



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

**SENIOR CERTIFICATE/*SENIOR SERTIFIKAAT*
NATIONAL SENIOR CERTIFICATE/
*NASIONALE SENIOR SERTIFIKAAT***

TECHNICAL MATHEMATICS P1/*TEGNIESE WISKUNDE VI*

NOVEMBER 2020

MARKING GUIDELINES/*NASIENRIGLYNE*

MARKS/*PUNTE*: 150

MARKING CODES/<i>NASIENKODES</i>	
A	Accuracy/ <i>Akkuraatheid</i>
AO	Answer only/ <i>Slegs antwoord</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 omitting unit/ <i>Geen penalisering vir eenhede weggelaat nie</i>
S	Simplification/ <i>Vereenvoudiging</i>
F	Correct formula/ <i>Korrekte formule</i>
SF	Substitution in correct formula/ <i>Vervanging in korrekte formule</i>

**These marking guidelines consist of 26 pages./
*Hierdie nasienriglyne bestaan uit 26 bladsye.***

NOTE:

- If a candidate answers a question **TWICE**, only mark the **FIRST** attempt.
- Consistent accuracy to be applied as indicated on the marking guidelines.
- # Shows questions where a Tolerance Range will be applied are **Q3.1; Q3.3.2; Q4.1.2 & Q5.3.2**

LET WEL:

- Indien 'n kandidaat 'n vraag **TWEE** keer beantwoord, sien slegs die **EERSTE** poging na.
- Volgehoue akkuraatheid sal toegepas word soos op die nasienriglyne aangedui.
- # Toon vrae waar Toleransie Wydte (Verdraagsaamheids omvang) toegepas word is **Q3.1; Q3.3.2; Q4.1.2 & Q5.3.2**

QUESTION/VRAAG 1

1.1.1(a)	$(12 + 2x)$ OR/OF $(12 + x + x)$	✓ length/lengte	A (1)
1.1.1(b)	$(3 + 2x)$ OR/OF $(3 + x + x)$	✓ breadth/breedte	A (1)
1.1.2	Area = length × breadth/lengte × breedte $= (12 + 2x)(3 + 2x)$ $= 36 + 24x + 6x + 4x^2$ $= 4x^2 + 30x + 36$	✓✓ SF	CA (2)
1.1.3	$4x^2 + 30x + 36 = 52$ $4x^2 + 30x - 16 = 0$ OR/OF $2x^2 + 15x - 8 = 0$ $2(2x-1)(x+8) = 0$ OR/OF $x = \frac{-(15) \pm \sqrt{(15)^2 - 4(2)(-8)}}{2(2)}$ $x = \frac{1}{2}$ or/of $x \neq -8$ Outside length / buite lengte $= 12\text{ m} + 2\left(\frac{1}{2}\right)\text{ m} = 13\text{ m}$	✓ equation/vergelyking ✓ factors/formula faktore/formule ✓ both x values/beide x-waardes ✓ length/lengte	CA CA CA CA
		NPU	(4)

<p>1.2.1</p>	$\frac{3}{x} = 7x - 5$ $7x^2 - 5x - 3 = 0$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-(-5) \pm \sqrt{(-5)^2 - 4(7)(-3)}}{2(7)}$ $x = \frac{5 \pm \sqrt{109}}{14}$ <p>$x \approx 1,10$ or /of $x \approx -0,39$</p>	<p>✓ standard form/ standaardvorm A</p> <p>✓ SF CA</p> <p>✓ both values of x/beide x-waardes CA</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;">NPR</div> (3)
<p>1.2.2</p>	<p>$\therefore x \in \left\{ \text{Real numbers / Reële getalle} \right\}$</p> <p>OR/OF $x \in (-\infty ; \infty)$ OR/OF $x \in \square$</p>	<p>✓ $x \in$ Real Numbers / Reële getalle A</p> <p>(1)</p>
<p>1.3</p>	<p>$y - x = 3$ and /en $3x^2 + xy - y^2 = -3$</p> <p>$y = x + 3$</p> <p>$3x^2 + x(x + 3) - (x + 3)^2 = -3$</p> <p>$3x^2 + x^2 + 3x - (x^2 + 6x + 9) + 3 = 0$</p> <p>$3x^2 - 3x - 6 = 0$ OR/OF $x^2 - x - 2 = 0$</p> <p>$3(x - 2)(x + 1) = 0$ OR/OF $x = \frac{-(-1) \pm \sqrt{(-1)^2 - 4(1)(-2)}}{2(1)}$</p> <p>$\therefore x = 2$ or /of $x = -1$</p> <p>$y = 2 + 3 = 5$ or /of $y = -1 + 3 = 2$</p> <p style="text-align: center;">OR/OF</p> <p>$y - x = 3$ and /en $3x^2 + xy - y^2 = -3$</p> <p>$x = y - 3$</p> <p>$3(y - 3)^2 + y(y - 3) - y^2 = -3$</p> <p>$3y^2 - 18y + 27 + y^2 - 3y - y^2 + 3 = 0$</p> <p>$3y^2 - 21y + 30 = 0$ OR/OF $y^2 - 7y + 10 = 0$</p> <p>$3(y - 2)(y - 5) = 0$ OR/OF $y = \frac{-(-7) \pm \sqrt{(-7)^2 - 4(1)(10)}}{2(1)}$</p> <p>$\therefore y = 2$ or /of $y = 5$</p> <p>$x = 2 - 3 = -1$ or /of $x = 5 - 3 = 2$</p>	<p>✓ subject/onderwerp A</p> <p>✓ substitution/vervanging CA</p> <p>✓ S CA</p> <p>✓ factors/faktore or/of formula CA</p> <p>✓ both x-values/ beide x-waardes CA</p> <p>✓ both y-values/ beide y-waardes CA</p> <p>OR/OF</p> <p>✓ subject/onderwerp A</p> <p>✓ substitution/vervanging CA</p> <p>✓ S CA</p> <p>✓ factors/faktore or/of formula CA</p> <p>✓ both y-values/beide y- waardes CA</p> <p>✓ both x-values/beide x- waardes CA</p> <p>(6)</p>

<p>1.4.1</p>	$X_c = \frac{1}{2\pi f C}$ $f = \frac{1}{2\pi X_c C} \quad \text{OR/OF} \quad f = (2\pi X_c C)^{-1}$	<p>✓ making f the subject/maak f die onderwerp A (1)</p>																																
<p>1.4.2</p>	$f = \frac{1}{2\pi X_c C}$ $= \frac{1}{2\pi \times 63,66 \times 50 \times 10^{-6}} \quad \text{OR/OF} \quad (2\pi \times 63,66 \times 50 \times 10^{-6})^{-1}$ <p>≈ 50 hertz</p> <p style="text-align: center;">OR/OF</p> $X_c = \frac{1}{2\pi f C}$ $63,66 = \frac{1}{2\pi f \times 50 \times 10^{-6}}$ $f = \frac{1}{2\pi \times 63,66 \times 50 \times 10^{-6}}$ <p>≈ 50 hertz</p>	<p>✓ substitution/vervangings CA ✓ value of/waarde van f CA OR/OF ✓ substitution/vervangings CA ✓ value of/waarde van f CA NPR NPU (2)</p>																																
<p>1.5.1</p>	$110011_2 + 111101_2 = 1110000_2$ <p style="text-align: center;">OR/OF</p> $32 + 16 + 2 + 1 + 32 + 16 + 8 + 1 = 112 = 1110000_2$	<p>✓ correct sum/korrekte som A (1)</p>																																
<p>1.5.2</p>	<table border="1" style="width: 100%; text-align: center;"> <tr> <td>2^6</td> <td>2^5</td> <td>2^4</td> <td>2^3</td> <td>2^2</td> <td>2^1</td> <td>2^0</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> </table> <p>$= 64 + 32 + 16 = 112$</p> <p style="text-align: center;">OR/OF</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td>2^5</td> <td>2^4</td> <td>2^3</td> <td>2^2</td> <td>2^1</td> <td>2^0</td> </tr> <tr> <td>1</td> <td>1</td> <td>0</td> <td>0</td> <td>1</td> <td>1</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>0</td> <td>1</td> </tr> </table> <p>$51 + 61 = 112$</p>	2^6	2^5	2^4	2^3	2^2	2^1	2^0	1	1	1	0	0	0	0	2^5	2^4	2^3	2^2	2^1	2^0	1	1	0	0	1	1	1	1	1	1	0	1	<p>✓ M CA ✓ decimal/desimaal CA OR/OF ✓ M CA ✓ decimal/desimaal CA AO: Full marks/ Volpunte (2) [24]</p>
2^6	2^5	2^4	2^3	2^2	2^1	2^0																												
1	1	1	0	0	0	0																												
2^5	2^4	2^3	2^2	2^1	2^0																													
1	1	0	0	1	1																													
1	1	1	1	0	1																													

QUESTION/VRAAG 2

2.1.1	$3x^2 + 2x + 2 = 0$ $\Delta = b^2 - 4ac$ $= (2)^2 - 4 \times 3 \times 2$ $= -20$	<p>✓ substitution/<i>vervanging</i> A</p> <p>✓ value of/<i>waarde van</i> Δ CA</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 5px auto;"> <p>AO: Full marks/ Volpunte</p> </div> <p style="text-align: right;">(2)</p>
2.1.2	<p>non-real/ <i>nie-reël</i></p>	<p>✓ description/<i>beskrywing</i> CA</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 5px auto;"> <p>Accept imaginary/ aanvaar imaginêr</p> </div> <p style="text-align: right;">(1)</p>
2.2.1	$x^2 - 2px = 3p^2$ $x^2 - 2px - 3p^2 = 0$ <p style="text-align: center;">OR/OF</p> $-x^2 + 2px + 3p^2 = 0$	<p>✓ standard form/ <i>standaardvorm</i> A</p> <p style="text-align: right;">(1)</p>
2.2.2	$\Delta = (-2p)^2 - 4(1)(-3p^2)$ $\Delta = 4p^2 + 12p^2$ $= 16p^2$ <p>Δ is a perfect square \therefore roots will be rational/ <i>Δ is volkome vierkant \therefore die wortels is rasionaal</i></p>	<p>✓ subst. in discriminant/ <i>vervanging in dikriminant</i> CA</p> <p>✓ S CA</p> <p>✓ perfect square/ <i>Volkome vierkant</i> CA</p> <p style="text-align: right;">(3)</p> <p style="text-align: right;">[7]</p>

QUESTION/VRAAG 3

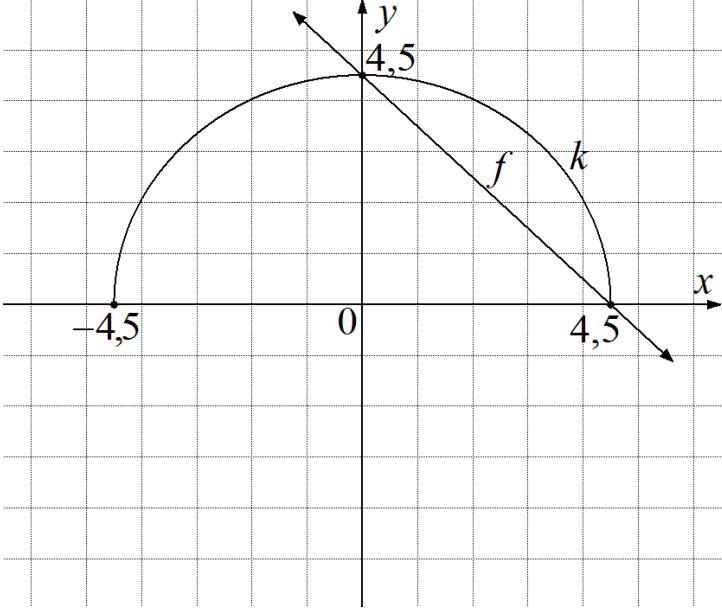
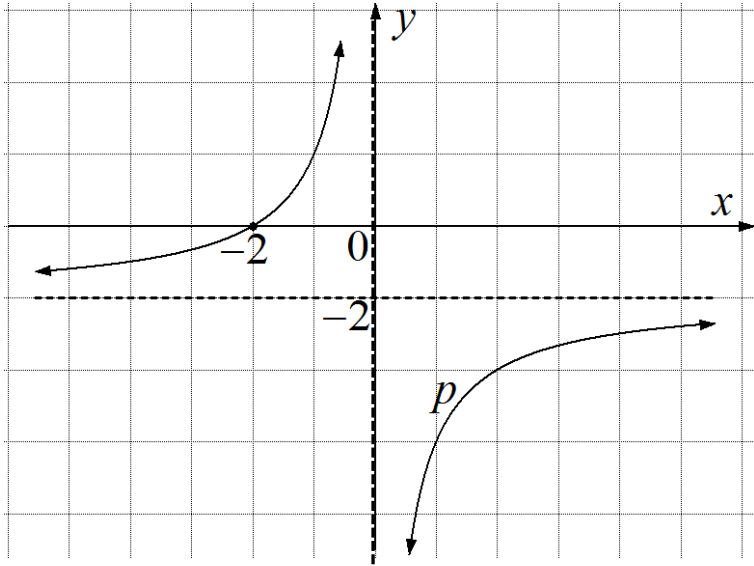
<p>3.1.1 #</p>	$\frac{\log 3 + \log 27}{\log 81 - \log 9}$ $= \frac{\log 3 + \log 3^3}{\log 3^4 - \log 3^2}$ $= \frac{\log 3 + 3 \log 3}{4 \log 3 - 2 \log 3}$ $= \frac{4 \log 3}{2 \log 3}$ $= 2$ <p style="text-align: center;">OR/OF</p> $\frac{\log 3 + \log 27}{\log 81 - \log 9}$ $= \frac{\log (3 \times 27)}{\log \left(\frac{81}{9} \right)}$ $= \frac{\log 81}{\log 9}$ $= \frac{\log 3^4}{\log 3^2} \quad \text{OR / OF} \quad \frac{\log 9^2}{\log 9} \quad \text{OR / OF} \quad \log_9 81$ $= \frac{4 \log 3}{2 \log 3} \quad \text{OR / OF} \quad \frac{2 \log 9}{\log 9} \quad \text{OR / OF} \quad \log_9 9^2 = 2 \log_9 9$ $= 2$	<p>✓ prime bases/ <i>Priem grondtalle</i> A</p> <p>✓ log property/<i>eienskap</i> CA</p> <p>✓ S CA</p> <p>✓ S CA</p> <p style="text-align: center;">OR/OF</p> <p>✓ log property/<i>eienskap</i> A</p> <p>✓ prime bases or log prop/ <i>Priemgrondtalle of log eienskap</i> CA</p> <p>✓ S CA</p> <p>✓ S CA</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>AO: 1 mark/ punt</p> </div> <p style="text-align: right;">(4)</p>
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<p>3.1.2 #</p>	$\frac{2^n \sqrt{32} + 2^n \sqrt{2}}{2^n \sqrt{50}} = \frac{2^n \sqrt{2 \times 16} + 2^n \sqrt{2}}{2^n \sqrt{2 \times 25}}$ $= \frac{2^n 4\sqrt{2} + 2^n \sqrt{2}}{2^n \cdot 5\sqrt{2}}$ $= \frac{2^n \sqrt{2}(4+1)}{2^n \cdot 5\sqrt{2}}$ $= 1$ <p style="text-align: center;">OR/OF</p> $\frac{2^n \sqrt{32} + 2^n \sqrt{2}}{2^n \sqrt{50}} = \frac{2^n \sqrt{32}}{2^n \sqrt{50}} + \frac{2^n \sqrt{2}}{2^n \sqrt{50}}$ $= \frac{4\sqrt{2}}{5\sqrt{2}} + \frac{\sqrt{2}}{5\sqrt{2}}$ $= \frac{4}{5} + \frac{1}{5}$ $= 1$ <p style="text-align: center;">OR/OF</p> $\frac{2^n \sqrt{32} + 2^n \sqrt{2}}{2^n \sqrt{50}} = \frac{2^n (2^5)^{\frac{1}{2}} + 2^n 2^{\frac{1}{2}}}{2^n (5^2 \cdot 2)^{\frac{1}{2}}}$ $= \frac{2^n 2^{\frac{5}{2}} + 2^n 2^{\frac{1}{2}}}{2^n 5 \cdot 2^{\frac{1}{2}}}$ $= \frac{2^n 2^{\frac{1}{2}} (2^2 + 1)}{2^n 5 \cdot 2^{\frac{1}{2}}}$ $= 1$ <p style="text-align: center;">OR/OF</p> $\frac{2^n \sqrt{32} + 2^n \sqrt{2}}{2^n \sqrt{50}} = \frac{2^n (\sqrt{32} + \sqrt{2})}{2^n (\sqrt{50})}$ $= \frac{4\sqrt{2} + \sqrt{2}}{5\sqrt{2}}$ $= \frac{5\sqrt{2}}{5\sqrt{2}}$ $= 1$	<p>✓ simplified surds/vereenv. wortelvorm A</p> <p>✓ S CA</p> <p>✓ common factor or like terms /gemene faktor of gelyke terme CA</p> <p>✓ S CA</p> <p style="text-align: center;">OR/OF</p> <p>✓ Separating terms/ skei terme A</p> <p>✓ S CA</p> <p>✓ S CA</p> <p>✓ S CA</p> <p style="text-align: center;">OR/OF</p> <p>✓ exponent form/eksponent vorm A</p> <p>✓ S CA</p> <p>✓ common factor/gemene faktor CA</p> <p>✓ S CA</p> <p style="text-align: center;">OR/OF</p> <p>✓ Common factor/gemene faktor A</p> <p>✓ S CA</p> <p>✓ common factor/gemene faktor CA</p> <p>✓ S CA</p> <div style="border: 1px solid black; padding: 5px; text-align: center; margin-top: 10px;"> <p>AO: 1 mark/ Punt</p> </div> <p style="text-align: right;">(4)</p>
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<p>3.2</p>	<p> $\log_x 32 + \log_x 4 - \log_x 16 = \log_5 125$ $\log_x \frac{32 \times 4}{16} = \log_5 5^3$ $\log_x 8 = 3$ $x^3 = 8 = 2^3$ $\therefore x = 2$ </p> <p style="text-align: center;">OR/OF</p> <p> $\log_x 32 + \log_x 4 - \log_x 16 = \log_5 125$ $5 \log_x 2 + 2 \log_x 2 - 4 \log_x 2 = 3 \log_5 5$ $3 \log_x 2 = 3$ $\log_x 2 = 1$ $\therefore x = 2$ </p> <p style="text-align: center;">OR/OF</p> <p> $\log_x 32 + \log_x 4 - \log_x 16 = \log_5 125$ $\log_x \frac{32 \times 4}{16} = \log_5 5^3$ $\log_x 8 = 3$ </p> <p style="text-align: center;">OR/OF $\log_x 2^3 = \log_x x^3$</p> <p> $x^3 = 2^3$ $\therefore x = 2$ </p>	<p> \checkmark log property/eienskap A \checkmark power form/magte vorm A \checkmark S CA \checkmark exp form/eksp. vorm CA \checkmark value of/waarde van x CA </p> <p style="text-align: center;">OR/OF</p> <p> \checkmark log property/eienskap A \checkmark log identity/identiteit A \checkmark S A \checkmark S CA \checkmark value of/waarde van x CA </p> <p style="text-align: center;">OR/OF</p> <p> \checkmark log property/eienskap A \checkmark power form/magte vorm A \checkmark S CA </p> <p> \checkmark exp form/eksp. vorm CA \checkmark value of/waarde van x CA </p> <p style="text-align: right;">(5)</p>
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3.3.1	$Z_T = 4 + 5i - 4 - 4i$ $= i$	✓ total impedance/totale impedansie A (1)
3.3.2 #	$z_T = i$ $r = 1$ $\tan \theta = \frac{1}{0}$ $\theta = 90^\circ \quad \text{OR/OF} \quad \theta = \frac{1}{2}\pi$ $z_T = 1(\cos 90^\circ + i \sin 90^\circ) \quad \text{OR/OF} \quad z_T = 1(\cos \frac{1}{2}\pi + i \sin \frac{1}{2}\pi)$	✓ value of modulus/ waarde van modulus CA ✓ tan ratio/verhouding CA ✓ correct angle/korrekte hoek CA ✓ z in polar vorm/polêre vorm CA <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> AO: 1 mark/punt </div> (4)
3.4	$k = 6 + 4(i - 9) + 2mi$ $k - 2mi = 6 + 4i - 36$ $k - 2mi = -30 + 4i$ $\therefore k = -30 \quad \text{and/en} \quad -2m = 4$ $\therefore k = -30 \quad \text{and/en} \quad m = -2$ <p style="text-align: center;">OR/OF</p> $k = 6 + 4(i - 9) + 2mi$ $k - 6 = 4i - 36 + 2mi$ $k = -30 + (2m + 4)i$ $\therefore k = -30 \quad \text{and/en} \quad -2m = 4$ $\therefore k = -30 \quad \text{and/en} \quad m = -2$ <p style="text-align: center;">OR/OF</p> $k = 6 + 4(i - 9) + 2mi$ $k - 6 - 2mi = 4i - 36$ $k - 6 - 2mi = -36 + 4i$ $k - 6 = -36 \quad \text{and/en} \quad -2mi = 4i$ $\therefore k = -30 \quad \text{and/en} \quad m = -2$	✓ product/produk A ✓ S CA ✓ value of/waarde van k CA ✓ value of/waarde van m CA <p style="text-align: center;">OR/OF</p> ✓ product/produk A ✓ S CA ✓ value of/waarde van k CA ✓ value of/waarde van m CA <p style="text-align: center;">OR/OF</p> ✓ product/produk A ✓ S CA ✓ value of/waarde van k CA ✓ value of/waarde van m CA (4) [22]

QUESTION/VRAAG 4

4.1.1	$radius / radius = 4,5 \text{ units} / eenhede$	✓ length of radius/lengte van radius A (1)
4.1.2 #		CA from/vanaf Q/V4.1.1 f: ✓ both intercepts/beide afsnitte CA ✓ negative straight line /negatiewe reguitlyn CA k: ✓ x-intercepts/afsnitte CA ✓ y-intercept/afsnitte CA ✓ semi-circle/ halfsirkel CA (5)
4.1.3	$x \in [-4,5; 4,5]$ OR/OF $-4,5 \leq x \leq 4,5$	✓ end points/eindpunte CA ✓ correct notation/ korrekte notasie A (2)
4.2		✓ Horizontal asymptote/horizontale asimptoot A ✓ x-intercept/afsnit A ✓ shape/vorm (both sections) A (3)

4.3.1(a)	T (0 ; 16)	✓ coordinates of/ <i>koördinate van T</i> A (1)
4.3.1(b)	P (- 4 ; 0)	✓ - 4 A ✓ 0 A (2)
4.3.2	$g(x) = a(x - x_1)(x - x_2)$ $g(x) = a(x + 4)(x - 2)$ $16 = a(0 + 4)(0 - 2)$ $\therefore a = - 2$ $g(x) = -2(x + 4)(x - 2)$ OR/OF $-\frac{b}{2a} = -1$ $-\frac{b}{2(-2)} = -1$ $\therefore g(x) = -2x^2 - 4x + 16$ $\therefore g'(x) = 2ax + b = 0$ OR/OF $2(-2)(-1) + b = 0$ $\therefore b = -4$ OR/OF subst./ <i>verv.</i> U (2 ; 0): $0 = a(2)^2 + b(2) + 16$ $4a + 2b = - 16 \dots(1)$ subst./ <i>verv.</i> S (1 ; 10): $10 = a(1)^2 + b(1) + 16$ $a + b = - 6 \Rightarrow 2a + 2b = -12 \dots(2)$ $(1) - (2): 2a = - 4$ $\therefore a = -2$ $2(-2) + 2b = -12$ $\therefore b = -4$ OR/OF	✓ substitution in intercept form/ <i>vervanging in afsnitvorm</i> CA ✓ value of/waarde van a CA ✓ substitution/ <i>vervanging</i> CA ✓ value of/waarde van b CA OR/OF ✓ substitution/ <i>vervanging</i> A ✓ substitution/ <i>vervanging</i> A ✓ value of/waarde van a CA ✓ value of/waarde van b OR/OF

	$y = a(x + p)^2 + q$ $y = a(x + 1)^2 + q$ <p>Subst./verv. (2;0) : $0 = a(2 + 1)^2 + q$ $0 = 9a + q \dots \dots \dots (1)$</p> <p>Subst./verv. (1;10) : $10 = a(1 + 1)^2 + q$ $10 = 4a + q \dots \dots \dots (2)$</p> <p>(1) – (2) $-10 = 5a$ $\therefore a = -2$</p> <p>$10 = 4a + q$ $10 = 4(-2) + q$ $\therefore q = 18$</p> $y = -2(x + 1)^2 + 18$ $= -2x^2 - 4x - 16$ $\therefore b = -4$	<p>✓ substitution/vervanging A</p> <p>✓ substitution/vervanging A</p> <p>✓ value of/waarde van a CA</p> <p>✓ value of/waarde van b</p> <p style="text-align: right;">(4)</p>
<p>4.3.3</p>	$g(x) = -2x^2 - 4x + 16$ <p>subst. / verv. $x = -1$ $g(-1) = -2(-1)^2 - 4(-1) + 16$ $y = 18$</p> <p style="text-align: center;">OR/OF</p> <p>(R(-1; 18))</p>	<p>✓ substitution/vervanging CA (Q4.3.2)</p> <p>✓ y-coordinate of/ koördinate van R CA</p> <p style="text-align: center;">OR/OF</p> <p>✓✓ y-coordinate of/ koördinate van R CA (2)</p>
<p>4.3.4</p>	$h(x) = k^x + 8$ $10 = k^1 + 8$ $\therefore k = 2$ $h(x) = 2^x + 8$	<p>✓ value of/waarde van q A</p> <p>✓ substitution/ vervanging A</p> <p>✓ value of/waarde van k A (3)</p>
<p>4.3.5</p>	<p>$y > 8$ OR/OF $y \in (8; \infty)$</p>	<p>✓ range/waarde-versameling A (1)</p>

<p>4.3.6</p>	<p>subst./ <i>verv.</i> $x = -1$ At W : $y = 2^{-1} + 8 = \frac{17}{2} = 8,5$ $VW = \frac{17}{2} - 8$ OR/OF $VW = 8,5 - 8$ $= 0,5$ units / <i>eenhede</i></p> <p style="text-align: center;">OR/OF</p> <p>At W : $y = 2^{-1} + 8 = \frac{17}{2} = 8,5$ $VW = \sqrt{(1-1)^2 + (8,5-8)^2}$ $= \sqrt{0,25}$ $= 0,5$ units/<i>eenhede</i></p> <p style="text-align: center;">OR/OF</p> <p>$h(x) = 2^x + 8$ eq. of the asympt./ <i>verg. van asimpt.</i> $y = 8$ $VW = 2^x + 8 - 8 = 2^x$ $x = -1$ $\therefore VW = 2^{-1} = 0,5$ units/<i>eenhede</i></p>	<p>✓ value of/<i>waarde van y</i> at/by W A</p> <p>✓ M CA</p> <p>✓ length of/<i>lengte van</i> VW CA</p> <p>OR/OF</p> <p>✓ value of/<i>waarde van y</i> at/by W A</p> <p>✓ M CA</p> <p>✓ length of/<i>lengte van</i> VW CA</p> <p>OR/OF</p> <p>✓ value of/<i>waarde van y</i> at/by W A</p> <p>✓ M CA</p> <p>✓ length of/<i>lengte van</i> VW CA</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>AO: Full marks/ Volpunte</p> </div> <p style="text-align: right;">(3) [27]</p>
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QUESTION/VRAAG 5

<p>5.1.1</p>	<p>90% of / van R 250 000 = R 225 000</p> <p style="text-align: center;">OR/OF</p> <p>10 % of / van R 250 000 = R 25 000</p> <p>Loan value/leningswaarde: R 250 000 – R25 000 = R 225 000</p>	<p>✓ Loan value/waarde van lening A</p> <p style="text-align: center;">OR/OF</p> <p>✓ Loan value/waarde van lening A (1)</p>				
<p>5.1.2</p>	$i_{eff} = \left(1 + \frac{i_{nom.}}{m} \right)^m - 1$ $i_{eff} = \left(1 + \frac{6,3\%}{12} \right)^{12} - 1$ <p>$\therefore i_{eff} \approx 6,5\%$</p> <p style="text-align: center;">OR/OF</p> <p>$A = P(1 + i)^n$ Let/ Laat $P = R100$</p> $A = 100 \left(1 + \frac{6,3\%}{12} \right)^{12}$ <p>= R 106, 49 interest / rente = R106,49 – R100 = 6,49 $\therefore i \approx 6,49 \approx 6,5$</p>	<p>✓ F A</p> <p>✓ SF A</p> <p>✓ value of i_{eff} greater than. / waarde van i_{eff} groter as 6,3% CA</p> <p style="text-align: center;">OR/OF</p> <p>✓ F A</p> <p>✓ SF A</p> <p>✓ value of i_{eff} greater than. / waarde van i_{eff} groter as 6,3% CA</p> <table border="1" style="width: 100%; margin-top: 10px;"> <tr> <td colspan="2" style="text-align: center;">AO: Full marks /Volpunte</td> </tr> <tr> <td style="width: 20%; text-align: center;">NPR</td> <td></td> </tr> </table> <p style="text-align: right;">(3)</p>	AO: Full marks /Volpunte		NPR	
AO: Full marks /Volpunte						
NPR						

<p>5.2</p>	$A = P(1 - i)^n$ $60 = P(1 - 5,43\%)^4$ $\frac{60}{(1 - 5,43\%)^4} = P$ <p>$\therefore P \approx 75,01$</p> <p>$\therefore$ There were 75 unskilled workers during April 2019 <i>Daar was 75 ongeskoolde werkers gedurende April 2019</i></p> <div style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;"> <p>Incorrect formula: one mark for value of n/ <i>verkeerde formule: een punt vir die waarde van n</i></p> </div>	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">\checkmarkF</td> <td style="width: 50%;">A</td> </tr> <tr> <td>\checkmark $n = 4$</td> <td>A</td> </tr> <tr> <td>\checkmarkSF</td> <td>A</td> </tr> <tr> <td colspan="2" style="padding-top: 20px;">\checkmark Number of unskilled Workers/ <i>aantal ongeskoolde werkers</i></td> </tr> <tr> <td colspan="2" style="text-align: right;">CA</td> </tr> <tr> <td colspan="2" style="text-align: center; border: 1px solid black; padding: 5px; margin: 10px auto;"> Accept/ aanvaar 76 </td> </tr> <tr> <td colspan="2" style="text-align: center; border: 1px solid black; padding: 5px; margin: 10px auto;"> NPR </td> </tr> <tr> <td colspan="2" style="text-align: right; vertical-align: bottom;">(4)</td> </tr> </table>	\checkmark F	A	\checkmark $n = 4$	A	\checkmark SF	A	\checkmark Number of unskilled Workers/ <i>aantal ongeskoolde werkers</i>		CA		Accept/ aanvaar 76		NPR		(4)	
\checkmark F	A																	
\checkmark $n = 4$	A																	
\checkmark SF	A																	
\checkmark Number of unskilled Workers/ <i>aantal ongeskoolde werkers</i>																		
CA																		
Accept/ aanvaar 76																		
NPR																		
(4)																		
<p>5.3.1</p>	<p>Value of the investment at the end of the first 2 years <i>/waarde van belegging einde van eerste 2 jare :</i></p> $A = P(1 + i)^n$ $= R 85 000 \left(1 + \frac{5,4\%}{2} \right)^{2 \times 2}$ $\approx R 94 558,53$	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">\checkmarkSF</td> <td style="width: 50%;">A</td> </tr> <tr> <td>\checkmark R 94558,53</td> <td>CA</td> </tr> <tr> <td colspan="2" style="text-align: center; border: 1px solid black; padding: 5px; margin: 10px auto;"> NPR </td> </tr> <tr> <td colspan="2" style="text-align: center; border: 1px solid black; padding: 5px; margin: 10px auto;"> Incorrect formula: no marks / verkeerde formule: geen punte </td> </tr> <tr> <td colspan="2" style="text-align: right; vertical-align: bottom;">(2)</td> </tr> </table>	\checkmark SF	A	\checkmark R 94558,53	CA	NPR		Incorrect formula: no marks / verkeerde formule: geen punte		(2)							
\checkmark SF	A																	
\checkmark R 94558,53	CA																	
NPR																		
Incorrect formula: no marks / verkeerde formule: geen punte																		
(2)																		

<p>5.3.2 #</p>	<p>Value of the investment after change in interest rate for 2 years/ waarde van belegging na rentekoersverandering vir 2 jaar:</p> $A = R94558,53 \left(1 + \frac{6\%}{12}\right)^{2 \times 12}$ $\approx R106582,57$ <p>Value of the investment after withdrawing/waarde van belegging na onttrekking:</p> $P = R106582,57 - R20\,000 = R86582,57$ <p>YES it will be more./JA dit sal meer wees.</p> <p style="text-align: center;">OR/OF</p> $A = R94558,53 \left(1 + \frac{6\%}{12}\right)^{4 \times 12} - 20\,000 \left(1 + \frac{6\%}{12}\right)^{2 \times 12}$ $\approx R\,97\,592,39$ <p>YES, it will be more./JA dit sal meer wees.</p> <p style="text-align: center;">OR/OF</p> $A = \left[R94558,53 \left(1 + \frac{6\%}{12}\right)^{2 \times 12} - 20\,000 \right] \times \left(1 + \frac{6\%}{12}\right)^{2 \times 12}$ $\approx R\,97\,592,39$ <p>YES, it will be more./JA dit sal meer wees.</p>	<p>CA from/vanaf Q/V 5.3.1</p> <p>✓✓SF CA</p> <p>✓ R106582,57 CA</p> <p>✓M subtracting/ aftrek 20000 A</p> <p>✓ difFerence/ Verskil CA CA</p> <p>✓ conclusion/ gevolgtrekking CA</p> <p style="text-align: center;">OR/OF</p> <p>✓M A</p> <p>✓SF CA</p> <p>✓ $\left(1 + \frac{6\%}{12}\right)^{4 \times 12}$ A</p> <p>✓ $\left(1 + \frac{6\%}{12}\right)^{2 \times 12}$ A</p> <p>✓ value of/ waarde van A_{final} CA</p> <p>✓ conclusion/ gevolgtrekking CA</p> <p style="text-align: center;">OR/OF</p> <p>✓M A</p> <p>✓SF CA</p> <p>✓✓ value of/waarde van i and n A</p> <p>✓ value of/waarde van A_{final} CA</p> <p>✓ conclusion/ gevolgtrekking CA</p> <div style="border: 1px solid black; display: inline-block; padding: 2px;">NPR</div> (6) [16]
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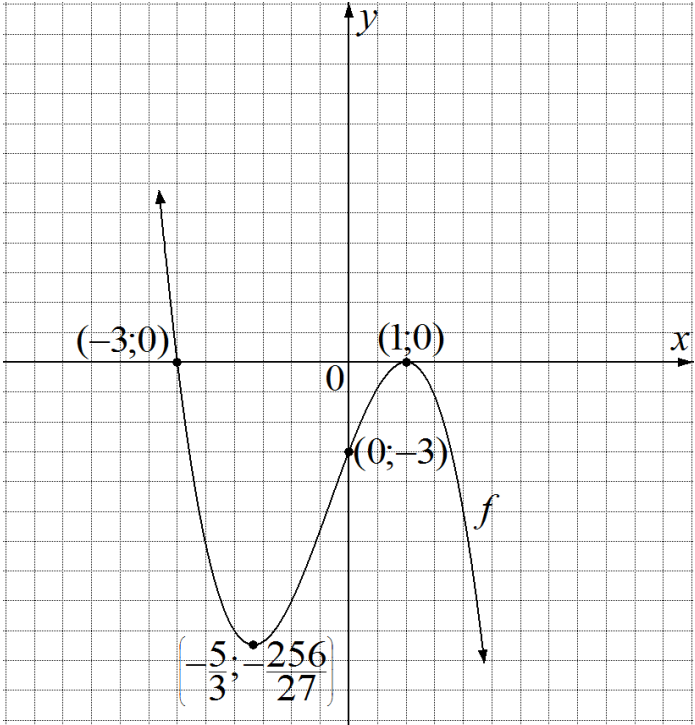
QUESTION/VRAAG 6

<p>6.1</p>	$f(x) = \frac{1}{2}x$ $f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ $= \lim_{h \rightarrow 0} \frac{\left(\frac{1}{2}(x+h)\right) - \left(\frac{1}{2}x\right)}{h}$ $= \lim_{h \rightarrow 0} \frac{\frac{1}{2}x + \frac{1}{2}h - \frac{1}{2}x}{h} \quad \text{OR/OF} \quad = \lim_{h \rightarrow 0} \frac{\frac{x}{2} + \frac{h}{2} - \frac{x}{2}}{h}$ $= \lim_{h \rightarrow 0} \frac{\frac{1}{2}h}{h} \quad \text{OR/OF} \quad = \lim_{h \rightarrow 0} \frac{\frac{1}{2}}{1}$ $\therefore f'(x) = \lim_{h \rightarrow 0} \frac{1}{2} = \frac{1}{2}$	<p>✓ definition/definisie A</p> <p>✓ SF A</p> <p>✓ S CA</p> <p>$\frac{1}{2}$ CA</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>Penalty of 1 mark if incorrect notation used/ 1 punt penaliseering vir verkeerde notasie</p> </div> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>AO: 0 marks/ punte (4)</p> </div>
<p>6.2.1</p>	$\frac{dA}{dr} = 2\pi r$	<p>✓ derivative/afgeleide A</p> <p>(1)</p>
<p>6.2.2</p>	$D_x \left[(x - \sqrt{x})^2 \right]$ $= D_x \left[\left(x - x^{\frac{1}{2}} \right) \left(x - x^{\frac{1}{2}} \right) \right]$ $= D_x \left[x^2 - 2x^{\frac{3}{2}} + x \right]$ $= 2x - 3x^{\frac{1}{2}} + 1$	<p>✓ exponent vorm/ eksp vorm A</p> <p>✓ S CA</p> <p>✓ 2x CA</p> <p>✓ $-3x^{\frac{1}{2}}$ CA</p> <p>✓ 1 CA</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>No Penalty for incorrect notation used/ geen penaliseering vir verkeerde notasie</p> </div> <p>(5)</p>

<p>6.3</p> <p>$g(x) = ax^2 - x$ sub(-1;-1)</p> <p>$-1 = a(-1)^2 - (-1)$</p> <p>$-1 = a + 1$</p> <p>$a = -2$</p> <p style="text-align: center;">OR/OF</p> <p>$3x - y + 2 = 0$</p> <p>$y = 3x + 2$</p> <p>$\therefore m_{\text{tan/raakl.}} = 3$</p> <p>$g(x) = ax^2 - x$</p> <p>$g'(x) = 2ax - 1$</p> <p>$2a(-1) - 1 = 3$</p> <p>$-2a = 3 + 1$</p> <p>$a = -2$</p> <p style="text-align: center;">OR/OF</p> <p>$ax^2 - x = 3x + 2$</p> <p>$ax^2 - 4x - 2 = 0$</p> <p>$b^2 - 4ac = 0$ (equal roots) tangent touches)</p> <p>$(-4)^2 - 4(a)(-2) = 0$</p> <p>$16 + 8a = 0$</p> <p>$a = -2$</p>	<p>✓✓ subst/ verv A</p> <p>✓ S CA</p> <p>✓✓ value of/ waarde van A CA</p> <p style="text-align: center;">OR/OF</p> <p>✓ gradient of tan./grad van A rklyn</p> <p>✓ derivative/afgeleide A</p> <p>✓ $g'(x) = 3$ CA</p> <p>✓ substitution/vervanging CA</p> <p>✓ value of/ waarde van a CA</p> <p style="text-align: center;">OR/OF</p> <p>✓ equating/ vergelyk A</p> <p>✓ std form/ vorm A</p> <p>✓ equal roots/ gelyke CA wortels</p> <p>✓ S CA</p> <p>✓ value of/ waarde van a CA</p> <p style="text-align: right;">(5)</p> <p style="text-align: right;">[15]</p>
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QUESTION/VRAAG 7

<p>7.1</p>	<p>$y = f(0) = -(0 - 1)^2(0 + 3) = -3$</p> <p style="text-align: center;">OR/OF</p> <p>$(0 ; -3)$</p>	<p>✓ y-intercept / Afsnit A</p> <p style="text-align: right;">(1)</p>
<p>7.2</p>	<p>$f(x) = -(x - 1)^2(x + 3)$ $x = 1$ or/of $x = -3$</p> <p style="text-align: center;">OR/OF</p> <p>$(1 ; 0)$ or/of $(-3 ; 0)$</p>	<p>✓ $x = 1$ A ✓ $x = -3$ A</p> <p style="text-align: right;">(2)</p>
<p>7.3</p>	<p>$f(x) = -x^3 - x^2 + 5x - 3$ $f'(x) = -3x^2 - 2x + 5$ $-3x^2 - 2x + 5 = 0$ $3x^2 + 2x - 5 = 0$</p> <p>$(3x + 5)(x - 1) = 0$ OR/OF $x = \frac{-(2) \pm \sqrt{(2)^2 - 4(3)(-5)}}{2(3)}$</p> <p>$x = -\frac{5}{3}$ or/of $x = 1$</p> <p>$y = -\frac{256}{27} \approx -9,5$ or / of $y = 0$</p> <p style="text-align: center;">OR/OF</p>	<p>✓ derivative/afgeleide A ✓ $f'(x) = 0$ A</p> <p>✓ factors/formula faktore/formule CA ✓ both values of/beide waardes van x CA</p> <p>✓ both values of y/ beide y-warrdes CA</p> <p>If derivative is first degree then Max 2 marks/ Indien afgeleide eerste order dan Mak. 2 punte</p> <p style="text-align: right;">(5)</p>

<p>7.4</p>		<p>✓ cubic shape/vorm A</p> <p>✓ y-intercepts/afsnitte CA from/vanaf QV7.1</p> <p>✓ both/albei x-intercepts/afsnitte CA from/vanaf QV7.2</p> <p>✓ both turning points/ draaipunte CA from/vanaf QV7.3</p> <p>(4)</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Using calculator to generate table, maximum 3 marks/ gebruik van 'n sakrekenaar om 'n tabel te genereer: maksimum 3 punte</p> </div>
<p>7.5</p>	<p>$-\frac{5}{3} < x < 1$ OR/OF $x \in \left(-\frac{5}{3}; 1\right)$</p>	<p>CA from/vanaf Q/V7.4</p> <p>✓ both end points/beide eindpunte CA</p> <p>✓ notation/notasie A</p> <p>(2)</p> <p>[14]</p>

QUESTION/VRAAG 8

8.1.1	$D(10) = -0,5(10)^2 + 20(10)$ $= 150 \text{ m}$	✓ distance/afstand A <div style="border: 1px solid black; padding: 2px; display: inline-block;">NPU</div> (1)
8.1.2	velocity = $D'(t) = -t + 20$ $D'(12) = -(12) + 20$ $= 8 \text{ m/s}$	✓ derivative/afgeleide A ✓ substitution in derivative/ Vervangingin afgeleide CA ✓ velocity/snelheid CA <div style="border: 1px solid black; padding: 2px; display: inline-block;">NPU</div> (3)
8.2.1(a)	TSA/TBO. = $(4x)(3x) + (5x)(y) + (4x)(y) + (3x)(y)$ $= 12x^2 + 5xy + 4xy + 3xy$ $3600 = 12x^2 + 12xy$ $300 = x^2 + xy$ $xy = 300 - x^2$ $\therefore y = \frac{300 - x^2}{x}$ <p style="text-align: center;">OR/OF</p> $TSA/TBO = (3x + 4x + 5x)y + 2\left(\frac{1}{2} \cdot 3x \cdot 4x\right)$ $12xy + 12x^2 = 3600$ $300 = x^2 + xy$ OR/OF $xy = 300 - x^2$ $\therefore y = \frac{300 - x^2}{x}$	✓ area/oppervlakte A ✓ equat. area to/stel oppervl gelyk 3 600 A ✓S CA <p style="text-align: center;">OR/OF</p> ✓ area/oppervlakte A ✓ equat. area to 3 600/stel oppervl gelyk A ✓S CA (3)
8.2.1(b)	$V = \frac{1}{2}(3x)(4x)\left(\frac{300 - x^2}{x}\right)$ $= 6x(300 - x^2)$ $= 1800x - 6x^3$	✓SF CA ✓S CA (2)
8.2.2	$V = 1800x - 6x^3$ $\frac{dV}{dx} = 1800 - 18x^2$ $1800 - 18x^2 = 0$ OR/OF $18(100 - x^2) = 0$ $x^2 = 100$ $\therefore x = 10$	✓ derivative/afgeleide CA ✓ equating derivative to 0/gelykstel van afgeleide aan 0 A ✓ value of/waarde van x CA (3) [12]

QUESTION/VRAAG 9

Penalize for constant C in either Q 9.1.1 or Q 9.1.2 / Penaliseer vir konstante C in of V9.1.1 of V9.1.2		
9.1.1	$\int 2^x dx$ $= \frac{2^x}{\ln 2} + C$	$\checkmark \frac{2^x}{\ln 2}$ $\checkmark C$ <p style="text-align: right;">A A (2)</p>
9.1.2	$\int \left(\sqrt{x} + \frac{7}{x} + 4x^{-5} \right) dx$ $= \int \left(x^{\frac{1}{2}} + \frac{7}{x} + 4x^{-5} \right) dx$ $= \frac{2}{3} x^{\frac{3}{2}} + 7 \ln x - x^{-4} + C$ <p style="text-align: center;">OR/OF</p> $= \frac{2}{3} x^{\frac{3}{2}} + 7 \ln x - \frac{1}{x^4} + C$ <p style="text-align: center;">OR/OF</p> $= \frac{x^{\frac{3}{2}}}{\frac{3}{2}} + 7 \ln x - \frac{1}{x^4} + C$	$\checkmark \text{power vorm/magte vorm}$ <p style="text-align: right;">A</p> $\checkmark \frac{2}{3} x^{\frac{3}{2}} \quad \text{OR/OF} \quad \frac{x^{\frac{3}{2}}}{\frac{3}{2}}$ <p style="text-align: right;">CA</p> $\checkmark 7 \ln x$ <p style="text-align: right;">A</p> $\checkmark -x^{-4}$ <p style="text-align: right;">OR / OF $-\frac{1}{x^4} \dots$ A</p> <p style="text-align: right;">(4)</p>

<p>9.2</p>	<p>Area above the x-axis/ <i>oppervlakte bo die x-as</i> :</p> $= \int_{-3}^2 (-x^2 - x + 6) dx$ $= \left[-\frac{x^3}{3} - \frac{x^2}{2} + 6x \right]_{-3}^2$ $= \left(-\frac{(2)^3}{3} - \frac{(2)^2}{2} + 6(2) \right) - \left(-\frac{(-3)^3}{3} - \frac{(-3)^2}{2} + 6(-3) \right)$ $= \frac{125}{6} \text{ square units/vk.eenhede}$ <p>Unshaded area / <i>ongearseerde oppvlk</i> = $\frac{125}{6} - \frac{34}{3}$</p> $= \frac{19}{2} \text{ square units /}$ <p style="text-align: center;"><i>vk.eenhede</i></p> <p>\therefore the unshaded area is LESS than the shaded area/<i>Die ongearseerde oppvlk is MINDER as die gearseerde oppervlakte.</i></p> <p style="text-align: center;">OR/OF</p>	<p>✓ area notation using integrals/<i>oppervl notasie deur integrale</i> A</p> <p>✓ integration/<i>integrasie</i> A</p> <p>✓✓ subst./<i>verv.</i> CA</p> <p>✓S CA</p> <p>✓M unshaded area/<i>ongearseerde oppvlk</i> CA</p> <p>✓ conclusion/<i>gevolgtrknng</i> CA</p> <p>OR/OF</p>
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<p>Unshaded area above the x - axis/<i>ongearseerde oppvlk bo die x - as :</i></p>	
$= \left[\int_{-3}^{-1} (-x^2 - x + 6) dx \right] + \left[\int_1^2 (-x^2 - x + 6) dx \right]$	<p>✓ area notation using Integrals/<i>oppervl notasie deur integrale</i> A</p>
<p>Unshaded area/<i>ongearseerde oppvlk 1:</i></p>	
$= \left[-\frac{x^3}{3} - \frac{x^2}{2} + 6x \right]_{-3}^{-1}$	<p>✓ integration/<i>integrasie</i> A</p>
$= \left[\left(-\frac{(-1)^3}{3} - \frac{(-1)^2}{2} + 6(-1) \right) - \left(-\frac{(-3)^3}{3} - \frac{(-3)^2}{2} + 6(-3) \right) \right]$	<p>✓ subst./<i>verv.</i> CA</p>
$= \frac{22}{3} \text{ square units/vk.eenhede}$	
<p>Unshaded area/<i>ongearseerde oppvlk 2:</i></p>	<p>\</p>
$= \left[-\frac{x^3}{3} - \frac{x^2}{2} + 6x \right]_1^2$	
$= \left[\left(-\frac{(2)^3}{3} - \frac{(2)^2}{2} + 6(2) \right) - \left(-\frac{(1)^3}{3} - \frac{(1)^2}{2} + 6(1) \right) \right]$	<p>✓ subst./<i>verv</i> CA</p>
$= \frac{13}{6} \text{ square units/vk.eenhede}$	<p>✓ S CA</p>
<p>∴ Total unshaded area = $\frac{22}{3} + \frac{13}{6} = \frac{19}{2}$ square units</p>	<p>✓ M unshaded area/<i>ongearseerde opperv</i> CA</p>
<p>∴ The unshaded area is LESS than the shaded area/ <i>Die ongearseerde oppervlakte is MINDER as die gearseerde oppervlakte.</i></p>	<p>✓ conclusion/<i>gevolgtrkng</i> CA</p>
	<div style="border: 1px solid black; padding: 5px; width: fit-content;"> <p>AO (conclusion gevolgtrekking): 1 mark/ punt</p> </div>
	<p>(7) [13]</p>

TOTAL/TOTAAL: 150

ADDENDUM

TECHNICAL MATHEMATICS/ TEGNIESE WISKUNDE Paper 1/ Vraestel 1 November 2020

FINAL MARKING GUIDELINES (ADDITIONAL NOTES) FINALE NASIEN RIGLYNE (ADDISIONELE NOTAS)

ITEM	DESCRIPTION/ VERKLARING
1.1.2	Factors must have a variable x and product should lead to a quadratic equation. <i>Faktore moet 'n onbekende x en die produk moet lei na 'n kwadratiese vergelyking</i>
1.1.3	If $4x^2 + 30x - 16 = 0$ is used and leading to negative x -values with not valid conclusion, maximum 2 marks <i>Indien $4x^2 + 30x - 16 = 0$ gebruik word en lei na negatiewe x-waardes met nie geldige gevolgtrekking, maksimum 2 punte</i>
1.2.1	Linear equation, no marks / <i>liniêre vergelyking: geen punt</i>
1.3	If simplification leads to linear equation, maximum 3 marks <i>Indien vereenvoudiging lei na 'n liniêre vergelyking; maksimum 3 punte</i>
1.5.1	If base 2 is omitted, no penalty / <i>indien grondtal 2 uitgelaat is; geen penalisering</i>
2.2.1	Order of terms not necessary/ <i>orde van terme nie belangrik</i>
2.2.2.	<ul style="list-style-type: none"> If p is omitted, accept $\Delta = 16$, maximum 2 marks/ <i>indien p uitgelaat is aanvaar $\Delta = 16$ maksimum 2 punte</i> If Δ is irrational based on CA from Q2.2.1, maximum 3 marks/ <i>Indien Δ irrasionaal is gebaseer op CA vanaf Q2.2.1, maksimum 3 punte</i>
3.3.2 #	<ul style="list-style-type: none"> $\tan \theta = \frac{1}{0}$ can be implied/ <i>kan geïmpliseer word</i> If 1 is omitted, no penalty/ <i>indien 1 uitgelaat is, geen penalisering</i> Accept/ <i>aanvaar $Z_T = 1 \text{ cis } 90^\circ$</i>

ITEM	DESCRIPTION/ VERKLARING	
5.2	<ul style="list-style-type: none"> • If: Year 1: $60 \div (1 - 5,3\%) = 63,45$ Year 2: $63,45 \div (1 - 5,3\%) = 67,09$ Year 3: $67,09 \div (1 - 5,3\%) = 70,94$ Year 4: $70,94 \div (1 - 5,3\%) = 75,01$ \therefore 75 workers/werkers 	<ul style="list-style-type: none"> ✓ F ✓ SF ✓ $n = 4$ ✓ Number of skilled workers/ <i>aantal geskoolde werkers</i> Maximum 4 marks/ maksimum 4 punte
	<ul style="list-style-type: none"> • Simple interest used , maximum 3 marks/<i>Enkelvoudige rente; maksimum 3 punte</i> • Depreciation Compound used,maximum 4 marks/ <i>Waardevermindering gebruik dan maksimum 4 punte</i> 	
7.3	If derivative is first degree,maximum 2 marks/ <i>Indien afgeleide 'n eerstegraadsvergelyking is maksimum 2 punte</i>	
7.4	<ul style="list-style-type: none"> • If point by point plotted and Turning Point not shown maximum 3 marks/ <i>indien punt-vir-punt geplot en draaipunt nie getoon maksimum 3 punte</i> • If 2 Turning points are correctly plotted, award a mark./ <i>As twee draaipunte korrek geplot is, gee 'n punt</i> 	