GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

JUNE EXAMINATION/ *JUNIE EKSAMEN* GRADE/*GRAAD* 12

2026

MARKING GUIDELINES/*NASIENRIGLYNE*

TECHNICAL MATHEMATICS/ *TEGNIESE WISKUNDE*

(PAPER/*VRAESTEL* 1)

Marking Codes/*Nasienkodes*	
A	Accuracy/*Akkuraatheid*
CA	Consistent accuracy/*Volgehoue akkuraatheid*
M	Method/*Metode*
R	Rounding/*Afronding*
NPR	No penalty for rounding/*Geen straf vir afronding nie*
NPU	No penalty for units omitted/*Geen straf vir weggelate eenhede nie*
S	Simplification/*Vereenvoudiging*
SF	Substitution in correct formula/*Vervanging in korrekte formule*
ST	Statement/*Stelling*
ST/RE	Statement and reason/*Stelling en rede*
RE	Reason/*Rede*

NOTE/*LET WEL:*

- If a candidate answers a question TWICE, only mark the FIRST attempt.
  Indien 'n kandidaat 'n vraag TWEE keer beantwoord, sien slegs die eerste poging na.
- If a candidate has crossed out an attempt to answer the question and did not redo it, mark the crossed-out version.
  Indien 'n kandidaat 'n antwoord doodgetrek het, maar dit nie probeer oordoen het nie, sien die doodgetrekte weergawe na.
- Consistent accuracy applies in all aspects of the marking guidelines, where applicable.
  Konstante akkuraatheid word toegepas dwarsdeur die nasienriglyne en waar van toepassing.

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QUESTION/*VRAAG* 1				CL
1.1.1	$(2x-1)(x-1)=0$ $x=1$ or/*of* $x=\frac{1}{2}$	✓ $x=1$ A ✓ $x=\frac{1}{2}$ A	(2)	1D
1.1.2	$2x^2-3x-1=0$ $x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$ $x=\frac{-(-3)\pm\sqrt{(-3)^2-4(2)(-1)}}{2(2)}$ $x=\frac{3\pm\sqrt{17}}{4}$ $x=1{,}78$ or/*of* $x=-0{,}28$	✓ SF A ✓ $x=1{,}78$ CA ✓ $x=-0{,}28$ CA	(3)	1D
1.1.3	$x(2x+1)-3\leq 0$ $2x^2+x-3\leq 0$ $(2x+3)(x-1)\leq 0$ **OR/*OF*** $\boldsymbol{x=\frac{-(1)\pm\sqrt{(1)^2-4(2)(-3)}}{2(2)}}$ $x=-\frac{3}{2}$ or/*of* $x=1$ $-\frac{3}{2}\leq x\leq 1$ **OR/*OF*** $x\in\left[-\frac{3}{2};1\right]$ **OR/*OF*** x-values from $-\frac{3}{2}$ to 1 **OR/*OF***  	✓ Standard Form/*Standaardvorm* A ✓ both end points/ *beide eindpunte* CA ✓ notation/*notasie* A	(3)	2D

1.2	$y + x = 2$ and/ *en* $x^2 + y^2 = 2$ $y = -x + 2$ or/*of* $x = -y + 2$	✓ $y = -x + 2$ A		4D
	$x^2 + (-x + 2)^2 = 2$ $x^2 + x^2 - 4x + 4 = 2$ $2x^2 - 4x + 2 = 0$ $x^2 - 2x + 1 = 0$ $(x - 1)(x - 1) = 0$ **OR/*OF*** $2x^2 - 4x + 2 = 0$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(2)(2)}}{2(2)}$ $x = \frac{4 \pm \sqrt{0}}{2}$ $x = 1$ or/*of* $x = 1$	✓ SF CA ✓ standard form/*standaardvorm* CA ✓ factors/*faktore* **OR/*OF*** SF A ✓ x-values *x-waardes* CA		
	$y = -(1) + 2$ $y = 1$	✓ y-values *y-waardes* CA	(6)	

1.3.1	$Volume = \pi r^2 h$ $\frac{Volume}{\pi h} = r^2$ $\sqrt{\frac{Volume}{\pi h}} = r$	✓ divide by πh/ *deel deur* πh M ✓ $\sqrt{\frac{Volume}{\pi h}}$ CA	(2)	1D
1.3.2	$1\ 000\ \text{cm}^3 = 1\ l$ $4\ 434\ \text{cm}^3 = 4{,}434\ l$ $\sqrt{\frac{4\ 434}{\pi(28)}} = r$ $7{,}099\ \text{cm} = r$ $70{,}99\ \text{mm} = r$ $d = 141{,}98\ \text{mm}$	✓ $4\ 434\ \text{cm}^3$ A ✓ Substitution/*Substitusie* CA ✓ $7{,}099\ \text{cm} = r$ CA ✓ $d = 141{,}98\ \text{mm}$ CA accept/*aanvaar* 142 mm **NPR**	(4)	2D
1.4	$25 + 11001_2$ $= 25 + 25$ $= 50$ or/*of* $= 11\ 001_2 + 11\ 001_2$ $= 110010_2$	✓conversion/*herleiding* A ✓✓answer – binary form *antwoord – binêre vorm* CA (PENALTY IF BASE 2 IS OMITTED) *(PENALISASIE INDIEN BASIS 2 UITGELAAT IS)* **AO** $\frac{3}{3}$	(3)	2D
				[23]

QUESTION/*VRAAG* 2				
2.1.1	$x^2 - 3x = -3$ $x^2 - 3x + 3 = 0$ $\Delta = b^2 - 4ac$ $\Delta = (-3)^2 - 4(1)(3)$ $\Delta = -3$	✓ standard form/*standaardvorm* A ✓ SF CA ✓ $\Delta = -3$ CA	(3)	2D
2.1.2	Roots are non-real *Wortels is nie-reëel.*	✓ answer/*antwoord* CA	(1)	1D
2.2	$2x^2 + (k-3)x + 8 = 0$ $\Delta = b^2 - 4ac$ $= (k-3)^2 - 4(2)(8)$ $= k^2 - 6k + 9 - 64$ $\therefore \Delta = k^2 - 6k - 55$ **For equal roots/*Vir* gelyke *wortels*:** $\Delta = 0$ $k^2 - 6k - 55 = 0$ $(k-11)(k+5) = 0$ **OR/*OF*** $k = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $k = \frac{-(-6) \pm \sqrt{(-6)^2 - 4(1)(-55)}}{2(1)}$ $k = \frac{6 \pm \sqrt{256}}{2}$ $k = 11$ or/*of* $k = -5$	✓SF A ✓ $\Delta = k^2 - 6k - 55$ CA ✓ $\Delta = 0$ A ✓ factors/*faktore* **OR/*OF*** SF CA ✓ $k = 11$ or/*of* $k = -5$ CA	(5)	3D
				[9]

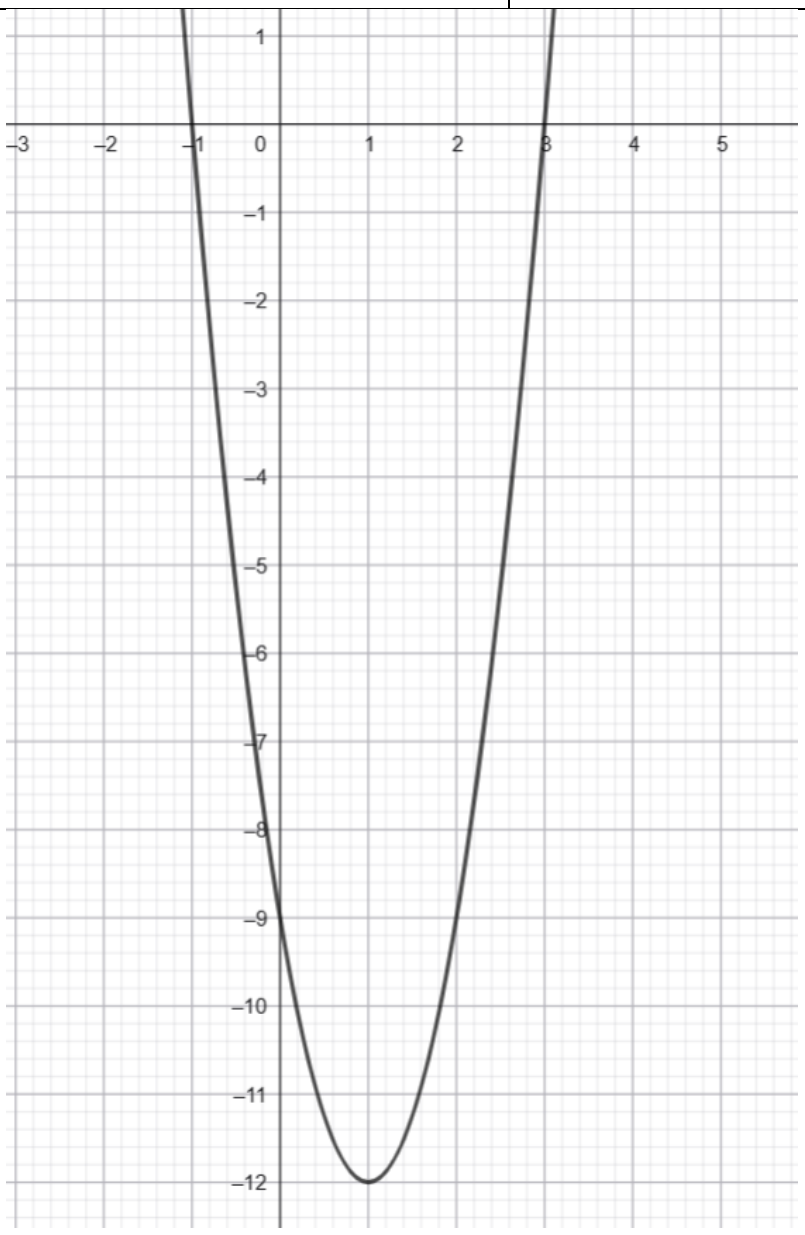
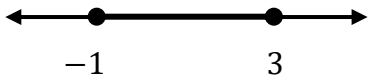
QUESTION/*VRAAG* 3				
3.1.1	$\frac{m^6n^8}{(m^2n)^4}$ $=\frac{m^6n^8}{m^8n^4}$ $=m^{-2}n^4$ $=\frac{n^4}{m^2}$	✓ S A ✓answer/*antwoord* CA	(2)	1E
3.1.2	$(\sqrt{2}+\sqrt{3})^2$ $=(\sqrt{2}+\sqrt{3})(\sqrt{2}+\sqrt{3})$ $=2+\sqrt{6}+\sqrt{6}+3$ $=5+2\sqrt{6}$	✓ S A ✓ 5 CA ✓ $2\sqrt{6}$ CA **AO $\frac{1}{3}$**	(3)	1D
3.1.3	$\frac{(a^2)^{2b+3c}\times(a^3)^{b-c}}{a^{3b-c}\times a^{b+2c}}$ $=\frac{a^{4b+6c}\times a^{3b-3c}}{a^{3b-c}\times a^{b+2c}}$ $=a^{4b+6c+3b-3c-3b+c-b-2c}$ $=a^{3b+2c}$	✓ a^{4b+6c} A ✓ a^{3b-3c} A ✓ S CA ✓ a^{3b+2c} CA	(4)	2D
3.1.4	$\log_2(0{,}25)^2$ $=\log_2\left(\frac{25}{100}\right)^2$ $=2\log_2\frac{1}{4}$ $=2\log_2 2^{-2}$ $=-4\log_2 2$ $=-4$	✓ $\frac{25}{100}$ or/*of* $\frac{1}{4}$ A ✓ 2^{-2} CA ✓ log property/*log wet* $-4\log_2 2$ CA ✓ -4 CA **AO $\frac{1}{4}$**	(4)	2M

3.2	$\log_x 8 - \log_x \frac{1}{2} + \log_x 4 = 3$ $\log_x \frac{8 \times 4}{\frac{1}{2}} = 3$ $\log_x 64 = 3$ $x^3 = 64$ $x^3 = 4^3$ $x = 4$	✓ log property/*log wet* $\frac{8\times4}{\frac{1}{2}}$ A ✓ $\log_x 64$ CA ✓ $x^3 = 64$ CA ✓ $x = 4$ CA	(4)	3E
3.3.1	$z = 4 + \sqrt{5}i$	✓ $z = 4 + \sqrt{5}i$ A	(1)	1E
3.3.2	$r = \sqrt{(4)^2 + (\sqrt{5})^2}$ $r = \sqrt{21}$ or/*of* 4,58 $tan\theta = \frac{\sqrt{5}}{4}$ $\theta = 29{,}21°$ $z = 4{,}58cis29{,}21°$	✓ $\sqrt{(4)^2 + (\sqrt{5})^2}$ CA ✓ $r = \sqrt{21}$ or/*of* 4,58 CA ✓ $\frac{\sqrt{5}}{4}$ CA ✓ $\theta = 29{,}21°$ CA ✓ $z = 4{,}58cis29{,}21°$ CA	(5)	2D
				[23]

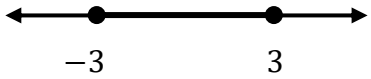
QUESTION/*VRAAG* 4				
4.1.1	$f(x) = 3x^2 - 6x - 9$ $0 = 3x^2 - 6x - 9$ $0 = x^2 - 2x - 3$ $0 = (x-3)(x+1)$ **OR/*OF*** $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $x = \frac{-(-6) \pm \sqrt{(-6)^2 - 4(3)(-9)}}{2(3)}$ $x = \frac{6 \pm \sqrt{144}}{6}$ $x = 3 \ of \quad x = -1$	✓ $f(x) = 0$ A ✓ factors/*faktore*/SF A ✓ $x = 3$ CA ✓$x = -1$ CA	(4)	1D

4.1.2	$x = \frac{-b}{2a}$ $x = \frac{-(-6)}{2(3)}$ $x = 1$ $f(1) = 3(1)^2 - 6(1) - 9$ $f(1) = -12$ **OR/*OF*** $f'(x) = 6x - 6$ $0 = 6x - 6$ $x = 1$ $f(1) = 3(1)^2 - 6(1) - 9$ $f(1) = -12$	✓ M A ✓ answer/*antwoord* $x = 1$ A ✓ answer/*antwoord* $y = -12$ CA **OR/*OF*** ✓ M differantiation/*differensiasie* A ✓ answer/*antwoord* $x = 1$ A ✓ answer/*antwoord* $y = -12$ CA		3E

	OR/*OF* $x = \frac{-b}{2a}$ $x = \frac{-(-6)}{2(3)}$ $x = 1$ $y = \frac{4ac - b^2}{4a}$ $y = \frac{4(3)(-9) - (-6)^2}{4(3)}$ $y = -12$	**OR/*OF*** ✓ M A ✓ answer/*antwoord* $x = 1$ A ✓ answer/*antwoord* $y = -12$ CA **AO $\frac{3}{3}$**	(3)	
4.1.3	$y = -12$	✓ y A ✓ -12 CA (IF ONLY -12, NO MARKS) *(INDIEN SLEGS -12, GEEN PUNTE)*	(2)	4E

4.1.4		For/*Vir* $f(x)$ ✓ Shape/*Vorm* ✓ y-intercept/*y-afsnit* ✓ x-intercept/*x-afsnit* ✓ turning point/*draaipunt*	(4)	1D
				
4.1.5	$-1 \leq x \leq 3$ **OR/*OF*** $x \in [-1; 3]$ **OR/*OF*** x-values from -1 to 3 **OR/*OF*** 	✓ notation/*notasie* A ✓ end point/*eindpunt* CA	(2)	3M

4.2.1	$g(x) = \frac{a}{x}$ $-1 = \frac{a}{-3}$ $a = 3$ $g(x) = \frac{3}{x}$	✓ SF A ✓ $a = 3$ CA ✓ answer/*antwoord* CA	(3)	2D
4.2.2	$y = mx + c$ $y = mx + 2$ $-3 = m(-1) + 2$ $-5 = m(-1)$ $5 = m$ $y = 5x + 2$	✓ $c = 2$ A ✓ SF (-1;-3) A ✓ $5 = m$ CA ✓ answer/*antwoord* CA	(4)	2D
4.2.3	$x^2 + y^2 = r^2$ $(-1)^2 + (-3)^2 = r^2$ $10 = r^2$ $r = \sqrt{10}$ **OR/*OF*** $f(x) = -\sqrt{r^2 - x^2}$ $-3 = -\sqrt{r^2 - (-1)^2}$ $(3)^2 = r^2 - 1$ $9 + 1 = r^2$ $r^2 = 10$ $r = \sqrt{10}$	✓ SF A ✓ answer/*antwoord* CA ✓ SF A ✓ answer/*antwoord* CA	(2)	2D
4.3.1	$y = -3$	✓ $y = -3$ A	(1)	1E
4.3.2	$g(x) = 2^x - 3$ $y = 2^0 - 3$ $y = -2$	✓ $x = 0$ A ✓ $y = -2$ A **AO $\frac{2}{2}$**	(2)	1D
4.3.3	$b = 2$ *or* $b = -2$	✓ answer/*antwoord* CA	(1)	1D

4.3.4	$-3 \leq x \leq 3$ **OR/*OF*** $x \in [-3; 3]$ **OR/*OF*** x-values from -3 to 3 **OR/*OF***  	✓ notation/*notasie* A ✓ end point/*eindpunt* A	(2)	4D
				[30]

QUESTION/*VRAAG* 5) BREAK DOWN IF INCORRECT FORMULA USED				
5.1	$A = P(1-i)^n$ $1000 = 40000\left(1-\frac{10}{100}\right)^n$ $0{,}025 = (0{,}9)^n$ $\log 0{,}025 = \log(0{,}9)^n$ $n = \frac{\log 0{,}025}{\log 0{,}9}$ $n = 35{,}01$ $n = 35$ years/*jaar*	✓ formula/*formule* A ✓ SF A ✓ S (log) CA ✓ answer/*antwoord* CA (ACCEPT 36 AS WELL) *(AANVAAR 36 OOK)* **PR**	(4)	3E
5.2	$A = P(1+i)^n$ $3\,277 = 1\,800\left(1+\frac{r}{100}\right)^6$ $\frac{3\,277}{1\,800} = \left(1+\frac{r}{100}\right)^6$ $\sqrt[6]{\frac{3\,277}{1\,800}} = 1+\frac{r}{100}$ $\sqrt[6]{\frac{3\,277}{1\,800}} - 1 = \frac{r}{100}$ $r = 10{,}5\%$ **OR/*OF*** $A = P(1+i)^n$ $3\,277 = 1\,800(1+i)^6$	✓ formula/*formule* A ✓ SF A ✓ answer/*antwoord* CA **NPR** ✓ formula/*formule* A ✓ SF A	(3)	2D

	$\frac{3\,277}{1\,800} = (1+i)^6$ $\sqrt[6]{\frac{3\,277}{1\,800}} = 1+i$ $\sqrt[6]{\frac{3\,277}{1\,800}} - 1 = i$ $i = 10{,}5\%$	✓ answer/*antwoord* CA **NPR**		
5.3	$i = \left(1+\frac{i}{m}\right)^m - 1$ $i = \left(1+\frac{0{,}085}{12}\right)^{12} - 1$ $i = 0{,}08839$ $r = 8{,}84\%$	✓ F A ✓ SF A ✓ 8,84% CA **NPR**	(3)	2M
5.4	Method/*Metode* 1: $A = P(1+i)^n$ $A = 12\,000\left(1+\frac{0{,}06}{4}\right)^{2\times4}\left(1+\frac{0{,}06}{12}\right)^{5\times12} + 5\,000\left(1+\frac{0{,}06}{12}\right)^{5\times12} = \text{R}24\,977{,}89$ Method/*Metode* 2: $A = P(1+i)^n$ $A = 12\,000\left(1+\frac{0{,}06}{4}\right)^{2\times4}$ $A = \text{R}13\,517{,}91$ $\text{R}13\,517{,}91 + \text{R}5\,000 = \text{R}18\,517{,}91$ $A = 18\,517{,}91\left(1+\frac{0{,}06}{12}\right)^{5\times12}$	✓ $\left(1+\frac{0{,}06}{4}\right)^{2\times4}$ A ✓ $\left(1+\frac{0{,}06}{12}\right)^{5\times12}$ A ✓ Add/*tel by* R5 000 A ✓ $\left(1+\frac{0{,}06}{12}\right)^{5\times12}$ A ✓ *R*24 977,89 CA ✓SF A ✓ R13 517,91 CA ✓ add/*tel by* R5 000 A	(5)	3D

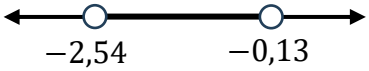
	$= \text{R}24\,977,89$	✓ SF A ✓ R24 977,89 CA **NPR**		
				[15]

QUESTION/*VRAAG* 6				
6.1	$f(x) = 7 + 5x$ $f(x+h) = 7 + 5(x+h)$ $= 7 + 5x + 5h$ $f(x+h) - f(x)$ $= 7 + 5x + 5h - (7 + 5x)$ $= 7 + 5x + 5h - 7 - 5x$ $= 5h$ $f'(x) = \lim_{h\to 0} \frac{f(x+h) - f(x)}{h}$ $f'(x) = \lim_{h\to 0} \frac{7 + 5x + 5h - (7 + 5x)}{h}$ $f'(x) = \lim_{h\to 0} \frac{7 + 5x + 5h - 7 - 5x}{h}$ $f'(x) = \lim_{h\to 0} \frac{5h}{h}$ $f'(x) = 5$	✓ definition/*definisie* A ✓ SF CA ✓ $-7 - 5x$ CA ✓ $\frac{5h}{h}$ CA ✓ 5 CA (5) **AO 0** More than two mistakes – a breakdown. Do not mark any further *Meer as twee foute, "'n ineenstorting. merk nie verder nie*	(5)	2D

6.2	$D_x\left[\frac{1}{3}x^3 + 4\sqrt{x} - \frac{2}{x}\right]$ $D_x\left[\frac{1}{3}x^3 + 4x^{\frac{1}{2}} - 2x^{-1}\right]$ $= x^2 + 2x^{-\frac{1}{2}} + 2x^{-2}$	✓ $4x^{\frac{1}{2}}$ A ✓ $-2x^{-1}$ A ✓ x^2 CA ✓ $2x^{-\frac{1}{2}}$ CA ✓ $2x^{-2}$ CA	(5)	3D

6.3	$g(x) = \frac{x^2}{20} - \frac{7x}{20} + 15$ $g'(x) = \frac{1}{10}x - \frac{7}{20}$ $g'(5) = \frac{1}{10}(5) - \frac{7}{20}$ $g'(5) = \frac{3}{20}$ $m = \frac{3}{20}$	✓ $\frac{1}{10}x$ A ✓ $-\frac{7}{20}$ A ✓ substitution/*vervanging* CA ✓ answer/*antwoord* CA	(4)	2D 2D
				[14]

QUESTION/*VRAAG* 7				
7.1	$f(x) = (x+3)(x+2)(x-1)$ $f(x) = (x^2+5x+6)(x-1)$ $f(x) = x^3+5x^2+6x-x^2-5x-6$ $f(x) = x^3+4x^2+x-6$	✓ $(x+3)$ A ✓ $(x+2)$ A ✓ $(x-1)$ A ✓ product of any two brackets/*produk van enige twee hakies* CA ✓ S CA **AO $\frac{0}{5}$**	(5)	2D
7.2	$(0;\ -6)$	✓ 0 A ✓ -6 A	(2)	1E

7.3	$f(x) = x^3 + 4x^2 + x - 6$ $f'(x) = 3x^2 + 8x + 1$ $3x^2 + 8x + 1 = 0$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $x = \frac{-(8) \pm \sqrt{(8)^2 - 4(3)(1)}}{2(3)}$ $\therefore x = -0{,}13 \quad of \quad x = -2{,}54$ $y = (-0{,}13)^3 + 4(-0{,}13)^2 + (-0{,}13) - 6$ $y = -6{,}06$ $y = (-2{,}54)^3 + 4(-2{,}54)^2 + (-2{,}54) - 6$ $y = 0{,}88$	✓ $f'(x)$ A ✓ $f'(x) = 0$ A ✓ SF CA ✓both x-values *beide x-waardes* CA ✓ both y-values *beide y-waardes* CA	(5)	3D
7.4	$-2{,}54 < x < -0{,}13$ **OR/*OF*** $x \in (-2{,}54; -0{,}13)$ **OR/*OF*** x-values between $-2{,}54$ and $-0{,}13$ **OR/*OF***  $-2{,}54$ $-0{,}13$	✓ notation/*notasie* A ✓ end point/*eindpunt* CA	(2)	4E
				[14]

QUESTION/*VRAAG 8*				
8.1	$s = ut + \frac{1}{2}gt^2$ $s = 5 \times 6 + \frac{1}{2}(10)(6)^2$ $s = 210m$	✓ SF A ✓ answer/*antwoord* CA **NPU**	(2)	2D
8.2	$\frac{ds}{dt} = v = u + gt$ **OR/*OF*** $\frac{ds}{dt} = 5 + 10t$ **ALSO ACCEPT:** $s = ut + \frac{1}{2}gt^2$ $u = \frac{1}{t}\left(s - \frac{1}{2}gt^2\right)$ $u = \frac{1}{t}\left(s - \frac{1}{2}(10)t^2\right)$ $u = \frac{1}{t}(s - 5t^2)$	✓ u A ✓ gt A **OR/*OF*** ✓ 5 A ✓ $10t$ A	(2)	1D
8.3	$v = u + gt$ $v = 5 + 10(6)$ $v = 65\ m/s$ **ALSO ACCEPT (FROM 8.2):** $u = \frac{1}{t}(s - 5t^2)$ $u = \frac{1}{6}(s - 5(6)^2)$ $u = \frac{1}{6}s - 30$	✓ SF CA ✓ answer/*antwoord* CA **NPU**	(2)	2E
8.4	Average rate of change/*Gemid tempo van verandering* = $\frac{65-5}{6-0}$ = 10 m/s^2	✓ SF CA ✓ answer/*antwoord* CA	(2)	2M
				[8]

QUESTION/*VRAAG* 9				
Do not penalise if C is omitted in question 9.1.2. *Moet nie penaliseer indien C weggelaat word in vraag 9.1.2.*				
9.1.1	$\int\left(3x^2+\frac{3}{x}-2^x\right)dx$ $=\frac{3x^3}{3}+3\ln x-\frac{2^x}{\ln 2}+C$ $=x^3+3\ln x-\frac{2^x}{\ln 2}+C$	✓ x^3 A ✓ $3\ln x$ A ✓ $-\frac{2^x}{\ln 2}$ A ✓ $+C$ A	(4)	2D
9.1.2	$\int\left(\sqrt{x^4}+2\right)^2dx$ $=\int(x^2+2)(x^2+2)\,dx$ $=\int(x^4+4x^2+4)\,dx$ $=\frac{x^5}{5}+\frac{4x^3}{3}+4x+C$	✓ $x^{\frac{4}{2}}/x^2$ A ✓ x^4+4x^2+4 CA ✓ $\frac{x^5}{5}$ CA ✓ $\frac{4x^3}{3}$ CA ✓ $4x+C$ CA	(5)	3D
9.2	$f(x)=x^3+2x^2-3x$ $A=\int_{-3}^{0}(x^3+2x^2-3x\,)dx$ $=\left[\frac{1}{4}x^4+\frac{2}{3}x^3-\frac{3}{2}x^2\right]_{-3}^{0}$ $=\left[\frac{1}{4}(0)^4+\frac{2}{3}(0)^3-\frac{3}{2}(0)^2\right]-\left[\frac{1}{4}(-3)^4+\frac{2}{3}(-3)^3-\frac{3}{2}(-3)^2\right]$ $=0-\left(-\frac{45}{4}\right)$ $=11{,}25/\ \frac{45}{4}$ unit/*eenheid*^{2}	✓ area notation using integrals/*area notasie met gebruik van integrale* $\int_{-3}^{0}(x^3+2x^2-3x\,)dx$ A ✓ $\frac{1}{4}x^4+\frac{2}{3}x^3-\frac{3}{2}x^2$ A ✓ SF 0 CA ✓ SF -3 CA ✓ answer/*antwoord* CA **AO** $\frac{1}{5}$	(5)	3D
				[14]

TOTAL/*TOTAAL:* 150