Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE
NASIONALE SENIOR SERTIFIKAAT

GRADE/*GRAAD* 11

NOVEMBER 2019

TECHNICAL MATHEMATICS P1 / *TEGNIESE WISKUNDE V1*

MARKING GUIDELINE/*NASIENRIGLYN*

MARKS/ *PUNTE*: **150**

Marking Codes / *Nasienkodes*	
A	Accuracy / *Akkuraatheid*
CA	Consistent Accuracy / *Volgehoue akkuraatheid*
M	Method / *Metode*
R	Rounding / *Afronding*
NPR	No Penalty for Rounding / *Geen penalisering vir afronding*
NPU	No Penalty for Units omitted / *Geen penalisering vir eenhede weggelaat*
S	Simplification / *Vereenvoudiging*
SF	Substitution in the correct Formula / *Vervanging in die korrekte formule*
AO	Answer Only / *Slegs antwoord*

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

QUESTION/*VRAAG* 1					
1.1					
	1.1.1	$\frac{12^{x+1}}{6^x.2^{x+1}}$			
		$=\frac{\left(2^2.3\right)^{x+1}}{\left(2.3\right)^x.2^{x+1}}$	✓ Method, bases as prime factors *Metode, basis as priemfaktore*	**A**	
		$=\frac{2^{2(x+1)}.3^{x+1}}{2^x.3^x.2^{x+1}}$			
		$=\frac{2^{2x+2}.3^{x+1}}{2^x.3^x.2^{x+1}}$			
		$=2^{2x+2-(x)-(x+1)}.3^{x+1-(x)}$	✓ Exponential property / *eksponensiële eienskap*	**CA**	
		$=2^1.3^1$			
		$=6$	✓ Simplification / *Vereenvoudiging*	**CA**	
		OR/*OF*	**OR/*OF***		
		$\frac{12^{x+1}}{6^x.2^{x+1}}$			
		$=\frac{\left(6.2\right)^{x+1}}{6^x.2^{x+1}}$	✓ Method / *metode*	**A**	
		$=\frac{6^{x+1}.2^{x+1}}{6^x.2^{x+1}}$	✓ Exponential property / *eksponensiële eienskap*	**CA**	
		$=\frac{6^x.6}{6^x}$			
		$=6$	✓ Simplification / *Vereenvoudiging*	**CA**	(3)

	1.1.2	$\frac{5^{n+1}+6.5^{n-1}}{5^{n+1}+5^n}$ $=\frac{5^n.5+6.5^n.5^{-1}}{5^n.5+5^n}$ $=\frac{5^n\left(5+6.5^{-1}\right)}{5^n\left(5+1\right)}$ $=\frac{5+\frac{6}{5}}{6}$ $=\frac{\frac{31}{5}}{6}$ $=\frac{31}{30}$	✓ Exponential property / *eksponensiële eienskap* ✓ Factorise / *Faktoriseer* ✓ Simplification / *Vereenvoudiging* ✓ $\frac{31}{30}$	**A** **CA** **S** **CA**	(4)
	1.1.3	$\frac{\sqrt{75}-\sqrt{12}}{\sqrt{48}}$ $=\frac{\sqrt{5^2.3}-\sqrt{2^2.3}}{\sqrt{2^4.3}}$ $=\frac{5\sqrt{3}-2\sqrt{3}}{4\sqrt{3}}$ $=\frac{3\sqrt{3}}{4\sqrt{3}}$ $=\frac{3}{4}$	✓ Method / *metode* ✓ Simplification / *Vereenvoudiging* ✓ $\frac{3}{4}$	**A** **CA** **CA**	

	1.1.3	**OR/*OF***	**OR/*OF***		
		$\frac{\sqrt{75}-\sqrt{12}}{\sqrt{48}}$			
		$=\frac{\sqrt{5^2.3}-\sqrt{2^2.3}}{\sqrt{2^4.3}}$	✓ Method / *metode*	**A**	
		$=\frac{5\sqrt{3}-2\sqrt{3}}{4\sqrt{3}}$			
		$=\frac{\sqrt{3}(5-2)}{4\sqrt{3}}$	✓ Factors / *faktore*	**CA**	
		$=\frac{3}{4}$	✓ $\frac{3}{4}$	**CA**	(3)
	1.1.4	$\left(2-\frac{\sqrt{7}}{2}\right)^{\frac{1}{2}}.\left(2+\frac{\sqrt{7}}{2}\right)^{\frac{1}{2}}$			
		$=\left[\left(2-\frac{\sqrt{7}}{2}\right).\left(2+\frac{\sqrt{7}}{2}\right)\right]^{\frac{1}{2}}$	✓ Exponential property / *eksponensiële eienskap*	**A**	
		$=\left[2^2-\left(\frac{\sqrt{7}}{2}\right)^2\right]^{\frac{1}{2}}$	✓ Simplification / *Vereenvoudiging*	**CA**	
		$=\left(4-\frac{7}{4}\right)^{\frac{1}{2}}$			
		$=\left(\frac{16-7}{4}\right)^{\frac{1}{2}}$	✓ Simplification / *Vereenvoudiging*	**CA**	
		$=\left(\frac{9}{4}\right)^{\frac{1}{2}}$			
		$=\left(\frac{3^2}{2^2}\right)^{\frac{1}{2}}$	✓ Simplification / *Vereenvoudiging*	**CA**	
		$=\frac{3}{2}$	✓ $\frac{3}{2}$	**CA**	(5)

	1.1.5	$\log_4 64 - 4\left(\log_4 2 - \log_7 1\right)$ $= \log_4\left(4^3\right) - 4\log_4 2 + 4(0)$ $= 3\log_4 4 - \log_4 16$ $= 3 - 2\log_4 4$ $= 1$	✓ $\log_7 1 = 0$ ✓ Log property /*eienskap* ✓ Log property/ *eienskap* ✓ Simplification/ *Vereenvoudiging* ✓ 1	**A** **CA** **CA** **CA** **CA**	(5)
1.2	$\log_9\left(\frac{1}{9}\right) + \log 100 = 1$ $\text{LHS} = \log_9 1 - \log_9 9 + \log(10)^2$ $\text{LHS} = 0 - 1 + 2$ $\text{LHS} = 1 = \text{RHS}$ **OR/*OF*** $\log_9\left(\frac{1}{9}\right) + \log 100 = 1$ $\text{LHS} = \log_9\left(9^{-1}\right) + \log(10)^2$ $\text{LHS} = -\log_9 9 + 2\log 10$ $\text{LHS} = -1 + 2$ $\text{LHS} = 1 = \text{RHS}$	✓ Method /*metode* ✓ Log property /*eienskap* ✓ Simplification / *vereenvoudiging* **OR/*OF*** ✓ Method /*metode* ✓ Log property / *eienskap* ✓ Simplification / *vereenvoudiging*	**A** **A** **A** **A** **A** **A**	(3)

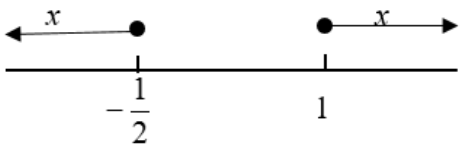
1.3	<table><tr><th>DIVISOR/ *DELER*</th><th>DIVIDEND / *DEELTAL*</th><th>REMAINDER *RES*</th></tr><tr><td>2</td><td>53</td><td></td></tr><tr><td>2</td><td>26</td><td>1</td></tr><tr><td>2</td><td>13</td><td>0</td></tr><tr><td>2</td><td>6</td><td>1</td></tr><tr><td>2</td><td>3</td><td>0</td></tr><tr><td>2</td><td>1</td><td>1</td></tr><tr><td></td><td>0</td><td>1</td></tr></table> $53 = 110101_2$ **-1 FOR NO BASE 2** ***-1 VIR GEEN BASIS 2*** **OR/*OF*** $53 = 32+16+4+1$ $53 = 110101_2$ **-1 FOR NO BASE 2** ***-1 VIR GEEN BASIS 2***	✓ Method /*metode* ✓ 110101_2 **OR / *OF*** ✓ Method /*metode* ✓ 110101_2	**A** **A** **A** **A**	(2)
1.4	$11011_2 \times 111_2$ 11011_2 11011_2 11011_2 10111101_2	✓ 11011_2 ✓ 11011_2 ✓ 11011_2 ✓ 10111101_2	**A** **A** **A** **CA**	(4)
1.5	$\frac{(4,8\times10^3)(3^2\times10^{-2})}{2,4\times10^4}$ $=18\times10^{-3}$	✓ 18 ✓ 10^{-3}	**A** **A**	(2)
				[31]

QUESTION/*VRAAG* 2					
2.1	2.1.1	$\frac{6}{(x)^{\frac{2}{3}}} = 54$ $\frac{6}{54} = (x)^{\frac{2}{3}}$ $\frac{1}{9} = (x)^{\frac{2}{3}}$ $x^{\frac{2}{3}} = 3^{-2}$ $x = \left(3^{-2}\right)^{\frac{3}{2}}$ $x = 3^{-3} = \frac{1}{27}$	✓ Method /*metode* ✓ Exponential law / *eksponensiële wet* ✓ Simplification / *vereenvoudiging*	**A** **CA** **CA**	(3)
		OR/*OF*	**OR/*OF***		
		$\frac{6}{(x)^{\frac{2}{3}}} = 54$ $6(x)^{-\frac{2}{3}} = 54$ $(x)^{-\frac{2}{3}} = 9$ $(x)^{-\frac{2}{3}} = 3^2$ $x = \left(3^2\right)^{-\frac{3}{2}}$ $x = 3^{-3} = \frac{1}{27}$	✓ Method / *metode* ✓ Simplification / *vereenvoudiging* ✓ Simplification / *vereenvoudiging*	**A** **CA** **CA**	

	2.1.2	$\frac{4^{2x+1}-16^{x-1}}{63}=\frac{1}{4}$ $4\left(4^{2x+1}-16^{x-1}\right)=63$ $4\left(4^{2x+1}-(4)^{2x-2}\right)=63$ $4^{2x+2}-(4)^{2x-1}=63$ $4^{2x}\left(4^2-4^{-1}\right)=63$ $4^{2x}\left(\frac{63}{4}\right)=63$ $4^{2x}=4$ $2x=1$ $x=\frac{1}{2}$	✓ Method / *metode* ✓ Exponential law / *eksponensiële wet* ✓ Factors / *faktore* ✓ Simplification / *vereenvoudiging* ✓ $x=\frac{1}{2}$	**A** **S** **CA** **CA** **CA**	
		OR / *OF*	**OR/*OF***		
		$\frac{4^{2x+1}-16^{x-1}}{63}=\frac{1}{4}$ $\frac{4^{2x+1}-(4)^{2x-2}}{63}=\frac{1}{4}$ $4^{2x+1}-(4)^{2x-2}=\frac{63}{4}$ $4^{2x}\left(4-4^{-2}\right)=\frac{63}{4}$ $4^{2x}\left(4-\frac{1}{4^2}\right)=\frac{63}{4}$ $4^{2x}\left(\frac{63}{16}\right)=\frac{63}{4}$ $4^{2x}=4$ $2x=1$ $x=\frac{1}{2}$	✓ Method / *metode* ✓ Exponential law / *eksponensiële wet* ✓ Factors / *faktore* ✓ Simplification / *vereenvoudiging* ✓ $x=\frac{1}{2}$	**A** **S** **CA** **S** **CA**	(5)

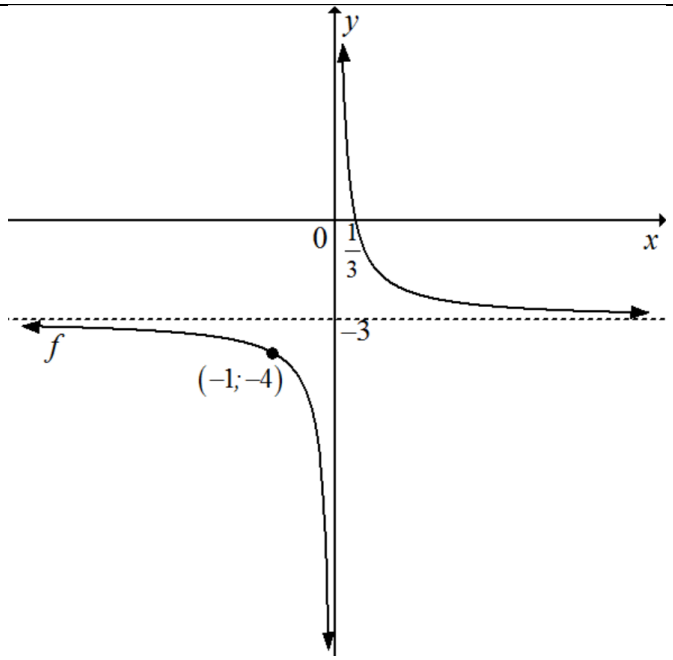
	2.1.3	$7 = x - \sqrt{x+5}$ $\sqrt{x+5} = x - 7$ $\left(\sqrt{x+5}\right)^2 = (x-7)^2$ $x + 5 = x^2 - 14x + 49$ $x^2 - 15x + 44 = 0$ $(x-11)(x-4) = 0$ $x = 11$ or $x \neq 4$	✓ Rearrangement / *herrangskik* ✓ Squaring both sides / *Kwadreer beide kante* ✓ Standard form / *standaardvorm* ✓ Factorisation/ Substitution *Faktorisering / vervanging* ✓ $x = 11$ or $x \neq 4$	**A** **CA** **S** **CA** **CA**	(5)
	2.1.4	$\log_8(x-8) + \log_8(x+2) = \log_8 11$ $\log_8(x-8)(x+2) = \log_8 11$ $(x-8)(x+2) = 11$ $x^2 - 6x - 27 = 0$ $(x-9)(x+3) = 0$ $x = 9$ or $x \neq -3$	✓ Log law/*wet* ✓ Log law/*wet* ✓ Standard form /*standaardvorm* ✓ Factors / *faktore* ✓ $x = 9$ or $x \neq -3$	**A** **A** **S** **CA** **CA**	(5)

	2.1.5	$\log x = \dfrac{\log_5\left(\frac{1}{5}\right) - \log_2 4}{\log 2 + \log 5}$ $\log x = \dfrac{\log_5 5^{-1} - \log_2 (2)^2}{\log 2 + \log 5}$ $\log x = \dfrac{-\log_5 5 - 2\log_2 2}{\log 10}$ $\log x = \dfrac{-1-2}{1}$ $\log x = -3$ $x = 10^{-3} = \dfrac{1}{1000}$	✓Method / *metode* ✓ Power rule / *magreël* ✓ Log law / *wet* ✓ Simplification / *vereenvoudiging* ✓ $x = 10^{-3}$ **accept /*aanvaar*** $x = \dfrac{1}{1000}$	**A** **A** **CA** **S** **CA**	
		OR /*OF* $\log x = \dfrac{\log_5\left(\frac{1}{5}\right) - \log_2 4}{\log 2 + \log 5}$ $\log x = \dfrac{\log_5 1 - \log_5 5 - \log_2 (2)^2}{\log 10}$ $\log x = \dfrac{0-1-2}{\log 10}$ $\log x = -3$ $x = 10^{-3} = \dfrac{1}{1000}$	**OR/*OF*** ✓Method / *metode* ✓ Power rule /*magreël* ✓ Log law /*wet* ✓ Log law /*wet* ✓ $x = 10^{-3}$ **accept** $x = \dfrac{1}{1000}$	**A** **A** **CA** **CA** **CA**	(5)
2.2	2.2.1	$F = \dfrac{T}{r.sin\theta}$	✓ Accurate /*akkuraat*	**A**	(1)
	2.2.2	$F = \dfrac{T}{r.sin\theta}$ $F = \dfrac{4}{2sin(57^\circ)}$ $F = 2,38$	✓ Substitution /*vervanging* **SF** ✓ $F = 2,38$	**CA** **CA**	(2)
					[26]

QUESTION / *VRAAG* 3					
3.1	3.1.1	$(4x+1)(x+1)=0$ $x=-\frac{1}{4}$ or $x=-1$	✓ $x=-\frac{1}{4}$ ✓ $x=-1$	**A** **A**	(2)
	3.1.2	$x^2-7x-1=0$ $x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$ $x=\frac{-(-7)\pm\sqrt{(-7)^2-4(1)(-1)}}{2(1)}$ $=\frac{7\pm\sqrt{53}}{2}$ $x=7{,}14$ or $x=-0{,}14$	✓ SF ✓S ✓ $x=7{,}14$ ✓ $x=-0{,}14$	**A** **CA** **CA** **R**	(4)
	3.1.3	$2x^2-1\geq x$ $2x^2-x-1\geq 0$ $(2x+1)(x-1)\geq 0$ Critical Values / *Kritiese waardes*: $-\frac{1}{2}$ and / *en* 1 $x\leq -\frac{1}{2}$ or / *of* $x\geq 1$  	✓Standard Form /*standaardvorm* ✓Factors / *faktore* ✓ Both critical values / *Beide kritiese waardes* ✓ Correct Notation / *Korrekte notasie* ✓ Number line /*getallelyn*	**A** **CA** **CA** **CA** **CA**	(5)

3.2	$x - y = 1$ ……(1) $2x^2 + 3y + 3 = 0$ ……..(2) $x = y + 1$……..(3) $2(y+1)^2 + 3y + 3 = 0$ $2y^2 + 4y + 2 + 3y + 3 = 0$ $2y^2 + 7y + 5 = 0$ $(2y+5)(y+1) = 0$ $y = -1$ or / *of* $y = -\frac{5}{2}$ $x = 0$ or / *of* $x = -\frac{3}{2}$	✓ Equation /*vergelyking* (3) ✓ Substitution / *vervanging* ✓ Standard form / *standaardvorm* ✓ Factorization / *faktorisering* ✓ $y = -1$ ✓ $y = -\frac{5}{2}$ ✓ $x = 0$ or / *of* $x = -\frac{3}{2}$	**A** **CA** **CA** **CA** **CA** **CA** **CA**	(7)
3.3	15 cm = 0,15 m and 5 cm = 0,05 m Area of the brick $= l_{brick} \times w_{brick}$ *Oppervlakte van baksteen* = 0,15 ×0,05 m^2 = 0,0075 m^2 Area of the wall = $l_{wall} \times w_{wall}$ *Oppervlakte van muur* = 10 ×4 m^2 = 40 m^2 $\text{Number of bricks} = \frac{\text{Side Area of wall}}{\text{Side Area of brick}}$ $= \frac{sy\ area\ van\ muur}{sy\ area\ van\ baksteen}$ $Aantal\ \ bakstene = \frac{40}{0.0075} = 5333\,\text{Bricks / } bakstene$	✓Same unit conversion / *dieselfde eenheid herleiding* ✓ Area formula / *formule* ✓ 0,0075m^2 ✓ 40m^2 ✓ $\frac{40}{0,0075}$ ✓ 5333 Bricks / *bakstene*	**A** **A** **CA** **CA** **SF CA** **CA**	(6)
				[24]

QUESTION / *VRAAG* 4				
4.1	$b^2-4ac=(-1)^2-4(4)(3)$ $b^2-4ac=-47$	✓ SF ✓ -47	**A** **CA**	(2)
4.2	Roots are non-real / imaginary *Wortels is nie-reëel / imaginêr*	✓ Non-real/Imaginary *Nie-reëel / imaginêr*	**CA**	(1)
4.3	$b^2-4ac=(-1)^2-4(4)(c)=0$ $c=\frac{1}{16}$	✓ SF ✓ $b^2-4ac=0$ ✓ Value of c / *Waarde van c*	**A** **A** **CA** only if value of ***c*** is **valid** *Slegs as waarde van c* ***geldig*** *is*	(3)
				[6]

QUESTION / *VRAAG* 5				
5.1	$y=-3$ $x=0$	✓$y=-3$ ✓$x=0$	**A** **A**	(2)
5.2	$0=\frac{1}{x}-3$ $x=\frac{1}{3}$	✓ $f(x)=0$ ✓ $x=\frac{1}{3}$	**A** **CA**	(2)
5.3	$f(x)=\frac{1}{x}-3$ $-\frac{7}{2}=\frac{1}{-2}-3$ $-\frac{7}{2}=-\frac{7}{2}$ *LHS = RHS*, $\therefore\left(-2;-\frac{7}{2}\right)$ lies on the graph/*lê op die grafiek*	✓SF ✓ S ✓ Conclusion / *gevolgtrekking*	**A** **CA** **CA**	(3)
5.4		✓Shape / *vorm* ✓Asymptote /*asimptote* ✓*x*-intercept/*afsnit*	**A** **CA** **CA**	(3)

5.5	Range/*waardeversameling*: $y \neq -3$ **OR/*OF*** $y \in$ R but/*maar* $y \neq -3$ **OR /*OF*** $y < -3 \cup y > -3$ **OR/ *OF*** $-\infty < y < -3 \cup -3 < y < \infty$	✓ $y \neq -3$	**A**	(1)
5.6	$0 < x \leq \frac{1}{3}$ **OR /*OF*** $x \in \left(0; \frac{1}{3}\right]$	✓0 ✓$\frac{1}{3}$ ✓Correct notation / *korrekte notasie*	**A** **A** **A**	(3)
5.7	$g(x) = -\frac{1}{x} - 3$	✓$-\frac{1}{x}$ ✓-3	**A** **A**	(2)
				[16]

QUESTION / *VRAAG* 6				
6.1	$x = \frac{-3+1}{2}$ $x = -1$	✓ M ✓ $x = -1$	**A** **A**	(2)
6.2	Area of $\Delta AOC = \frac{1}{2}(AO \times OC)$ $6 = \frac{1}{2}(3 \times OC)$ $OC = 4$ $C(0;4)$	✓ Area formula/*formule* ✓ SF ✓ y-intercept/*afsnit* = 4	**A** **A** **CA**	(3)
6.3	$ax^2 + bx + 4 = 0 \ldots\ldots\ldots\ldots (1)$ $a + b + 4 = 0 \ldots\ldots\ldots\ldots (2)$ $9a - 3b + 4 = 0 \ldots\ldots\ldots\ldots (3)$ $3 \times (2) + (3) : 12a + 16 = 0$ $\therefore a = \frac{-4}{3}$ $b = \frac{4}{3} - 4$ $b = \frac{-8}{3}$ **OR / *OF*** $y = a(x+3)(x-1)$ $4 = a(0+3)(0-1)$ $\therefore a = \frac{-4}{3}$ Then / *dan*, $y = \frac{-4}{3}(x+3)(x-1)$ $y = \frac{-4}{3}x^2 - \frac{8}{3}x + 4$ $\therefore b = -\frac{8}{3}$ and / *en* $c = 4$	✓ $c = 4$ ✓ Equation/*vergelyking* (2) ✓ Equation/*vergelyking* (3) ✓ $a = \frac{-4}{3}$ ✓ $b = -\frac{8}{3}$ **OR / *OF*** ✓ $y = a(x+3)(x-1)$ ✓ Substitute/*vervang* (0;4) ✓ $a = -\frac{4}{3}$ ✓ $b = -\frac{8}{3}$ ✓ $c = 4$	**A** **A** **A** **CA** **CA** **A** **A** **CA** **CA** **CA**	(5)

6.4	$y=-\frac{4}{3}x^2-\frac{8}{3}x+4$ $y=-\frac{4}{3}(-1)^2-\frac{8}{3}(-1)+4$ $y=\frac{16}{3}$	✓ Substitution/ *vervanging* ✓ $y=\frac{16}{3}$	**CA** **CA**	(2)
6.5	$m_{AC}=\frac{4-0}{0-(-3)}$ $m_{AC}=\frac{4}{3}$ $y=\frac{4}{3}x+4$	✓ SF ✓ $m_{AC}=\frac{4}{3}$ ✓ Equation / *vergelyking*	**A** **CA** **CA**	(3)
6.6	$h(x)=\frac{4}{3}x^2+\frac{8}{3}x-4+2$ $h(x)=\frac{4}{3}x^2+\frac{8}{3}x-2$ $y-$intercept / *afsnit* $=-2$	✓ $-f(x)$ ✓+2 ✓ $y-$intercept / *afsnit* $=-2$	**A** **A** **CA**	(3)
				[18]

QUESTION /*VRAAG* 7				
7.1	$k=1$	✓ $k=1$	**A**	(1)
7.2	B (0;2)	✓ 0 ✓ 1	**A** **CA**	(2)
7.3	$2=\sqrt{r^2-0^2}$ $4=r^2$ $g(x)=\sqrt{4-x^2}$	✓ SF ✓ $g(x)=\sqrt{4-x^2}$	**CA from/ *vanaf* Q7.2** **CA**	(2)
7.4	$x\in[-2;2]$ **OR / *OF*** $-2\le x\le 2$	✓ -2 ✓2 ✓ Correct notation / *Korrekte notasie*	**CA** **From / *vanaf*Q7.3** **A**	(3)
7.5	Av/*gemid*.gradient $=\frac{y_B-y_A}{x_B-x_A}$ $0,44=\frac{2-y_A}{0-(-1,466)}$ $(0,44\times 1,466)-2=-y_A$ $1,35=y_A$	✓Formula/*formule* ✓ SF ✓ $y_A=1,35$	**A** **A** **CA**	(3)
				[11]

QUESTION / *VRAAG* 8					
8.1	8.1.1	Deposit amount = 0,15 × R3 500 *Depositobedrag* = R525	✓ R525	**A**	(1)
	8.1.2	Balance on hire purchase = R3 500 – R525 *Balans op huurkoop* = R2 975 $A = P(1+in)$ $A = 2\,975(1+0{,}08\times 2)$ $A = R3\,451$ Total paid / *Totaal betaal* = R3 451 + R525 = R3 975	✓ Difference / *verskil* ✓ SF ✓R3 451 ✓ Total amount paid / *Totaal betaal*	**CA** **CA** **CA** **CA**	(4)
8.2	$i_{eff} = \left(1+\frac{i}{m}\right)^m - 1$ $0{,}075 = \left(1+\frac{i}{4}\right)^4 - 1$ $i = 4\left[(1{,}075)^{0{,}25} - 1\right]$ $i \approx 0{,}073$ ∴ Nominal interest rate / *rentekoers* ≈ 7,3%	✓ Formula / *formule* ✓ SF ✓*i*, subject/*onderwerp* ✓ $i_{nom} \approx 7{,}3\%$	**A** **A** **CA** **CA**	(4)
8.3	8.3.1	220 kPa	✓ 220 kPa	**A**	(1)
	8.3.2	$A = P(1-i)^n$ $= 220(1-0{,}045)^{15}$ $\approx 110{,}27\,\text{kPa}$	✓Formula / *formule* ✓ SF ✓S	**A** **A** **CA**	(3)
8.4	$A_5 = P(1+i)^n$ $= 18\,000\left(1+\frac{8{,}5}{1200}\right)^{60} + 15\,595\left(1+\frac{8{,}5}{1200}\right)^{24}$ $\approx 27\,491{,}41076 \quad + \quad 18\,473{,}75535$ ≈ R 45 965,17	✓*i* and *n*=60 ✓ *i* and *n*=24 ✓SF 18 000 ✓SF 15 595 ✓ S	**A** **A** **A** **A** **CA**	(5)
					[18]
				TOTAL/*TOTAAL*:	**150**