Province of the
EASTERN CAPE
EDUCATION

Iphondo leMpuma Kapa: Isebe leMfundo
Provinsie van die Oos Kaap: Department van Onderwys
Porafensie Ya Kapa Botjahabela: Lefapha la Thuto

NATIONAL SENIOR CERTIFICATE/ *NASIONALE SENIOR SERTIFIKAAT*

GRADE/*GRAAD* 12

JUNE/*JUNIE* 2026

TECHNICAL MATHEMATICS P1/*TEGNIESE 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.

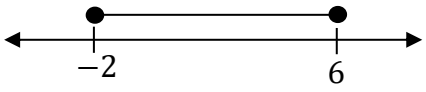
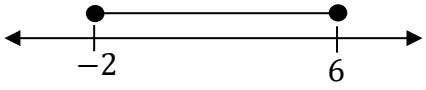
LET WEL:

- *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/*Faktore* ✓ Both values of x/*Albei waardes van x* **OR/*OF*** ✓ **SF** ✓ Both values of x/*Albei waardes van x*	**A** **CA** **A** **CA** (2)
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/*Elke waarde van x* **OR/*OF*** ✓ **SF** ✓✓ Each value of x/*Elke waarde van x* **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*** $12 + 4x > x^2$ $x^2 - 4x - 12 < 0$ $x = \frac{-(-4) \pm \sqrt{(-4) - 4(1)(-12)}}{2(1)}$ CV: $x = -2$ and/*en* $x = 6$ $\therefore -2 < x < 6$  	✓ Standard form/*Standaard vorm* **A** ✓ Factors/*Faktore* **A** ✓ Answer/*Antwoord* **CA** ✓ Representation/ *Voorstelling* **CA** **OR/*OF*** ✓ Standard form/*Standaard vorm* **A** ✓ **SF** **A** ✓ Answer/*Antwoord* **CA** ✓ Representation/ *Voorstelling* **CA** (4)
1.2	$x - y - 1 = 0$ ... eqn 1 $x^2 + y^2 = 5$ ... eqn 2 $x = y + 1$ ... eqn 3 Sub./*Vervang* 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./*Vervang* $y = -2$ in eqn. 3: $x = -2 + 1 = -1$ Sub./*Vervang* $y = 1$ in eqn. 3: $x = 1 + 1 = 2$ **OR/*OF***	✓ 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** **OR/*OF***

	$x - y - 1 = 0$ ... eqn 1 $x^2 + y^2 = 5$ ... eqn 2 $y = x - 1$ ... 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* ✓ Sub/*Vervang* ✓ Standard form/*Standaard vorm* ✓ Factors/*Faktore* ✓ Both values of y/*Albei waardes van* y ✓ Both values of x/*Albei waardes van* x	**A** **CA** **CA** **CA** **CA** **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** ✓ Make a the subj./*Maak* a *die onderwerp*	**A** **CA** (2)
1.3.2	$a = \frac{2(25-0)}{5}$ $a = 10\ m/s$	✓ Sub./ *Vervang* ✓ Answer/*Antwoord*	**A** **CA** (2)
1.4	$\begin{array}{r} 1\,0\,0\,0\,1\,1\,1 \\ +\ \ 1\,0\,1\,1\,1\,0 \\ \hline 1\,1\,1\,0\,1\,0\,1_2 \end{array}$ $\therefore 1\,1\,1\,0\,1\,0\,1_2 = 117$	✓ Answer/*Antwoord* ✓ Conversion/*Herleiding*	**A** **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* ✓ Conclusion/ *Gevolgtrekking*	**A** **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]

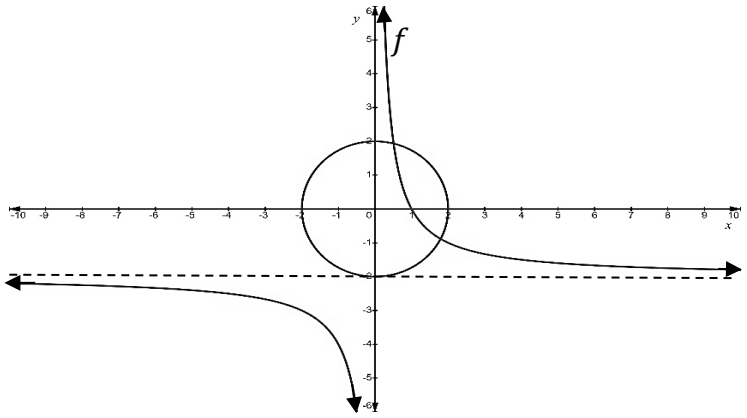
QUESTION/*VRAAG* 3

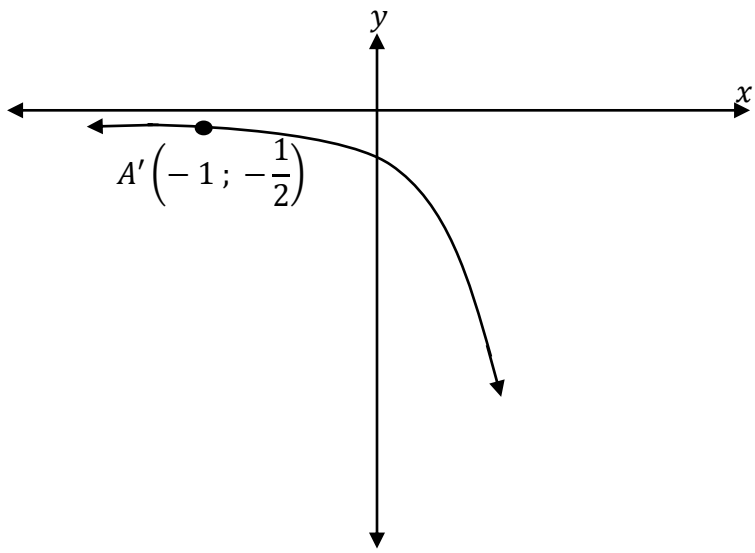
3.1.1	$\frac{\sqrt{20}-\sqrt[3]{8}}{\sqrt{5}-1}$ $=\frac{\sqrt{2^2.5}-\sqrt[3]{2^3}}{\sqrt{5}-1}$ **OR / *OF*** $\frac{\sqrt{4.5}-\sqrt[3]{8}}{\sqrt{5}-1}$ $=\frac{2\sqrt{5}-2}{\sqrt{5}-1}$ $=\frac{2\left(\sqrt{5}-1\right)}{\sqrt{5}-1}$ $=2$	✓ Exp. Form/ *Eksp. vorm* ✓ Common factor/*gemene faktor* ✓ Answer/*Antwoord* **AO: 1 mark/*punt***	**A** **CA** **CA** (3)
3.1.2	$\frac{5.2^{x+1}-2^x}{2^{x-1}}$ $=\frac{2^x\left(5.2-1\right)}{2^x.2^{-1}}$ $=\frac{10-1}{\frac{1}{2}}$ **OR / *OF*** $(10-1)\times 2$ $=9\times\frac{2}{1}$ $=18$	✓ Exp.prop /*Eksp.eienskap* ✓ Common factor / *Gemene factor* ✓ Answer/*Antwoord* **AO: 1 mark/*punt***	**A** **CA** **CA** (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/ *Eksp. vorm* **A** ✓ log rule/*reël* **CA** ✓ Answer/*antwoord* **CA** (3)
3.2	$\log_x 8 = 2$ $8 = x^2$ $\sqrt{4.2} = x$ $2\sqrt{2} = x$ **OR/*OF*** $\log_x 2^3 = 2$ $2^3 = x^2$ $2^{3\times\frac{1}{2}} = x$ $x = \sqrt{8}$ or $x = 2\sqrt{2}$	✓ Log. prop/*log eienskap* **A** ✓ Answer/*Antwoord* **CA** (2) ***OR/OF*** **A** ✓ Log. prop/*log eienskap* ✓ Answer/*Antwoord* **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* **A** ✓ Answer/*Antwoord* **CA** **AO: Full marks/*vol punte*** (2)

3.3.2	$\tan\theta = \frac{b}{a}$ $\tan\theta = -\frac{2}{2}$ $ref\angle = \tan^{-1}\left(\frac{2}{2}\right)$ $ref\angle = 45°$ $\theta = 180° - 45°$ $\theta = 135°$ **OR/*OF*** $\tan\theta = -\frac{2}{2}$ $\theta = 180° - \tan^{-1}\left(\frac{2}{2}\right)$ $\theta = 135°$	✓ Tan ratio/*verhouding* ✓ Ref./*verw.* ∠ ✓ $\theta = 135°$ **OR/*OF*** ✓ Tan ratio/*verhouding* ✓ $\theta = 180° - \tan^{-1}\left(\frac{2}{2}\right)$ ✓ $\theta = 135°$	**A** **CA** **CA** **A** **CA** **CA** (3)
3.3.3	$z = 2\sqrt{2}cis135°$ **OR/*OF*** $z = 2\sqrt{2}(\cos 135° + i\sin 135°)$	✓ Answer/*Antwoord* **OR/*OF*** ✓ Answer/*Antwoord*	**CA** **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* ✓ Make y the subj./*Maak* y *die onderwerp* ✓ Value of x/*waarde van* x ✓ Value of y/*waarde van* y	A A CA CA (4)
			[21]

QUESTION/*VRAAG* 4

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

4.2.2	$p(x)=h(-x)$ $p(x)=(2)^{-x}$ $p(x)=\left(\frac{1}{2}\right)^{x}$	✓ $-x$ **A** ✓ $p(x)=\left(\frac{1}{2}\right)^{x}$ **CA** (2)
4.2.3		✓ any coordinate indicated/*enige koordinaat aangedui* A ✓ 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$(5;0)$	✓ $y=0$ **A** ✓ Standard form/ *Standaard vorm* **CA** ✓ Factors/*Faktore* **CA** ✓ C$(-2\,;0)$ **CA** ✓ D$(5\,;0)$ **CA** **OR/*OF*** ✓ $y=0$ **A** ✓ Standard form/ *Standaard vorm* **CA** ✓ **SF** **CA** ✓ C$(-2\,;0)$ **CA** ✓ D$(5\,;0)$ **CA** (5)

4.3.2	$y = mx + c$ $c = 10$ (same y-intercept as g/*dieselfde y-afsnit as g*) 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*** $y - 0 = -2(x-5)$ $y = -2x + 10$	✓ $c = 10$ ✓ Sub./*vervang* ✓ $m = -2$ ✓ equation/*vergelyking* **OR/*OF*** ✓ **SF** ✓ $m = -2$ ✓ Sub m and point/*vervang m en punt* ✓ Equation/*vergelyking*	**A** **CA** **CA** **CA** **A** **CA** **CA** **CA** (4)
4.3.3	$0 < x < 5$	✓ values/*waardes* ✓ notation/*notasie*	**CA** **A** (2)
			[35]

QUESTION/*VRAAG* 5

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

5.1	$i_{eff} = \left(1 + \frac{i_{nom}}{m}\right)^m - 1$ $i_{eff} = \left(1 + \frac{17\%}{4}\right)^4 - 1$ or/of $i_{eff} = \left(1 + \frac{0,017}{4}\right)^4 - 1$ $i_{eff} = 0,18111....$ $r_{eff} = 18,11\%$	✓ **F** ✓ **SF** ✓ Answer/*antwoord*	**A** **CA** **CA** (3)
5.2.1	*R* 250 000	✓ Answer/*Antwoord*	**A** (1)
5.2.2	Depreciating/*depresiasie/vermindering*	✓ Answer/*antwoord*	**A** (1)
5.2.3	$A = P(1-i)^n$ $R81\,920 = R250\,000(1-i)^5$ $0,32768 = (1-i)^5$ $0,8 = 1-i$ $-0,2 = -i$ $i = 0,2$ $r = 20\%$	✓ **F** ✓ **SF** ✓ Simplification/ *Vereenvoudiging* ✓ Answer/*antwoord*	**A** **A** **CA** **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*** $A = P(1+i)^n$ $A = R75000\left(1+\frac{8,2\%}{4}\right)^{1,5\times 4}\left(1+\frac{6,5\%}{12}\right)^{3,5\times 12} - R5500\left(1+\frac{6,5\%}{12}\right)^{2\times 12}$ $+R6000\left(1+\frac{6,5\%}{12}\right)^{1\times 12}$ $A = R\,106\,426{,}13$	✓ **F** ✓ $\left(1+\frac{8{,}2\%}{4}\right)^{\frac{18}{12}\times 4}$ ✓ $\left(1+\frac{6{,}5\%}{12}\right)^{\frac{18}{12}\times 12}$ ✓ $R\,87\,861{,}70219\left(1+\frac{6{,}5\%}{12}\right)^{1\times 12}$ ✓ $R\,99\,745{,}9631\left(1+\frac{6{,}5\%}{12}\right)^{1\times 12}$ ✓ $R\,106\,426{,}13$ **OR/*OF*** ✓ **F** ✓ $\left(1+\frac{8{,}2\%}{4}\right)^{\frac{18}{12}\times 4}$ ✓ $\left(1+\frac{6{,}5\%}{12}\right)^{\frac{18}{12}\times 12}$ ✓ $-R5\,500\left(1+\frac{6{,}5\%}{12}\right)^{2\times 12}$ ✓ $+R6\,000\left(1+\frac{6{,}5\%}{12}\right)^{1\times 12}$ ✓ $R\,106\,426{,}13$	**A** **A** **A** **CA** **CA** **CA** **A** **A** **A** **CA** **CA** **CA** (6)
			[15]

QUESTION/*VRAAG* 6

6.1	$f(x) = 4 - 2x$ $f(x+h) = 4 - 2(x+h)$ $f(x+h) = 4 - 2x - 2h$ $f(x+h) - f(x) = 4 - 2x - 2h - (4 - 2x)$ $f(x+h) - f(x) = 4 - 2x - 2h - 4 + 2x$ $f(x+h) - f(x) = -2h$ $f^{\prime}(x) = \lim_{h\to 0} \frac{f(x+h)-f(x)}{h}$ $f^{\prime}(x) = \lim_{h\to 0} \frac{-2h}{h}$ $f^{\prime}(x) = \lim_{h\to 0} -2$ $f^{\prime}(x) = -2$ **OR/*OF*** $f^{\prime}(x) = \lim_{h\to 0} \frac{f(x+h)-f(x)}{h}$ $f^{\prime}(x) = \lim_{h\to 0} \frac{4-2(x+h)-(4-2x)}{h}$ $f^{\prime}(x) = \lim_{h\to 0} \frac{4-2x-2h-4+2x}{h}$ $f^{\prime}(x) = \lim_{h\to 0} \frac{-2h}{h}$ $f^{\prime}(x) = \lim_{h\to 0} -2$ $f^{\prime}(x) = -2$	✓ **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	$D_x\left[\left(x^3-3\right)\left(x^3-3\right)\right]$ $= D_x\left[x^6 - 3x^3 - 3x^3 + 9\right]$ $= D_x\left[x^6 - 6x^3 + 9\right]$ $= 6x^5 - 18x^2$	✓ Expansion/*uitbreiding* **A** ✓ Simplification/ *vereenvoudiging* **CA** ✓ $6x^5$ ✓ $-18x^2$ **CA** **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	$m = g'(x)$ $m = 4x - 4$ $sub.x = -1$ $m = 4(-1) - 4$ $m = -8$ $g(-1) = 2(-1)^2 - 4(-1) + 8$ $g(-1) = 14$ $\therefore (-1;14)$ $y = mx + c$ $sub.m = -8$ *and / en* $(-1;14)$ $14 = -8(-1) + c$ $14 = 8 + c$ $c = 6$ $\therefore y = -8x + 6$ **OR/*OF*** $m = 4x - 4$ $sub.x = -1$ $m = 4(-1) - 4$ $m = -8$ $g(-1) = 2(-1)^2 - 4(-1) + 8$ $g(-1) = 14$ $\therefore (-1;14)$ $y - y_1 = m(x - x_1)$ $sub.m = -8$ *and / en* $(-1;14)$ $y - 14 = -8(x - (-1))$ $y - 14 = -8(x + 1)$ $y = -8x - 8 + 14$ $\therefore y = -8x + 6$	✓ $m = 4x - 4$ ✓ $m = -8$ ✓ $(-1\,;14)$ ✓ Sub. $m = -8$ and/*en* $(-1\,;14)$ ✓ Equation/*vergelyking* **OR/*OF*** ✓ $m = 4x - 4$ ✓ $m = -8$ ✓ $(-1\,;14)$ ✓ Sub. $m = -8$ and/*en* $(-1\,;14)$ ✓ Equation/*vergelyking*	**A** **CA** **A** **CA** **CA** **A** **CA** **A** **CA** **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* $x = \frac{7}{2}$ ∴ tunnel/*tonnel* $= \left(\frac{7}{2} - 0\right) \times 100$ ∴ tunnel/*tonnel* $= 350\ m$	✓ $y = 0$ ✓ Common factor/*gemene faktor* ✓ factors/*faktore* ✓Ccorrect x-value/ *korrekte x-waarde* ✓$350\ m$	**A** **A** **CA** **CA** **CA** (5)
7.1.2	Bridge/*brug* $= \left(5 - \frac{7}{2}\right) \times 100$ Bridge/*brug* $= 150\ m$	✓ **M** ✓$150\ m$	**A** **CA** (2)
7.2	$y = 2x^3 - 17x^2 + 35x$ $\frac{dy}{dx} = 6x^2 - 34x + 35$ $0 = 6x^2 - 34x + 35$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $x = \frac{-(-34) \pm \sqrt{(-34)^2 - 4(6)(35)}}{2(6)}$ ∴ $x = 4{,}31$ or/*of* $x = 1{,}35$ ∴ height of mountain/*hoogte van berg*: Height/*hoogte* $= (2(1{,}35)^3 - 17(1{,}35)^2 + 35(1{,}35)) \times 100$ Height/*hoogte* $= (21{,}18825) \times 100$ Height/*hoogte* $= 2119\ m$	✓ $\frac{dy}{dx}$ ✓ $= 0$ ✓ **SF** ✓ Correct x-value/*korrekte x-waarde* ✓ height/*hoogte*	**A** **A** **CA** **CA** **CA** (5)
7.3	depth/*diepte* $= (2(4{,}31)^3 - 17(14{,}31)^2 + 35(4{,}31)) \times 100$ depth/*diepte* $= (-4{,}817718) \times 100$ ∴ depth/*diepte* $= 482\ m$	✓ Correct x-value/*korrekte x-waarde* ✓ Depth/*diepte*	**CA** **CA** (2)
			[14]

QUESTION/*VRAAG* 8

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

QUESTION/*VRAAG* 9

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