



Province of the  
**EASTERN CAPE**  
EDUCATION

**NATIONAL  
SENIOR CERTIFICATE/  
NASIONALE  
SENIOR SERTIFIKAAT**

**GRADE/GRAAD 12**

**SEPTEMBER 2020**

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

**MARKS/PUNTE: 150**

<b>MARKING CODES / NASIENKODES</b>	
<b>A</b>	Accuracy/ <i>Akkuraatheid</i>
<b>AO</b>	Answer only / <i>Slegs antwoord</i>
<b>CA</b>	Consistent accuracy / <i>Volgehoue akkuraatheid</i>
<b>M</b>	Method / <i>Metode</i>
<b>R</b>	Rounding / <i>Afronding</i>
<b>NPR</b>	No penalty for rounding / <i>Geen penalisering vir afronding</i>
<b>NPU</b>	No penalty for units omitted / <i>Geen penalisering vir weglating van eenhede nie</i>
<b>S</b>	Simplification / <i>Vereenvoudiging</i>
<b>F</b>	Correct formula / <i>Korrekte formule</i>
<b>SF</b>	Substitution in the correct formula / <i>Vervanging in die korrekte formule</i>

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This marking guideline consists of 20 pages./  
*Hierdie nasienriglyn bestaan uit 20 bladsye.*

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**NOTE:**

- If a candidate answers a question TWICE, only mark the FIRST attempt.
- If a candidate has crossed out an attempt of a question and not redone the question, mark the crossed-out version.
- Consistent accuracy (CA) to be applied as indicated on the marking guideline.
- Assuming answers/values to solve a problem is NOT ACCEPTABLE.

**LET WEL:**

- Indien 'n kandidaat 'n vraag TWEE keer beantwoord, sien slegs die EERSTE poging na.
- Indien 'n kandidaat 'n poging kanselleer, maar nie die vraag herdoen nie, merk die gekanselleerde poging.
- Volgehoue akkuraatheid (CA) sal toegepas word soos op die nasienriglyne aangedui.
- Aanvaarding van antwoorde / waardes om 'n probleem op te los is ONAANVAARBAAR.

QUESTION/VRAAG 1					
1.1	1.1.1	$0 = (3x - 2)(x + 1)$ $x = \frac{2}{3}$ or / of $x = -1$	$\checkmark x = \frac{2}{3}$ $\checkmark x = -1$	A A	(2)
	1.1.2	$7x^2 + 9x - 4 = 0$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $x = \frac{-(9) \pm \sqrt{(9)^2 - 4(7)(-4)}}{2(7)}$ $x = -1,64$ or / of $x = 0,35$ <div style="border: 1px solid black; padding: 2px; width: fit-content; margin-top: 5px;">           -1 MARK for incorrect rounding /            -1 PUNT vir verkeerde afronding         </div>	$\checkmark$ Formula /Formule  $\checkmark$ Substitution/Vervanging  $\checkmark x = -1,64$ $\checkmark x = 0,35$	R CA CA	(4)

	1.1.3	$-6x^2 < 5x$ $-6x^2 - 5x < 0$ $x(6x+5) > 0$ Critical Values / Kritiese waardes : $0$ and / en $-\frac{5}{6} = -0,83$ $x < -\frac{5}{6}$ or / of $0 < x$	$\checkmark$ Factors/Substitution <i>Faktore/vervanging</i> <b>M</b> $\checkmark$ Both critical Values <i>Beide kritiese waardes</i> <b>NPR</b> $\checkmark\checkmark$ Correct Notation for each interval <i>Korrekte notasie vir elke interval</i>	<b>A</b>  <b>CA</b>  <b>CA</b>  <b>CA</b>	(4)
1.2		$x+3y=1$ .....(1) $2x^2+2y^2=-5xy$ .....(2) $x=1-3y$ .....(3) $2(1-3y)^2+2y^2=-5(1-3y)y$ $2(1-6y+9y^2)+2y^2=-5y+15y^2$ $2-12y+18y^2+2y^2+5y-15y^2=0$ $5y^2-7y+2=0$ $y = \frac{-(-7) \pm \sqrt{(-7)^2 - 4(5)(2)}}{2(5)}$ $y=0,4$ or / of $y=1$ $x=1-3y$ $x=1-3(0,4)$ or / of $x=1-3(1)$ $x=-0,2$ or / of $x=-2$	$\checkmark$ Equation/vergelyking 3 <b>M</b> $\checkmark$ Substitution/vervanging $\checkmark$ Simplification/ <i>Vereenvoudiging</i> $\checkmark$ Standard form/ <i>Standaardvorm</i> $\checkmark$ Substitution/vervanging $\checkmark$ Both y values / <i>Beide y-waardes</i> $\checkmark$ Both x values <i>Beide x-waardes</i> <b>NPR</b>	<b>A</b>  <b>CA</b>  <b>S</b>  <b>S</b>  <b>SF</b>  <b>CA</b>  <b>CA</b>	
<b>OR/OF</b>					

	$x + 3y = 1 \dots\dots\dots(1)$ $2x^2 + 2y^2 = -5xy \dots\dots(2)$ $y = \frac{1-x}{3} \dots\dots\dots(3)$ $2x^2 + 2\left(\frac{1-x}{3}\right)^2 = -5x\left(\frac{1-x}{3}\right)$ $2x^2 + 2\left(\frac{1-2x+x^2}{9}\right) = \frac{-5x+5x^2}{3}$  $18x^2 + 2 - 4x + 2x^2 = -15x + 15x^2$ $18x^2 - 15x^2 + 2x^2 - 4x + 15x + 2 = 0$ $5x^2 + 11x + 2 = 0$  $y = \frac{-(11) \pm \sqrt{(11)^2 - 4(5)(2)}}{2(5)}$ $x = -2 \text{ or / of } x = -0,2$  $y = \frac{1-x}{3}$ $y = \frac{1-(-2)}{3} \text{ or / of } y = \frac{1-(0,2)}{3}$ $y = 1 \text{ or / of } y = 0,4$				(7)
1.3	1.3.1	$5,425 \text{ rev / min} = \frac{5,425 \text{ rev}}{60 \text{ sec}}$ $5,425 \text{ rev / min} = 0,09 \text{ rev / sec}$	✓ 0,09 rev/sec	A	(1)
	1.3.2	$5,425 \text{ rev / min} = 9 \times 10^{-2} \text{ rev / sec}$	✓ $9 \times 10^{-2} \text{ rev / sec}$ NPU	CA	(1)
1.4	$101111_2$ $= 1 \times 2^5 + 0 \times 2^4 + 1 \times 2^3 + 1 \times 2^2 + 1 \times 2^1 + 1 \times 2^0$ $= 32 + 8 + 4 + 2 + 1 = 47$	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;"> <b>AO: Full Marks/ Volpunte</b> </div>	✓ Method/Metode ✓ 47	A A	(2)
					<b>[21]</b>

QUESTION/VRAAG 2				
2.1	$-x^2 + 9x - 2 = 0$ $b^2 - 4ac = 9^2 - 4(-1)(-2)$ $b^2 - 4ac = 73$ Roots are real, irrational and unequal <i>Wortels is reël, irrasionaal en ongelyk</i>	✓ Substitution/Vervanging  ✓ $\Delta = 73$ ✓ Nature of roots/Aard van die wortels	<b>SF</b>  <b>CA</b> <b>CA</b>	(3)
2.2	$-x^2 + 9x - c = 0$ $b^2 - 4ac < 0$ $9^2 - 4(-1)(c) < 0$ $4c < -81$ $c < \frac{-81}{4}$	✓ $\Delta < 0$  ✓ Substitution/Vervanging  ✓ $\frac{-81}{4}$ ✓ Correct notation / <i>Korrekte notasie</i>	<b>A</b>  <b>CA</b>  <b>CA</b> <b>CA</b>	(4)
				<b>[7]</b>

QUESTION/VRAAG 3					
3.1	3.1.1	$\frac{2.8^{n-2} + 3.8^{n+1}}{2^{3n-5}}$ $= \frac{2.2^{3(n-2)} + 3.2^{3(n+1)}}{2^{3n-5}}$ $= \frac{2.2^{3n-6} + 3.2^{3n+3}}{2^{3n-5}}$ $= \frac{2^{3n} (2.2^{-6} + 3.2^3)}{2^{3n} . 2^{-5}}$ $= \frac{1}{32} + 24$ $= \frac{1}{32}$ $= \left( \frac{1}{32} + 24 \right) 32$ $= 1 + 768$ $= 769$	<p>✓ Prime bases/<i>Priemgrondtalle</i></p> <p>✓ Factorisation / <i>Faktorisering</i></p> <p>✓ Simplification/<i>Vereenvoudiging</i></p> <p>✓ Simplification/<i>Vereenvoudiging</i></p>	<p><b>A</b></p> <p><b>CA</b></p> <p><b>CA</b></p> <p><b>CA</b></p>	(4)
	3.1.2	$\sqrt[3]{(-27)x^6} + \sqrt{25x^4}$ $= \sqrt[3]{(-3)^3 x^6} + \sqrt{5^2 x^4}$ $= -3x^2 + 5x^2$ $= 2x^2$	<p>✓ Prime bases/<i>Priemgrondtalle</i></p> <p>✓ Simplification/<i>Vereenvoudiging</i></p> <p>✓ Simplification/<i>Vereenvoudiging</i></p>	<p><b>A</b></p> <p><b>CA</b></p> <p><b>CA</b></p>	(3)
	3.1.3	$\log_2 32 \div 2 \log_5 25$ $= \frac{\log_2 2^5}{2 \log_5 5^2}$ $= \frac{5 \log_2 2}{2 \times 2 \log_5 5}$ $= \frac{5}{4}$	<p>✓ Prime bases/<i>Priemgrondtalle</i></p> <p>✓ Log property/<i>wet</i></p> <p>✓ Simplification/<i>Vereenvoudiging</i></p>	<p><b>A</b></p> <p><b>CA</b></p> <p><b>CA</b></p>	(3)

3.2	$\log_2(8x^3 - 1) - \log 100 = \log_2(4x^2 + 2x + 1)$ $\log_2(8x^3 - 1) - \log_2(4x^2 + 2x + 1) = \log 100$ $\log_2\left(\frac{8x^3 - 1}{4x^2 + 2x + 1}\right) = \log 100$ $\log_2\left(\frac{(2x-1)(4x^2 + 2x + 1)}{4x^2 + 2x + 1}\right) = \log 10^2$ $\log_2(2x-1) = 2\log 10$ $\log_2(2x-1) = 2$ $2^2 = 2x - 1$ $x = \frac{5}{2}$ <p style="text-align: center;"><b>OR/OF</b></p> $\log_2(8x^3 - 1) - \log 100 = \log_2(4x^2 + 2x + 1)$ $\log_2(8x^3 - 1) - \log 10^2 = \log_2(4x^2 + 2x + 1)$ $\log_2(8x^3 - 1) - 2 = \log_2(4x^2 + 2x + 1)$ $\log_2(8x^3 - 1) - \log_2 4 = \log_2(4x^2 + 2x + 1)$ $\log_2\left(\frac{8x^3 - 1}{4}\right) = \log_2(4x^2 + 2x + 1)$ $\frac{8x^3 - 1}{4} = 4x^2 + 2x + 1$ $\frac{(2x-1)(4x^2 + 2x + 1)}{4x^2 + 2x + 1} = 4$ $2x - 1 = 4$ $x = \frac{5}{2}$	<p>✓ Log property/Wet</p> <p>✓ Factors/Faktore</p> <p>✓ Log property / wet</p> <p>✓ Exponential form / Eksponensiale vorm</p> <p>✓ Simplification/ Vereenvoudiging</p>	<p>A</p> <p>A</p> <p>A</p> <p>CA</p> <p>CA</p>	(5)
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3.3	$z = -3 + i\sqrt{3}$ $ z  = \sqrt{(-3)^2 + (\sqrt{3})^2}$ $ z  = \sqrt{12}$ $ z  = 2\sqrt{3}$ $\tan \theta = \frac{\sqrt{3}}{3}$ $\theta = \tan^{-1}\left(\frac{\sqrt{3}}{3}\right)$ $\theta = 30^\circ \text{ (Reference Angle / Verw}\angle\text{)}$ $\theta = 180^\circ - 30^\circ = 150^\circ$ $z = 2\sqrt{3}(\cos 150^\circ + i \sin 150^\circ)$	<p>✓ Substitution/Vervanging</p> <p>✓ Modulus</p> <p>✓ tan ratio/verhouding</p> <p>✓ Reference angle/ Verwysingshoek</p> <p>✓ Polar form/Polêre vorm</p>	<p>A</p> <p>CA</p> <p>A</p> <p>CA</p> <p>CA</p>	<p>(5)</p>
3.4	$\frac{y-i}{2-i} = 3xi$ $y-i = (3xi)(2-i)$ $y-i = 6xi - 3xi^2$ $y-i = 6xi - 3x(-1)$ $y-i = 3x + 6xi$ $y = 3x \text{ and / en } -1 = 6x$ $y = 3x \text{ and / en } x = -\frac{1}{6}$ $y = 3\left(-\frac{1}{6}\right) \text{ and / en } x = -\frac{1}{6}$ $y = -\frac{1}{2} \text{ and / en } x = -\frac{1}{6}$	<p>✓ Simplification / Vereenvoudiging</p> <p>✓ <math>i^2 = -1</math></p> <p>✓ <math>x = -\frac{1}{6}</math></p> <p>✓ <math>y = -\frac{1}{2}</math></p>	<p>A</p> <p>CA</p> <p>CA</p> <p>CA</p>	
<b>OR/OF</b>				



		$\frac{y-i}{2-i} \times \frac{2+i}{2+i} = 3xi$ $\frac{2y+yi-2i-i^2}{2^2-i^2} = 3xi$ $\frac{2y+yi-2i-(-1)}{4-(-1)} = 3xi$ $\frac{2y+1+(y-2)i}{5} = 3xi$ $2y+1+(y-2)i = 15xi$ $2y+1=0 \text{ and / en } y-2=15x$ $y = -\frac{1}{2} \text{ and / en } -\frac{1}{2}-2 = 15x$ $y = -\frac{1}{2} \text{ and / en } -\frac{5}{2} \div 15 = x$ $y = -\frac{1}{2} \text{ and / en } -\frac{1}{6} = x$	<p>✓ Conjugate product / Toegevoegde produk</p> <p>✓ <math>i^2 = -1</math></p> <p>✓ <math>x = -\frac{1}{6}</math></p> <p>✓ <math>y = -\frac{1}{2}</math></p>	<p>A</p> <p>CA</p> <p>CA</p> <p>CA</p>	(4)
<b>[24]</b>					
<b>QUESTION/VRAAG 4</b>					
4.1	4.1.1	$0 = -\frac{6}{x} + 2$ $\frac{6}{x} = 2$ $x = 3$	<p>✓ Equating to 0 / Gelykstel aan 0</p> <p>✓ <math>x = 3</math></p>	<p>A</p> <p>A</p> <p>S</p>	(2)
	4.1.2	$0 = x^2 - x - 6$ $0 = (x-3)(x+2)$ $x = 3 \text{ or/of } x = -2$	<p>✓ Factors/faktore</p> <p>✓ <math>x = 3</math> or/of</p> <p>✓ <math>x = -2</math></p>	<p>SF</p> <p>A</p> <p>CA</p> <p>CA</p>	(3)
	4.1.3	$y = -6$	✓ $y = -6$	A	(1)
	4.1.4	$x = 0$ and/en $y = 2$	<p>✓ <math>x = 0</math></p> <p>✓ <math>y = 2</math></p>	<p>A</p> <p>A</p>	(2)

	4.1.5	Axis of symmetry / <i>simmetriese - as</i> : $x = \frac{-2+3}{2} = \frac{1}{2}$ $g\left(\frac{1}{2}\right) = \left(\frac{1}{2}\right)^2 - \frac{1}{2} - 6$ $g\left(\frac{1}{2}\right) = \frac{-25}{4}$ Turning point / <i>draaipunt</i> $\left(\frac{1}{2}; \frac{-25}{4}\right)$	✓M $x = \frac{1}{2}$  ✓y-coordinate/ <i>koördinaat</i>	A  CA  CA	
		<b>OR/OF</b>			
		$g'(x) = 2x - 1$ $0 = 2x - 1$ $x = \frac{1}{2}$ $g\left(\frac{1}{2}\right) = \left(\frac{1}{2}\right)^2 - \frac{1}{2} - 6$ $g\left(\frac{1}{2}\right) = \frac{-25}{4}$ Turning point / <i>draaipunt</i> $\left(\frac{1}{2}; \frac{-25}{4}\right)$	✓ $g'(x) = 0$  $x = \frac{1}{2}$  ✓y-coordinate/ <i>koördinaat</i>	A  CA  CA	(3)
	4.1.6	<ul style="list-style-type: none"> <li>✓ Shape of / <i>vorm van g</i></li> <li>✓ Shape of / <i>vorm van f</i></li> <li>✓ Asymptotes / <i>asimptote</i></li> <li>✓ x-intercepts / <i>afsnitte</i></li> <li>✓ y-intercept / <i>afsnit</i></li> <li>✓ turning point / <i>draaipunt</i></li> </ul>		CA CA CA CA CA CA	(6)
	4.1.7	$x \neq 0$ <b>OR/OF</b> $x < 0 \cup x > 0$	✓ $x \neq 0$	CA	(1)
	4.1.8	$x \geq 3$ <b>OR/OF</b> $x \in [3; \infty)$	✓ $x \geq 3$	CA	(1)

4.2	4.2.1	$r^2 = (0)^2 + (-2)^2 = 4$ $y = -\sqrt{4-x^2}$	$\checkmark r^2 = 4$ $\checkmark$ Equation / vergelyking	<b>A</b> <b>CA</b>	(2)
	4.2.2	$y = 2^x + q$ $-2 = 2^0 + q$ $-2 = 1 + q$ $\square q = -3$	$\checkmark$ <b>SF</b> $\checkmark q = -3$	<b>A</b> <b>CA</b>	(2)
	4.2.3	$y = 2^x - 3$ $0 = 2^x - 3$ $3 = 2^x$ $x = \log_2 3$ $x = 1,58$ $A(1,58;0)$	$\checkmark$ Substitution / vervanging <b>SF</b> $\checkmark$ Logarithm Property/wet $\checkmark 1,58$	<b>A</b> <b>CA</b> <b>CA</b>	(3)
	4.2.4	$y > -3$	$\checkmark y > -3$	<b>A</b>	(1)
<b>[27]</b>					

QUESTION/VRAAG 5						
5.1	Depreciation value Verminderde waarde		$= \frac{8,8}{100} \times 800\,000 = R70\,400$	✓ R729 600	A	(1)
	Current Asset value Waarde van bate		$= R800\,000 - R70\,400 = R729\,600$			
	<b>OR / OF</b>					
	Current Asset value Waarde van bate		$= 91,2\% \times R800\,000 = R729\,600$	✓ R729 600	A	
5.2	5.2.1	Infected people / besmette mense = 9		✓ 9	A	(1)
	5.2.2	$A = P(1+i)^n$ $13 = 9(1+i)^7$ $\left(\frac{13}{9}\right)^{\frac{1}{7}} = 1+i$ $i = \left(\frac{13}{9}\right)^{\frac{1}{7}} - 1$ $i = 0,0539$ $\therefore$ Daily infection rate = 5,39% $\therefore$ Daaglikse besmettingskoers		✓ Substitution/Vervanging  ✓ $i$  ✓ 5,39%	SF  CA  CA	(3)
	5.2.3	$2P = P(1+0,0339)^n$ $2 = (1,0339)^n$ $n = \log_{1,0339} 2$ $\therefore n = 21$ days / dae		✓ Substitution/Vervanging  ✓ Log law/wet ✓ $n = 21$	A  CA	(3)

5.3	<p style="text-align: center;"> <math>P = x</math>                      <math>T_4</math>                      <math>T_{10} = R800\,000</math> </p> <p> <math display="block">\frac{i}{12} = \frac{0,065}{12}</math> <math display="block">\frac{i}{2} = \frac{0,07}{2}</math> </p> <p> <math>A_4 = P(1+i)^n</math> </p> <p> <math>A_4 = P\left(1 + \frac{i}{12}\right)^{12n}</math> </p> <p> <math>A_4 = x\left(1 + \frac{0,065}{12}\right)^{12 \times 4}</math> </p> <p> <math>A = A_4\left(1 + \frac{i}{2}\right)^{2n}</math> </p> <p> <math>800\,000 = x\left(1 + \frac{0,065}{12}\right)^{12 \times 4} \left(1 + \frac{0,07}{2}\right)^{2 \times 6}</math> </p> <p> <math display="block">x = \frac{800\,000}{\left(1 + \frac{0,065}{12}\right)^{12 \times 4} \left(1 + \frac{0,07}{2}\right)^{2 \times 6}}</math> </p> <p> <math>\therefore x = R408\,501,77</math> </p>	<p>✓ Substitute/Vervang <math>x</math>    <b>SF</b></p> <p>✓ Substitute <math>i</math> and <math>n</math> Vervang <math>i</math> en <math>n</math>    <b>SF</b></p> <p>✓ Substitution/ Vervanging    <b>SF</b></p> <p>✓ Simplification / Vereenvoudiging    <b>S</b></p> <p>✓ R 408 501,77</p>	<p><b>A</b></p> <p><b>A</b></p> <p><b>CA</b></p> <p><b>CA</b></p> <p><b>CA</b></p>	<p><b>(5)</b></p>
<b>[13]</b>				

QUESTION/VRAAG 6						
6.1	$f(x) = -\frac{1}{2}x + \pi$ $f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ $f'(x) = \lim_{h \rightarrow 0} \frac{-\frac{1}{2}(x+h) + \pi - \left(-\frac{1}{2}x + \pi\right)}{h}$ $f'(x) = \lim_{h \rightarrow 0} \frac{-\frac{1}{2}x - \frac{1}{2}h + \pi + \frac{1}{2}x - \pi}{h}$ $f'(x) = \lim_{h \rightarrow 0} \frac{-\frac{1}{2}h}{h}$ $f'(x) = \lim_{h \rightarrow 0} -\frac{1}{2}$ $\therefore f'(x) = -\frac{1}{2}$		<p>✓ Definition/<i>Definisie</i></p> <p>✓ Substitution / <i>Vervanging</i></p> <p>✓ Simplification/ <i>Vereenvoudiging</i></p> <p>✓ Simplification / <i>Vereenvoudiging</i></p> <p>✓ <math>f'(x) = -\frac{1}{2}</math></p>	<p><b>A</b></p> <p><b>A</b></p> <p><b>CA</b></p> <p><b>CA</b></p> <p><b>CA</b></p>	<p><b>SF</b></p> <p><b>S</b></p> <p><b>S</b></p>	<p><b>(5)</b></p>
6.2	6.2.1	$D_x \left( 9\pi - \frac{14}{\sqrt{x}} \right)$ $D_x \left( 9\pi - \frac{14}{x^{\frac{1}{2}}} \right)$ $D_x \left( 9\pi - 14x^{-\frac{1}{2}} \right)$ $= 0 + \frac{14}{2} x^{-\frac{1}{2}-1}$ $= 7x^{-\frac{3}{2}}$	<p>✓ Simplification/ <i>Vereenvoudiging</i></p> <p>✓ Simplification / <i>Vereenvoudiging</i></p> <p>✓ Derivative/<i>Afgeleide</i></p>	<p><b>A</b></p> <p><b>A</b></p> <p><b>CA</b></p>	<p><b>S</b></p> <p><b>S</b></p>	<p><b>(3)</b></p>

	6.2.2	$2xy + x = x^{-9}$ $y = \frac{x^{-9} - x}{2x}$ $y = \frac{x^{-10}}{2} - \frac{1}{2}$ $\frac{dy}{dx} = \frac{-10x^{-11}}{2}$ $\therefore \frac{dy}{dx} = -5x^{-11}$	$\checkmark$ y Subject/Onderwerp  $\checkmark\checkmark$ Simplification/ Vereenvoudiging S  $\checkmark -5x^{-11}$	A  CA CA CA	(4)
6.3		<p>Average gradient = <math>\frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}</math></p> <p>Gemiddelde gradiënt = <math>\frac{-3}{-2 - x_1} = 1</math></p> $-3 = -2 - x_1$ $\therefore x_1 = 1$ <p>or / of</p> <p>Average gradient = <math>\frac{-3}{x_1 + 2} = 1</math></p> $-3 = x_1 + 2$ $\therefore x_1 = -5$	$\checkmark$ Definition / definisie  $\checkmark$ Substitution/ Vervanging  $\checkmark 1$  $\checkmark -5$	A  A  CA  CA	(4)
					<b>[16]</b>

QUESTION/VRAAG 7				
7.1	$y = 2$	$\checkmark 2$	<b>A</b>	(1)
7.2	$h\left(\frac{1}{2}\right) = 2\left(\frac{1}{2}\right)^3 + \left(\frac{1}{2}\right)^2 - 5\left(\frac{1}{2}\right) + 2 = 0$ <p>Since/omdat <math>h\left(\frac{1}{2}\right) = 0</math>, then/dan <math>x = \frac{1}{2}</math> is the <math>x</math>-intercept/ is die <math>x</math>-afsnit</p>	$\checkmark h\left(\frac{1}{2}\right) = 0$ $\checkmark x = \frac{1}{2}$	<b>A</b> <b>A</b>	(2)
7.3	$\frac{1}{2} \left  \begin{array}{cccc} 2 & 1 & -5 & +2 \\ \hline 0 & 1 & 1 & -2 \\ \hline 2 & 2 & -4 & 0 \end{array} \right.$ $(2x^2 + 2x - 4)\left(x - \frac{1}{2}\right) = 0$ $(2x - 2)(x + 2)\left(x - \frac{1}{2}\right) = 0$ <p><math>x = -2</math> or / of <math>x = 1</math></p>	$\checkmark 2x^2 + 2x - 4$ $\checkmark (x + 2)(2x - 2)$ $\checkmark x = -2$ or/of $x = 1$	<b>A</b> <b>CA</b> <b>CA</b>	(3)
7.4	$h'(x) = 6x^2 + 2x - 5 = 0$ $x = \frac{-2 \pm \sqrt{4 - 4(6)(-5)}}{12}$ <p><math>x = -1,09</math> or / of <math>x = 0,76</math></p> $y = 2(-1,09)^3 + (-1,09)^2 - 5(-1,09) + 2 = 6,05$ <p>or / of</p> $y = 2(0,76)^3 + (0,76)^2 - 5(0,76) + 2 = -0,34$ <p><math>(-1,09; 6,05)</math> and/en <math>(0,76; -0,34)</math></p>	$\checkmark h'(x) = 6x^2 + 2x - 5$ $\checkmark h'(x) = 0$ $\checkmark$ Substitution/Vervanging $\checkmark$ Both $x$ values / <i>Beide <math>x</math>-waardes</i> $\checkmark$ Both $y$ -values / <i>Beide <math>y</math>-waardes</i>	<b>A</b> <b>A</b> <b>CA</b> <b>CA</b> <b>CA</b>	(5)



<p>7.5</p>		<ul style="list-style-type: none"> <li>✓ Shape/Vorm</li> <li>✓ <math>x</math>-intercepts/afsnitte</li> <li>✓ <math>y</math>- intercept/afsnit</li> <li>✓✓ Turning Points/ Draaipunte</li> </ul>	<p>A</p> <p>CA</p> <p>CA</p> <p>CA</p>	<p>(5)</p>
<p>7.6</p>	<p><math>h'(x) = 6x^2 + 2x - 5 = m_{\text{tangent/raaklyn}}</math></p> <p><math>m_{\text{tangent/raaklyn}} = -5</math></p> <p><math>y - y_1 = m(x - x_1)</math></p> <p><math>y - 2 = -5(x - 0)</math></p> <p><math>y = -5x + 2</math></p>	<ul style="list-style-type: none"> <li>✓</li> <li><math>m_{\text{tangent/raaklyn}} = 6x^2 + 2x - 5</math></li> <li>✓ <math>m_{\text{tangent/raaklyn}} = -5</math> at/by <math>x = 0</math></li> <li>✓ Substitution/Vervanging SF</li> <li>✓ <math>y = -5x + 2</math></li> </ul>	<p>A</p> <p>A</p> <p>CA</p> <p>CA</p>	<p>(4)</p>
				<p>[20]</p>

QUESTION/VRAAG 8				
8.1	$S(t) = 3 + 6t - \frac{3}{4}t^2$ <div style="border: 1px solid black; padding: 5px; display: inline-block; margin: 5px;"> <b>AO: FULL MARKS</b>  <b>AO: VOLPUNTE</b> </div> Truck Height = $S(0) = 3 + 6(0) - \frac{3}{4}(0)^2$ <i>Trok hoogte = 3m</i>	$\checkmark$ 3m	<b>A</b>	(1)
8.2	$S(t) = 3 + 6t - \frac{3}{4}t^2$ <div style="border: 1px solid black; padding: 5px; display: inline-block; margin: 5px;"> <b>AO: FULL MARKS</b>  <b>AO: VOLPUNTE</b> </div> $S(2) = 3 + 6(2) - \frac{3}{4}(2)^2$ $S(2) = 12m$	$\checkmark$ Substitution/Vervanging  $\checkmark$ 12 m	<b>A</b>  <b>CA</b>	(2)
8.3	$S(t) = 3 + 6t - \frac{3}{4}t^2$ $S'(t) = 6 - \frac{3}{2}t$ $6 - \frac{3}{2}t = 0$ $t = 4s$	$\checkmark$ $S'(t)$  $\checkmark$ $S'(t) = 0$ $\checkmark$ 4s	<b>A</b>  <b>A</b>  <b>CA</b>	(3)
8.4	Maximum Height = $S(4) = 3 + 6(4) - \frac{3}{4}(4)$ <i>Maksimum hoogte = 15m</i>  No, maximum height that can be reached is 15m. <i>Nee, die maksimum hoogte behaalbaar is 15m</i>	$\checkmark$ Substitution/Vervanging  $\checkmark$ 15 m  $\checkmark$ Conclusion/Gevolgtrekking $\checkmark$ Reason / Rede	<b>A</b>  <b>A</b>  <b>CA</b>  <b>CA</b>	
<b>OR/OF</b>				

	$3 + 6t - \frac{3}{4}t^2 = 16$ $-13 + 6t - \frac{3}{4}t^2 = 0$ $t = \frac{-6 \pm \sqrt{(6)^2 - 4\left(-\frac{3}{4}\right)(-13)}}{2\left(-\frac{3}{4}\right)}$ $t = \text{Non-real / nie-reël}$ <p>This indicates that it is not possible for the height of water ejected by the fire truck to reach 16 m, and so this truck is not suitable.  <i>Dit dui aan dat dit nie moontlik is vir water om 16 m te bereik nie en dus is die brandblussertrok nie geskik daarvoor nie.</i></p>	<p>✓ Equating to 16/  <i>Gelykgestel aan 16</i></p> <p>✓ Non-real/nie-reël</p> <p>✓ Conclusion/gevolgtrekking</p> <p>✓ Reason/rede</p>	<p><b>A</b></p> <p><b>A</b></p> <p><b>CA</b></p> <p><b>CA</b></p>	<p>(4)</p> <p><b>[11]</b></p>	
<b>QUESTION/VRAAG 9</b>					
9.1	9.1.1	$\int (y \sqrt[5]{x}) dx$ $= \int \left( y x^{\frac{1}{5}} \right) dx$ $= \frac{x^{\frac{1}{5}+1}}{\frac{1}{5}+1} y + c$ $= \frac{x^{\frac{6}{5}} y}{\frac{6}{5}} + c$ $= \frac{5x^{\frac{6}{5}} y}{6} + c$	<p>✓ Exponential form /  <i>Eksponensiële vorm S</i></p> <p>✓ <math>c</math></p> <p>✓ <math>\frac{5x^{\frac{6}{5}} y}{6}</math></p>	<p><b>A</b></p> <p><b>A</b></p> <p><b>CA</b></p>	<p>(3)</p>
	9.1.2	$\int \left( \frac{1}{x} - \frac{5}{x^2} \right) dx$ $\int \left( \frac{1}{x} - 5x^{-2} \right) dx$ $\ln x + 5x^{-1} + c$	<p>✓ Fraction/Breuk <b>S</b></p> <p>✓ <math>\ln x</math>          ✓ <math>5x^{-1} + c</math></p>	<p><b>A</b></p> <p><b>A</b>  <b>CA</b></p>	<p>(3)</p>

9.2	$\int_{-2}^0 (x^2 - 4) dx$ $= \left[ \frac{x^3}{3} - 4x + c \right]_{-2}^0$ $= 0 - \left( \frac{(-2)^3}{3} - 4(-2) \right)$ $= - \left( -\frac{8}{3} + 8 \right)$ $\therefore \text{Area} = \frac{16}{3} \approx 5,33$	✓ Area notation/ <i>notasie</i> ✓ Integral/ <i>Integraal</i> ✓ Substitution/ <i>Vervanging</i> ✓ Substitution/ <i>Vervanging</i> ✓ Simplification/ <i>Vereenvoudiging</i> ✓ Correct value of the bounded area/ <i>Korrekte waarde van          die begrensde area</i>	A A CA CA CA CA	(6)
				<b>[12]</b>
<b>TOTAL/TOTAAL:</b>				<b>150</b>