

PREPARATORY EXAMINATIONS ***VOORBEREIDENDE EKSAMEN*** **2023**

MARKING GUIDELINES/ ***NASIENRIGLYNE***

TECHNICAL MATHEMATICS P1/TEGNIJSE WISKUNDE VI (11091)
--

18 pages/*bladsye*

MARKING CODES/ <i>NASIENKODES</i>	
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 penalisering vir afronding nie</i>
NPU	No penalty for units omitted/ <i>Geen penalisering vir eenhede weggelaat nie</i>
S	Simplification/ <i>Vereenvoudiging</i>
F	Formula/ <i>Formule</i>
SF	Substitution in correct formula/ <i>Vervanging in korrekte formule</i>
AO	Answer only/ <i>Slegs antwoord</i>

NOTES:

- If a candidate answers a question TWICE, only mark the FIRST attempt.
- If a candidate has crossed out an attempt to answer a question and did not redo it, mark the crossed-out version.
- Consistent accuracy applies in all aspects of the marking guidelines where indicated.

NOTAS:

- Indien 'n kandidaat 'n vraag TWEE keer beantwoord, sien slegs die EERSTE poging na.
- As 'n kandidaat 'n poging om 'n vraag te beantwoord deurgehaal het en dit nie oorgedoen het nie, merk die deurgehaalde weergawe.
- Volgehoue akkuraatheid is deurgaans op alle aspekte van die nasienriglyne van toepassing, waar aangedui.

QUESTION/VRAAG 1

					CL/KV
1.1	1.1.1	$x + 3 = 2$ $x = -1$	$\checkmark x + 3 = 2$ $\checkmark x = -1$	A A (2)	1E
	1.1.2	$x^3 - 16x = 0$ $x(x^2 - 16) = 0$ $x = 0$ or/of $x^2 - 16 = 0$ $(x - 4)(x + 4) = 0$ $x = 4$ or/of $x = -4$	$\checkmark x(x^2 - 16)$ $\checkmark x = 0$ $\checkmark x = 4$ $\checkmark x = -4$	A A CA CA (4)	2M
	1.1.3	$x^2 = x + 3$ $x^2 - x - 3 = 0$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $x = \frac{-(-1) \pm \sqrt{(-1)^2 - 4(1)(-3)}}{2(1)}$ $x = 2,3$ or/of $x = -1,3$	$\checkmark x^2 - x - 3 = 0$ \checkmark SF $\checkmark x = 2,3$ $\checkmark x = -1,3$	A CA CA CA (4) AO: $\frac{2}{4}$ NPR	1D

	1.1.4	$-x - 3 \geq x^2 - 5$ $0 \geq x^2 + x - 2$ $(x - 1)(x + 2) \leq 0$ $- 2 \leq x \leq 1$ or/of $x \in [-2; 1]$ OR/OF $x + 3 \leq -x^2 + 5$ $x^2 + x - 2 \leq 0$ $(x - 1)(x + 2) \leq 0$ $- 2 \leq x \leq 1$ or/of $x \in [-2; 1]$	$\checkmark 0 \geq x^2 + x - 2$ A $\checkmark (x - 1)(x + 2)$ A \checkmark End points/ <i>Eindpunte</i> CA \checkmark Notation/ <i>Notasie</i> CA (4) OR/OF $\checkmark 0 \geq x^2 + x - 2$ A $\checkmark (x - 1)(x + 2)$ A \checkmark End points/ <i>Eindpunte</i> CA \checkmark Notation/ <i>Notasie</i> CA (4) AO: $\frac{2}{4}$	3E
1.2	$2^y - 16^x = 0$ 1 $y = x^2 + 4x - 4$ 2 $2^y = 16^x$ $2^y = 2^{4x}$ $y = 4x$ 3 Eq. 3=Eq. 2 or/of Verg. 3=Verg. 2 $x^2 + 4x - 4 = 4x$ $x^2 - 4 = 0$ $(x - 2)(x + 2) = 0$ $x = 2$ or/of $x = -2$ If/As $x = 2$ then/dan $y = 4(2) = 8$ If/As $x = -2$ then/dan $y = 4(-2) = -8$ OR/OF	$\checkmark 2^y = 2^{4x}$ A $\checkmark y = 4x$ A $\checkmark x^2 + 2x + 4 = 4x$ A $\checkmark (x - 2)(x + 2)$ CA $\checkmark x = 2$ and/en $x = -2$ CA $\checkmark y = 8$ and/en $y = -8$ CA (6) OR/OF	3M	

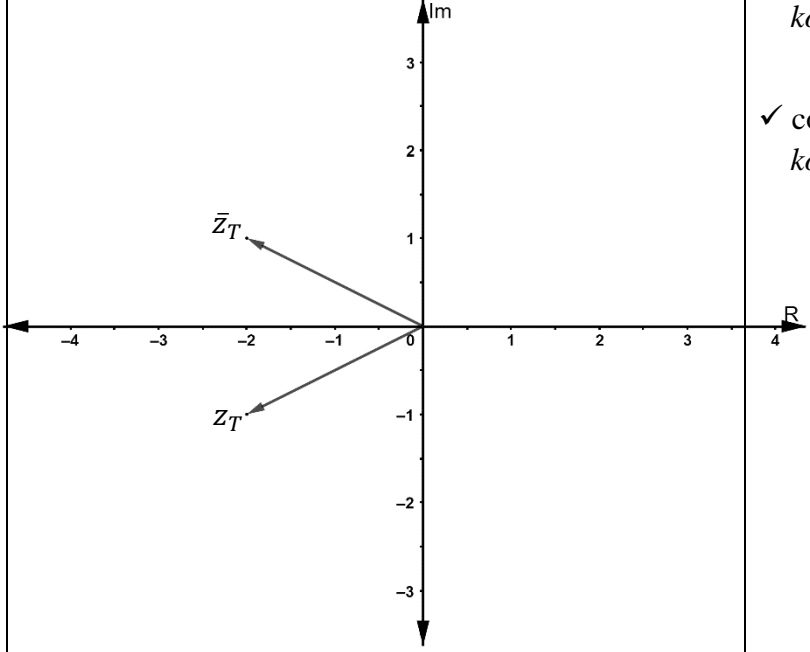
	$2^y - 16^x = 0$ 1 $y = x^2 + 4x - 4$ 2 $2^y = 16^x$ $2^y = 2^{4x}$ $y = 4x$ $x = \frac{y}{4}$ 3 Eq. 3 into Eq. 2 or/of Verg. 3 in Verg. 2 $y = \left(\frac{y}{4}\right)^2 + 4\left(\frac{y}{4}\right) - 4$ $\frac{y^2}{16} = 6$ $y^2 = 64$ $y = \pm 8$ $x = \frac{8}{4} = 2$ $x = -\frac{8}{4} = -2$	$\checkmark 2^y = 2^{4x}$ A $\checkmark x = \frac{y}{4}$ A $\checkmark y = \left(\frac{y}{4}\right)^2 + 4\left(\frac{y}{4}\right) - 4$ A $\checkmark y^2 = 64$ CA $\checkmark y = 8$ and/en $y = -8$ CA $\checkmark x = 2$ and/en $x = -2$ CA (6)	
1.3	$x = 2_{10} = 10_2$ $y = 8_{10} = 1000_2$	$\checkmark 10_2$ CA $\checkmark 1000_2$ CA (2) P: 1 if one or more of the base numbers 2 is omitted. P: 1 indien een of meer van die basis 2 uitgelaat word.	1E
1.4	1.4.1 $KE = \frac{1}{2}mv^2$ $2KE = mv^2$ $\frac{2KE}{m} = v^2$ $\sqrt{\frac{2KE}{m}} = v$ OR/OF	$\checkmark 2KE = mv^2$ M $\checkmark \frac{2KE}{m} = v^2$ M $\checkmark \sqrt{\frac{2KE}{m}} = v$ A OR/OF	2M

		$KE = \frac{1}{2}mv^2$ $\frac{KE}{\frac{1}{2}} = mv^2$ $\frac{KE}{\frac{1}{2}m} = v^2$ $v = \sqrt{\frac{KE}{\frac{1}{2}m}}$	$\checkmark \frac{KE}{\frac{1}{2}} = mv^2 \quad M$ $\checkmark \frac{KE}{\frac{1}{2}m} = v^2 \quad M$ $\checkmark v = \sqrt{\frac{KE}{\frac{1}{2}m}} \quad A$ <p style="text-align: right;">(3)</p>	
	1.4.2	$\sqrt{\frac{2KE}{m}} = v$ $\sqrt{\frac{2(411,675)}{55}} = v$ $v = 3,869108424$ $v = 3,9 \text{ m/s}$ <p style="text-align: right;">OR/OF</p> $v = \sqrt{\frac{KE}{\frac{1}{2}m}}$ $v = \sqrt{\frac{411,675}{\frac{1}{2}(55)}}$ $v = 3,869108424$ $v = 3,9 \text{ m/s}$ <p style="text-align: right;">OR/OF</p>	$\checkmark \text{ SF} \quad CA$ $\checkmark v = 3,9 \text{ m/s} \quad CA$ <p style="text-align: right;">OR/OF</p> $\checkmark \text{ SF} \quad CA$ $\checkmark v = 3,9 \text{ m/s} \quad CA$ <p style="text-align: right;">OR/OF</p>	1M

QUESTION/VRAAG 3

				CL/ KV
3.1	3.1.1	$3 \log 20 - \log 4 - \log 2$ $= 3 [\log(2 \times 10)] - 2 \log 2 - \log 2$ $= 3(\log 2 + \log 10) - 3 \log 2$ $= 3(\log 2 + 1) - 3 \log 2$ $= 3 \log 2 + 3 - 3 \log 2$ $= 3$ <p style="text-align: center;">OR / OF</p> $3 \log 20 - \log 4 - \log 2$ $= \log 8000 - \log 4 - \log 2$ $= \log \left(\frac{8000}{4 \times 2} \right)$ $= \log 1000$ $= 3$	$\checkmark 2 \log 2$ A $\checkmark 3 (\log 2 + \log 10)$ A $\checkmark \log 10 = 1$ A $\checkmark 3$ CA (4) <p style="text-align: center;">OR / OF</p> $\checkmark \log 8000$ A $\checkmark \log \left(\frac{8000}{4 \times 2} \right)$ A $\checkmark \log 1000$ A $\checkmark 3$ CA (4) AO: $\frac{1}{4}$	2M
	3.1.2	$\frac{2i^8 - 3i^7 + 4i^6}{5i^9}$ $= \frac{2i^8}{5i^9} - \frac{3i^7}{5i^9} + \frac{4i^6}{5i^9}$ $= \frac{2}{5i} - \frac{3}{5i^2} + \frac{4}{5i^3}$ $= \frac{2}{5i} \times \frac{i}{i} - \frac{3}{5(-1)} + \frac{4}{5i(-1)}$ $= \frac{2i}{-5} + \frac{3}{5} - \frac{4}{5i} \times \frac{i}{i}$ $= -\frac{2}{5}i + \frac{3}{5} - \frac{4i}{5(-1)}$ $= -\frac{2}{5}i + \frac{3}{5} + \frac{4}{5}i$ $= \frac{3}{5} + \frac{2}{5}i$ <p style="text-align: center;">OR / OF</p>	$\checkmark \frac{2}{5i} - \frac{3}{5i^2} + \frac{4}{5i^3}$ M $\checkmark \frac{2}{5i} \times \frac{i}{i} - \frac{3}{5(-1)} + \frac{4}{5i(-1)}$ S $\checkmark \times \frac{i}{i}$ CA $\checkmark i^2 = -1$ A $\checkmark \frac{3}{5} + \frac{2}{5}i$ CA (5) <p style="text-align: center;">OR / OF</p>	2D

	$\frac{2i^8-3i^7+4i^6}{5i^9}$ $= \frac{i^6(2i^2-3i+4)}{5i^6.i^3}$ $= \frac{2i^2-3i+4}{5i^2.i}$ $= \frac{2(-1)-3i+4}{5(-1).i}$ $= \frac{-2-3i+4}{-5i}$ $= \frac{2-3i}{-5i}$ $= \frac{2-3i}{-5i} \times \frac{i}{i}$ $= \frac{2i-3i^2}{-5i^2}$ $= \frac{2i+3}{5}$ $= \frac{3}{5} + \frac{2}{5}i$ <p style="text-align: center;">OR/OF</p> $= \frac{2(i^2)^4-3(i^2)^3i+4(i^2)^3}{5(i^2)^4i}$ $= \frac{2(-1)^4-3(-1)^3i+4(-1)^3}{5(-1)^4i}$ $= \frac{2+3i-4}{5i}$ $= \frac{-2+3i}{5i}$ $= \frac{-2+3i}{5i} \times \frac{i}{i}$ $= \frac{-2i+3i^2}{5i^2}$ $= \frac{-2i+3(-1)}{5(-1)}$ $= \frac{-2i}{-5} + \left(\frac{-3}{-5}\right)$ $= \frac{3}{5} + \frac{2}{5}i$	$\checkmark \frac{2(-1)-3i+4}{5(-1).i}$ <p style="text-align: right;">M</p> $\checkmark \frac{-2-3i+4}{-5i}$ <p style="text-align: right;">S</p> $\checkmark \times \frac{i}{i}$ <p style="text-align: right;">CA</p> $\checkmark i^2 = -1$ <p style="text-align: right;">A</p> $\checkmark \frac{3}{5} + \frac{2}{5}i$ <p style="text-align: right;">CA</p> <p style="text-align: right;">(5)</p> <p style="text-align: center;">OR/OF</p> $\checkmark \frac{2(i^2)^4-3(i^2)^3i+4(i^2)^3}{5(i^2)^4i}$ <p style="text-align: right;">M</p> $\checkmark i^2 = -1$ <p style="text-align: right;">A</p> $\checkmark \times \frac{i}{i}$ <p style="text-align: right;">CA</p> $\checkmark \frac{-2i+3(-1)}{5(-1)}$ <p style="text-align: right;">CA</p> $\checkmark \frac{3}{5} + \frac{2}{5}i$ <p style="text-align: right;">CA</p> <p style="text-align: right;">(5)</p>	
--	--	---	--

	3.1.3	$\frac{\sqrt{75}-\sqrt{27}}{\sqrt{48}}$ $= \frac{\sqrt{3 \times 25} - \sqrt{3 \times 9}}{\sqrt{3 \times 16}}$ $= \frac{5\sqrt{3}-3\sqrt{3}}{4\sqrt{3}}$ $= \frac{2\sqrt{3}}{4\sqrt{3}}$ $= \frac{1}{2}$	$\checkmark \frac{5\sqrt{3}-3\sqrt{3}}{4\sqrt{3}} \quad \text{A}$ $\checkmark \frac{2\sqrt{3}}{4\sqrt{3}} \quad \text{A}$ $\checkmark \frac{1}{2} \quad \text{CA}$ <p>(3)</p> <p>AO: 1 mark/punt</p>	2E
3.2	3.2.1	$z_T = -2 - i$	$\checkmark -2 \quad \text{A}$ $\checkmark -i \quad \text{A}$ <p>(2)</p> <p>AO</p>	2E
	3.2.2	$\bar{z}_T = -2 + i$	$\checkmark \bar{z}_T = -2 + i \quad \text{CA}$ <p>(1)</p>	1E
	3.2.3		$\checkmark \text{correct quadrant of } \bar{z}_t$ <p><i>korrekte kwadrant van \bar{z}_t</i> CA</p> $\checkmark \text{correct quadrant of } z_t$ <p><i>korrekte kwadrant van z_t</i> CA</p> <p>(2)</p>	1D
[17]				

QUESTION/VRAAG 4

				CL/KV
4.1	4.1.1	$EF = 5 - (-7) = 5 + 7 = 12$	$\checkmark M$ A $\checkmark EF = 12$ A (2) AO: $\frac{2}{2}$	1E
	4.1.2	For coordinate of/ <i>Vir koördinaat van D</i> : $D(2; -3)$ For coordinate of/ <i>Vir koördinaat van C</i> : $f(x) = -x^2 + 7x - 7$ $f'(x) = -2x + 7$ $0 = -2x + 7$ $2x = 7$ $x = \frac{7}{2}$ $f\left(\frac{7}{2}\right) = \frac{21}{4}$ $\therefore C\left(\frac{7}{2}; \frac{21}{4}\right)$	$\checkmark 2$ A $\checkmark -3$ A $\checkmark M$ A $\checkmark x = \frac{7}{2}$ A $\checkmark y = \frac{21}{4}$ CA (5)	2D

		OR/OF	OR/OF	
		<p>For coordinate of/<i>Vir koördinaat van D</i>:</p> <p>D (2 ; -3)</p> <p>For coordinate of/<i>Vir koördinaat van C</i>:</p> $x = -\frac{b}{2a} = -\frac{7}{2(-1)} = \frac{7}{2}$ $\text{MAX./MAKS.} = -\frac{\Delta}{4a} = \frac{-[49 - 4(-1)(-7)]}{4(-1)} = \frac{21}{4}$ $\therefore C\left(\frac{7}{2}; \frac{21}{4}\right)$ <p>ACCEPT/AANVAAR:</p> <p>$\left(3\frac{1}{2}; 5\frac{1}{4}\right)$ OR/OF (3,5; 5,25)</p>	<p>✓ 2 A</p> <p>✓ -3 A</p> <p>✓ $x = -\frac{b}{2a}$ M</p> <p>✓ $\frac{7}{2}$ A</p> <p>✓ $y = \frac{21}{4}$ CA</p> <p>(5)</p>	
	4.1.3	<p>$g(x) = 2x^2 - 8x + 5$</p> <p>$g\left(\frac{5}{2}\right) = 2\left(\frac{5}{2}\right)^2 - 8\left(\frac{5}{2}\right) + 5$</p> <p>$g\left(\frac{5}{2}\right) = -\frac{5}{2}$</p> <p>$Q\left(\frac{5}{2}; -\frac{5}{2}\right)$</p> <p>ACCEPT/AANVAAR:</p> <p>$x = \frac{5}{2}$ and/en $y = -\frac{5}{2}$</p> <p>$x = 2\frac{1}{2} = 2,5$ and/en $y = -2\frac{1}{2} = -2,5$</p>	<p>✓ $x = \frac{5}{2}$ A</p> <p>✓ $g\left(\frac{5}{2}\right) = -\frac{5}{2}$ A✓</p> <p>$Q\left(\frac{5}{2}; -\frac{5}{2}\right)$ CA</p> <p>(3)</p> <p>AO</p>	4E

4.2		✓ Asymptotes/ <i>Asimptote</i> A ✓ Correct quadrants/ <i>korrekte kwadrante</i> A ✓ Correct x – int <i>korrekte x – afsn</i> A (3)	4M
		[13]	

QUESTION/VRAAG 5				
5.1	Exponential/Eksponensieël		✓ Answer/Antwoord A (1)	1E
5.2	5.2.1	$f(x) = 4^x - 4$ $0 = 4^x - 4$ $4 = 4^x$ $x = 1$	✓ $f(x) = 0$ A ✓ $4 = 4^x$ M ✓ $x = 1$ CA (3)	2E
	5.2.2	$f(x) = 4^x - 4$ $f(x) = 4^0 - 4$ $f(x) = -3$	✓ $x = 0$ A ✓ $y = -3$ CA (2)	2E
5.3	$y = -4$		✓ $y = -4$ A (1)	1E

5.4		<p>For graph of f/ Vir grafiek van f:</p> <ul style="list-style-type: none"> ✓ x-intercepts x-afsnitte CA ✓ y-intercept y-afsnit CA ✓ Asymptote/<i>Asimptote</i> A ✓ Shape/<i>Vorm</i> A <p>For graph of g/ Vir grafiek van g:</p> <ul style="list-style-type: none"> ✓ x-int./<i>afsn.</i> A ✓ y-int./<i>afsn.</i> A ✓ Shape/<i>Vorm</i> A <p>(7)</p>	2E
5.5	Indicated on the graph/ <i>Aangedui op grafiek</i>	<ul style="list-style-type: none"> ✓ Indicating A/ <i>Dui A aan</i> CA <p>(1)</p>	1E
5.6	$h(x) = 4^x - 4 + 5$ $h(x) = 4^x + 1$	<ul style="list-style-type: none"> ✓ $h(x) = 4^x + 1$ A <p>(1)</p>	4E
5.7	$-4 \leq y \leq 0$ OR/OF $y \in [-4; 0]$	<ul style="list-style-type: none"> ✓ both y values/ <i>beide y waardes</i> A ✓ inequalities/ <i>ongelykhede</i> A <p>(2)</p>	4E
[18]			

QUESTION/VRAAG 6

				CL/KV
6.1	$i_{eff} = \left(1 + \frac{i}{m}\right)^m - 1$ $= \left(1 + \frac{0,072}{2}\right)^2 - 1$ $= 0,073296$ $i = 7,33\%$		✓ F A ✓ $m = 2$ A ✓ 0,0732 ... CA ✓ 7,33 CA (4) NPR	2E
6.2	6.2.1	$A = P(1 + i)^n$ $= 3\,400 \left(1 + \frac{0,092}{365}\right)^{365}$ $= 3\,727,597$ $= R3\,728$	✓ F A ✓ SF A ✓ $\frac{0,092}{365}$ A ✓ R3 728 CA (4) NPR	2E
	6.2.2	No, it is not a fair interest rate./ <i>Nee, dit is nie 'n billike rentekoers nie.</i> OR/OF Yes, Gomolemo only pays R328 in interest without the need to go to a bank. <i>Ja, Gomolemo betaal net R328 aan rente sonder dat dit nodig is om na 'n bank toe te gaan.</i>	✓ ST ✓ RE (Yes/No must correlate to learner's reason). (Ja/Nee moet ooreenstem met die leerder se rede) Statement only $\frac{0}{2}$ Slegs stelling $\frac{0}{2}$ (2)	4E

6.3	$A = P(1 + I)^n$ $= 20\,000 \left(1 + \frac{0,125}{12}\right)^{2 \times 12}$ $= 25\,647,32204$ $A = P(1 + i)^n$ $= 25\,647,32204 \left(1 + \frac{0,098}{4}\right)^{4 \times 4}$ $= R37\,777,52$ OR/OF $A = 20\,000 \left(1 + \frac{12,5}{100 \cdot 12}\right)^{24} \cdot \left(1 + \frac{9,8}{100 \cdot 4}\right)^{16}$ $A = R37\,777,52$	$\checkmark \frac{0,125}{12}$ $\checkmark 2 \times 12$ $\checkmark 25\,647,32$ \checkmark SF $\checkmark 37\,777,52$ OR/OF $\checkmark \frac{0,125}{12}$ $\checkmark 24$ $\checkmark \frac{9,8}{100 \cdot 4}$ $\checkmark 16$ $\checkmark 37\,777,52$	A A CA CA CA A A A A CA (5) NPR	3E
			[15]	

QUESTION/VRAAG 7

			CL/KV
7.1	$f(x) = 5 - 3x$ $f(x + h) = 5 - 3(x + h)$ $f(x + h) = 5 - 3x - 3h$ $f'(x) = \lim_{h \rightarrow 0} \frac{f(x + h) - f(x)}{h}$ $f'(x) = \lim_{h \rightarrow 0} \frac{5 - 3x - 3h - (5 - 3x)}{h}$ $f'(x) = \lim_{h \rightarrow 0} \frac{5 - 3x - 3h - 5 + 3x}{h}$ $f'(x) = \lim_{h \rightarrow 0} \frac{-3h}{h}$ $f'(x) = -3$	\checkmark Definition/Definisie \checkmark SF \checkmark S $\frac{-3h}{h}$ $\checkmark -3$	A CA CA CA (4) AO: $\frac{0}{4}$

7.2	7.2.1	$\lim_{x \rightarrow -2} \frac{x^2 + 3x + 2}{x + 2}$ $= \lim_{x \rightarrow -2} \frac{(x + 2)(x + 1)}{x + 2}$ $= \lim_{x \rightarrow -2} (x + 1)$ $= -2 + 1$ $= -1$	$\checkmark (x + 2)(x + 1)$ A $\checkmark (x + 1)$ S A $\checkmark -2 + 1$ CA $\checkmark -1$ CA (4)	2D
	7.2.2	$\frac{d}{dx} [(x^2 + 1)(x^{-2} - 1)]$ $= \frac{d}{dx} (1 - x^2 + x^{-2} - 1)$ $= \frac{d}{dx} (-x^2 + x^{-2})$ $= -2x - 2x^{-3}$ $= -2x - \frac{2}{x^3}$	$\checkmark 1 \text{ or/of } x^0$ A $\checkmark -x^2 + x^{-2}$ A $\checkmark -2x$ CA $\checkmark -\frac{2}{x^3}$ CA (4)	3E
7.3		$g(x) = 4x - x^2$ $g'(x) = 4 - 2x$ $m = g'(3) = 4 - 2(3) = 4 - 6 = -2$ $g(3) = 4(3) - (3)^2 = 12 - 9 = 3 \quad (3; 3)$ $y = mx + c$ $y = -2x + c$ $3 = -2(3) + c$ $3 = -6 + c$ $9 = c$ $y = -2x + 9$	$\checkmark 4 - 2x$ A $\checkmark -2$ CA $\checkmark 3$ CA $\checkmark \text{ SF}$ CA $\checkmark y = -2x + 9$ CA (5)	3E
[17]				

QUESTION/VRAAG 8

				CL/KV
8.1	$x - 1$	$\checkmark x - 1$	A (1)	1E
8.2	D(0 ; 37) ACCEPT / AANVAAR: $x = 0$ and/en $y = 37$	$\checkmark (0 ; 37)$	A (1)	1E
8.3	$f(x) = 2x^3 - 3x^2 - 36x + 37$ $f'(x) = 6x^2 - 6x - 36$ $6x^2 - 6x - 36 = 0$ $x^2 - x - 6 = 0$ $(x + 2)(x - 3) = 0$ $x = -2$ or/of $x = 3$ $f(-2) = 81$ B(-2 ; 81)	$\checkmark f'(x)$ A $\checkmark f'(x) = 0$ A \checkmark factors/faktore CA \checkmark both x -values beide x -waardes CA \checkmark B(-2 ; 81) CA (5)	3E	
8.4	$-2 < x < 3$ OR/OF $x \in (-2 ; 3)$	\checkmark Notation/Notasie A \checkmark Endpoints/Eindpunte CA (2)	4E	
8.5	$f'(x) = 6x^2 - 6x - 36$ $f'(-1) = -24$ C(-1; 68) $y - y_c = m(x - x_c)$ $y - 68 = -24(x + 1)$ Therefor the equation of the tangent is given by:/ Dus is die vergelyking van die raaklyn: $y = -24x + 44$	$\checkmark m = -24$ CA (-24 has to be calculated / -24 moet bereken word) \checkmark SF $x = -1$ A \checkmark SF $y = 68$ A (3)	4M	
				[12]

QUESTION/VRAAG 9

				CL/KV
9.1	$P = 2x + 2y + \frac{2\pi r}{2}$ $6 = 2x + 2y + \pi r$ $2y = 6 - 2x - \pi r$ $y = 3 - x - \frac{\pi r}{2}$	\checkmark M \checkmark S	A A (2)	3E
9.2	$L(x) = \frac{lb}{2} + \frac{\pi r^2}{2}$ $L(x) = \frac{y \cdot 2x}{2} + \frac{\pi r^2}{2}$ $L(x) = xy + \frac{\pi r^2}{2}$ $L(x) = x \left(3 - x - \frac{\pi x}{2} \right) + \frac{\pi x^2}{2}$ $L(x) = 3x - x^2 - \frac{\pi x^2}{2} + \frac{\pi x^2}{2}$ $L(x) = 3x - x^2$	\checkmark M \checkmark SF $\checkmark r = x$ \checkmark S \checkmark S	A A A A A (5)	3D
9.3	$L(x) = 3x - x^2$ $L'(x) = 3 - 2x$ $0 = 3 - 2x$ $2x = 3$ $x = \frac{3}{2}$ $y = 3 - \frac{3}{2} - \frac{\pi r}{2}$ $y = \frac{3}{2} - \frac{\pi \left(\frac{3}{2} \right)}{2}$ $y = \frac{3}{2} - \frac{3}{4}\pi$	$\checkmark 0 = 3 - 2x$ $\checkmark x = \frac{3}{2}$ $\checkmark y = \frac{3}{2} - \frac{3}{4}\pi$	A CA CA (3)	3E

9.4	$L(x) = 3x - x^2$ $L\left(\frac{3}{2}\right) = 3\left(\frac{3}{2}\right) - \left(\frac{3}{2}\right)^2$ $L\left(\frac{3}{2}\right) = \frac{9}{2} - \frac{9}{4}$ $L\left(\frac{3}{2}\right) = \frac{18-9}{4} = \frac{9}{4}$ ACCEPT/AANVAAR: $2\frac{1}{4}$ or/of 2,25	✓ SF ✓ $L\left(\frac{3}{2}\right) = \frac{9}{4}$	CA CA	3M (2)
				[12]

QUESTION/VRAAG 10

					CL/KV
10.1	10.1.1	$\int (4 + 2^{3x}) dx$ $= 4x + \frac{2^{3x}}{3\ln 2} + C$	$\checkmark 4x$ $\checkmark \frac{2^{3x}}{3\ln 2}$ $\checkmark C$	A A A (3)	2M
	10.1.2	$\int \left(\sqrt{x} + 6x^2 - \frac{8}{x}\right) dx$ $\int \left(x^{\frac{1}{2}} + 6x^2 - \frac{8}{x}\right) dx$ $= \frac{2}{3} x^{\frac{3}{2}} + 2x^3 - 8\ln x + C$	$\checkmark x^{\frac{1}{2}}$ $\checkmark \frac{2}{3} x^{\frac{3}{2}}$ $\checkmark 2x^3$ $\checkmark -8\ln x + c$	A A CA CA (4)	2D
10.2	$A/Opp = \int_1^4 (-x^3 + 6x^2) dx$ $A/Opp = [-\frac{1}{4}x^4 + 2x^3]_1^4$ $A/Opp = \left[-\frac{1}{4}(4)^4 + 2(4)^3\right] - \left[-\frac{1}{4}(1)^4 + 2(1)^3\right]$ $A/Opp = 64 - \frac{7}{4}$ $A/Opp = 62\frac{1}{4} \text{ unit}^2$ which is less than $62\frac{1}{2}$ sq. units./ <i>eenheid² wat minder as $62\frac{1}{2}$ eenhede is.</i>		$\checkmark F$ $\checkmark M$ $\checkmark SF$ $\checkmark S$ $\checkmark 62\frac{1}{4}$	A A CA CA CA (5)	3M
			[12]		
TOTAL/TOTAAL:			150		