x^2 + 3x + 6$ $\frac{dy}{dx} = -2x + 3$	✓ Make y the subj./ Maak y die onderwerp A ✓ $-2x$ CA ✓ $+3$ CA (3)

6.3	$m = g'(x)$ $m = 4x - 4$ $sub.x = -1$ $m = 4(-1) - 4$ $m = -8$ $g(-1) = 2(-1)^2 - 4(-1) + 8$ $g(-1) = 14$ $\therefore (-1; 14)$ $y = mx + c$ $sub.m = -8 \text{ and / en } (-1; 14)$ $14 = -8(-1) + c$ $14 = 8 + c$ $c = 6$ $\therefore y = -8x + 6$ OR/OF $m = 4x - 4$ $sub.x = -1$ $m = 4(-1) - 4$ $m = -8$ $g(-1) = 2(-1)^2 - 4(-1) + 8$ $g(-1) = 14$ $\therefore (-1; 14)$ $y - y_1 = m(x - x_1)$ $sub.m = -8 \text{ and / en } (-1; 14)$ $y - 14 = -8(x - (-1))$ $y - 14 = -8(x + 1)$ $y = -8x - 8 + 14$ $\therefore y = -8x + 6$	$\checkmark m = 4x - 4$ A $\checkmark m = -8$ CA $\checkmark (-1; 14)$ A $\checkmark \text{ Sub. } m = -8 \text{ and/en } (-1; 14)$ CA $\checkmark \text{ Equation/vergelijking}$ CA OR/OF $\checkmark m = 4x - 4$ $\checkmark m = -8$ A $\checkmark (-1; 14)$ CA $\checkmark \text{ Sub. } m = -8 \text{ and/en } (-1; 14)$ A CA $\checkmark \text{ Equation/vergelijking}$ CA (5)
		[17]

QUESTION/VRAAG 7

7.1.1	$y = 2x^3 - 17x^2 + 35x$ x -intercepts/afsnitte: $y = 0$ $0 = 2x^3 - 17x^2 + 35x$ $0 = x(2x^2 - 17x + 35)$ $0 = x(x - 5)(2x - 7)$ $x = 0$ or/of $x = 5$ or/of $x = \frac{7}{2}$ $\therefore \text{tunnel/tonnel} = \left(\frac{7}{2} - 0\right) \times 100$ $\therefore \text{tunnel/tonnel} = 350 \text{ m}$	$\checkmark y = 0$ A $\checkmark$ Common factor/gemene faktor A $\checkmark$ factors/faktore CA $\checkmark$ Correct x -value/korrekte x -waarde CA $\checkmark 350 \text{ m}$ CA (5)
7.1.2	$\text{Bridge/brug} = \left(5 - \frac{7}{2}\right) \times 100$ $\text{Bridge/brug} = 150 \text{ m}$	$\checkmark \text{ M}$ A $\checkmark 150 \text{ m}$ CA (2)
7.2	$y = 2x^3 - 17x^2 + 35x$ $\frac{dy}{dx} = 6x^2 - 34x + 35$ $0 = 6x^2 - 34x + 35$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $x = \frac{-(-34) \pm \sqrt{(-34)^2 - 4(6)(35)}}{2(6)}$ $\therefore x = 4,31$ or/of $x = 1,35$ $\therefore$ height of mountain/hoogte van berg: $\text{Height/hoogte} = (2(1,35)^3 - 17(1,35)^2 + 35(1,35)) \times 100$ $\text{Height/hoogte} = (21,18825) \times 100$ $\text{Height/hoogte} = 2119 \text{ m}$	$\checkmark \frac{dy}{dx}$ A $\checkmark = 0$ A $\checkmark \text{ SF}$ CA $\checkmark$ Correct x -value/korrekte x -waarde CA $\checkmark$ height/hoogte CA (5)
7.3	$\text{depth/diepte} = (2(4,31)^3 - 17(4,31)^2 + 35(4,31)) \times 100$ $\text{depth/diepte} = (-4,817718) \times 100$ $\therefore \text{depth/diepte} = 482 \text{ m}$	$\checkmark$ Correct x -value/korrekte x -waarde CA $\checkmark$ Depth/diepte CA (2)
		[14]

QUESTION/VRAAG 8

8.1	$A = l \times b$ $125 = x \times w$ $\frac{125}{x} = w$	✓ Sub. A ✓ $\frac{125}{x} = w$ CA AO: Full marks/ Volpunte (2)
8.2	Fencing/omheining $= x + \frac{125}{x} + \frac{125}{x}$ Fencing/omheining $= x + \frac{250}{x}$	✓ Circumf/omtrek A ✓ Simplification/ vereenvoudiging CA (2)
8.3	$\frac{df}{dx} = 1 - 250x^{-2}$ $0 = 1 - \frac{250}{x^2}$ $\frac{250}{x^2} = 1$ $250 = x^2$ $\therefore x = 5\sqrt{10}$ $\therefore l = 5\sqrt{10} = 15,81 \text{ m}$ $\therefore w = \frac{5\sqrt{10}}{2} = 7,91 \text{ m}$	✓ Derivative/ Afgeleide A ✓ $1 - 250x^{-2} = 0$ A ✓ $l = 5\sqrt{10} = 15,81 \text{ m}$ CA ✓ $w = \frac{5\sqrt{10}}{2} = 7,91 \text{ m}$ CA (4)
		[8]

QUESTION/VRAAG 9

9.1.1	$\int 3x^2 dx = x^3 + c$	$\checkmark x^3$ $\checkmark +c$	A A (2)
9.1.2	$\int \left(x^{-1} - \frac{2}{x^6}\right) dx = \int (x^{-1} - 2x^{-6}) dx$ $= \ln x + \frac{2x^{-5}}{5} + c$	$\checkmark -2x^{-6}$ $\checkmark \ln x$ $\checkmark \frac{2x^{-5}}{5} + c$ No penalty for omitting c / Geen penalisering vir weglating van c	A A CA (3)
9.2	$\text{Area/oppervlakte} = -\int_1^4 (x^3 - 4x^2 - x + 4) dx$ $\text{Area/oppervlakte} = -\left[\frac{x^4}{4} - \frac{4x^3}{3} - \frac{x^2}{2} + 4x\right]_1^4$ $\text{Area/oppervlakte} = -\left[\left(\frac{(4)^4}{4} - \frac{4(4)^3}{3} - \frac{(4)^2}{2} + 4(4)\right) - \left(\frac{(1)^4}{4} - \frac{4(1)^3}{3} - \frac{(1)^2}{2} + 4(1)\right)\right]$ $\text{Area/oppervlakte} = -\left(-\frac{40}{3} - \frac{29}{12}\right)$ $\text{Area/oppervlakte} = -\left(-\frac{63}{4}\right)$ $\text{Area/oppervlakte} = \frac{63}{4} = 15,75 \text{ square units/vierkante eenhede}$	$\checkmark$ Area notation/notasie $\checkmark$ Integration/integrasie $\checkmark$ Sub $x = 4$ $\checkmark$ Sub $x = 1$ $\checkmark$ Area/oppervlakte	A CA A A CA (5)
			[10]
			TOTAL /TOTAAL: 150