education

Department:
Education
North West Provincial Government
REPUBLIC OF SOUTH AFRICA

PROVINCIAL ASSESSMENT/
PROVINSIALE ASSESSERING

GRADE/GRAAD 11

TECHNICAL MATHEMATICS P1/*TEGNIESE WISKUNDE V1*

NOVEMBER 2024

MARKING GUIDELINES/*NASIENRIGLYNE*

MARKS: 150

CODE/*KODE*	EXPLANATION/*VERDUIDELIKING*
A	Accuracy/*Akkuraatheid*
AO	Answer only/*Slegs antwoord*
CA	Consistent Accuracy/*Volgehoue akkuraatheid*
I	Identity/*Identiteit*
M	Method/*Metode*
NPR	No penalty for rounding/*Geen penalisering vir afronding*
NPU	No penalty for units/*Geen penalisering vir eenhede*
R	Rounding/*Afronding*
RE	Reason/*Rede*
S	Simplification/*Vereenvoudiging*
F	Formula/*Formule*
SF	Substitution in correct formula/*Vervanging in korrekte formule*
ST/RE	Statement with reason/*Stelling met rede*
NPU	No penalty for units/*Geen penalisering vir eenhede*

These marking guidelines consist of 11 pages.

Hierdie nasienriglyne bestaan uit 11 bladsye.

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QUESTION 1/*VRAAG 1*

1.1			
1.1.1	$= (3^{-4})^{\frac{1}{4}}$ $= 3^{-4\times\frac{1}{4}}$ $= 3^{-1} = \frac{1}{3}$ OR/*OF* $\left(\frac{1}{81}\right)^{\frac{1}{4}}$ $= \sqrt[4]{\frac{1}{81}}$ $= \frac{1}{\sqrt[4]{3^4}}$ $= \frac{1}{3}$	✓ 3^{-4} ✓answer/*antwoord*	**A** **A** **(2)**
1.1.2	$= \frac{4\sqrt{3}-2\sqrt{3}}{5\sqrt{3}}$ $= \frac{(4-2)\sqrt{3}}{5\sqrt{3}}$ $= \frac{2}{5}$	✓ $\frac{4\sqrt{3}-2\sqrt{3}}{5\sqrt{3}}$ ✓common factor/*gemeenskaplike faktor* ✓answer/*antwoord*	**A** **CA** **(3)**
1.1.3	$= \frac{(3^2)^{x-1}.3^{5x}}{(3^4)^{x-1}.(3^3)^x}$ $= \frac{3^{2x-2}.3^{5x}}{3^{4x-4}.3^{3x}}$ $= \frac{3^{2x-2+5x}}{3^{4x-4+3x}}$ $= \frac{3^{7x-2}}{3^{7x-4}}$ $= 3^{7x-2-7x+4}$ $= 3^2 = 9$	✓prime bases/*priem basisse* ✓ exponents properties/*eksponensiële eienskappe* ✓**S** ✓exponents properties/*eksponensiële eienskappe* ✓ answer/*antwoord*	**A** **CA** **CA** **CA** **(5)**

1.1.4	$=\frac{3^n.3+4.3^n.3^{-1}}{3^n.3+3^n}$ $=\frac{3^n(3+4.3^{-1})}{3^n(3+1)}$ $=\frac{3+\frac{4}{3}}{4}$ $=\frac{13}{12}$	✓**M** ✓common factor/*gemene faktor* ✓**S** ✓answer/*antwoord*	**A** **A** **A** **CA** **(4)**
1.1.5	$=\frac{\log 4}{3\log 4^3}$ $=\frac{\log 4}{3\times 3\log 4}$ $=\frac{1}{9}$	✓4^3 ✓3×3 ✓answer/*antwoord*	**A** **A** **CA** **(3)**
1.1.6	$=\log_2 2^3+\log_x x^2-\log 10^3$ $=3\log_2 2+2\log_x x-3\log 10$ $=3(1)+2(1)-3(1)$ $=2$	✓ 2^3 ✓10^3 ✓$2\log_x x$ ✓S ✓answer/*antwoord*	**A** **A** **A** **CA** **(5)**

1.2	$=\frac{\log_x 2^6+\log_x 2^2-\log_x 2^3}{\log_x 2^9}$ $=\frac{6\log_x 2+2\log_x 2-3\log_x 2}{9\log_x 2}$ OR/*OF* $=\frac{(6+2-3)\log_x 2}{9\log_x 2}$ $=\frac{5}{9}$ $\frac{\log_x 64+\log_x 4-\log_x 8}{\log_x 512}$ $=\frac{\log_x \frac{64\times 4}{8}}{\log_x 2^9}$ $=\frac{\log_x 32}{9\log_x 2}$ $=\frac{\log_x 2^5}{9\log_x 2}$ $=\frac{5\log_x 2}{9\log_x 2}$ $=\frac{5}{9}$	✓**M** ✓logarithm properties/ *logaritmiese eienskappe* ✓common factor/ *gemene faktor* ✓answer/*antwoord*	**A** **A** **CA** **CA** **(4)**
1.3	$=\frac{(x-2)(x+2)}{(x-2)}$ $=x+2$ $=999999999+2$ $=1000000001$	✓**M** ✓**SF** ✓answer/*antwoord*	**A** **A** **CA** **(3)**
			[29]

QUESTION 2/*VRAAG 2*

2.1			
2.1.1	$5^x + 5^x.5 = 30$ $5^x(1+5) = 30$ $5^x.6 = 30$ $5^x = 5$ $x = 1$	✓exponents property/ *eksponensiële eienskappe* ✓common factor/ *gemene faktor* ✓**S** ✓answer/*antwoord*	**A** **A** **CA** **(4)**
2.1.2	$x\log 3 = \log 5$ $x = \frac{\log 5}{\log 3}$ $x = 1.46$	✓ $x\log 3 = \log 5$ ✓ $x = \frac{\log 5}{\log 3}$ ✓answer/*antwoord*	**A** **A** **A** **(3)**
2.1.3	$x^{\frac{3}{2}\times\frac{2}{3}} = (5^3)^{\frac{2}{3}}$ $x = 5^2 = 25$	✓M ✓5^3 ✓answer/*antwoord*	**A** **A** **CA** **(3)**
2.1.4	$\sqrt{x+2} = x$ $\left(\sqrt{x+2}\right)^2 = (x)^2$ $x+2 = x^2$ $x^2 - x - 2 = 0$ $(x+1)(x-2) = 0$ $x = -1$ *or* $x = 2$	✓squaring both side/*kwadreer beide kante* (M) ✓standard form/*standaard vorm* ✓factors/*faktore* ✓ both values */beide waardes*	**A** **A** **CA** **CA** **(4)**
2.1.5	$\log_2(x(x-3)) = 2$ $\log_2(x^2 - 3x) = 2$ $2^2 = x^2 - 3x$ $0 = x^2 - 3x - 4$ $0 = (x-4)(x+1)$ $\therefore x = 4$ $x \neq -1$	✓logarithm property/ *logaritmiese eienskap* ✓exponential form/*eksponensiële vorm* ✓standard form/*standaardvorm* ✓factors/*faktore* ✓both values/*beide waardes*	**A** **A** **A** **CA** **CA** **(5)**

2.2			
2.2.1	$\frac{A}{P}=(1+i)^n$ $\log\left(\frac{A}{P}\right)=n\log(1+i)$ $\frac{\log\left(\frac{A}{P}\right)}{\log(1+i)}=n$	✓ $\frac{A}{P}$ ✓ $\log(\frac{A}{P})=n\log(1+i)$ ✓answer/*antwoord*	**A** **A** **A** **(3)**
2.2.2	$n=\frac{\log\left(\frac{15000}{8400}\right)}{\log(1+0.075)}$ $n=8 years$	✓ $\frac{15000}{8400}$ ✓1 + 0,075 ✓answer/*antwoord*	**CA** **CA** **CA** **(3)**
2.2.3	$\log 6=\log(2\times3)$ $=\log 2+\log 3$ $=x+y$	✓ $\log(2\times3)$ ✓ $\log 2+\log 3$ ✓ $x+y$	**A** **A** **A** **(3)**
			[28]

QUESTION 3/*VRAAG 3*

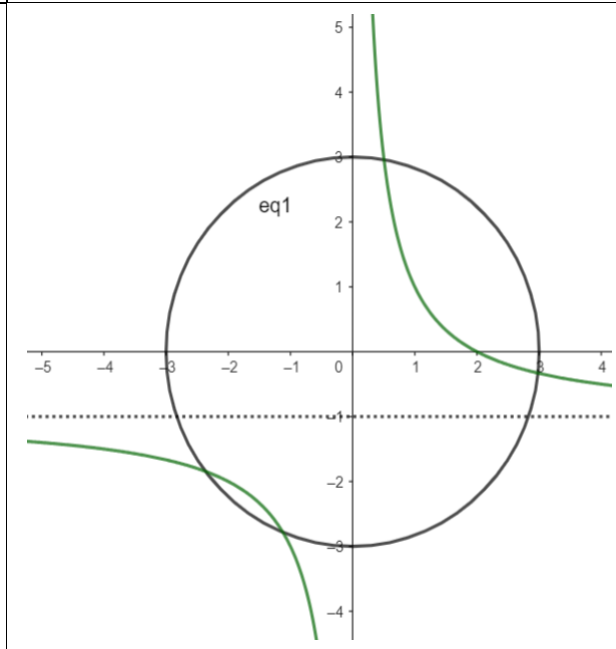
3.1			
3.1.1	$x=-2$ or/*of* $x=3$	✓✓ both values/*beide waardes*	**A** **(2)**
3.1.2	$x^2-5x+4=0$ $(x-4)(x-1)=0$ $x=4$ or/*of* $x=1$	✓standard form/*standaardvorm* ✓factors /*faktore* ✓both values/*beide waardes*	**A** **A** **CA** **(3)**
3.1.3	$x^2-3x-3=0$ $x=\frac{-(-3)\pm\sqrt{(-3)^2-4(1)(-3)}}{2(1)}$ $x=\frac{3\pm\sqrt{21}}{2}$ $x=3.79$ or/*of* $x=-0.79$	✓simplify/*vereenvoudig* ✓standard form/*standaardvorm* ✓substitution /*vervanging* ✓ $x=3.79$ ✓ $x=-0.79$	**A** **CA** **CA** **CA** **CA** **(5)**
3.1.4	$2x^2-5x-12\le0$ $(2x+3)(x-4)\le0$ C.V $2x+3=0$ or $x-4=0$ $x=-\frac{3}{2}$ or $x=4$ $-\frac{3}{2}\le x\le4$	✓changing the inequality/*verander die ongelykheid* ✓factors/*faktore* ✓both critical values/*beide kritieke waardes* Solution/*oplossing* ✓end points/*eindpunte* ✓notation/*notasie*	**A** **CA** **CA** **CA** **(5)**

3.1.5	$3(x-1)=(x-1)(x+1)$ $3x-3=x^2-1$ $0=x^2-3x+2$ $0=(x-2)(x-1)$ $x=2$ or/*of* $x=1$	✓**M** ✓**S** ✓standard form/*standaardvorm* ✓factors/*faktore* ✓both values/*beide waardes*	**A** **A** **CA** **CA** **CA** **(5)**
3.2	$y=3+x$ $x^2+(3+x)=-1-4x$ $x^2+3+x=-1-4x$ $x^2+5x+4=0$ $(x+4)(x+1)=0$ $x=-4$ or/*of* $x=-1$ $y=3+(-4)=-1$ or/*of* $y=3+(-1)=2$	✓ subject of the formula/ *onderwerp van die formule* ✓substitution/*vervanging* ✓standard form/*standaardvorm* ✓factors/*faktore* ✓ both x values/*beide x waardes* ✓both y values/*beide y waardes*	**A** **A** **CA** **CA** **CA** **CA** **(6)**
3.3	Let x be first odd number/*Laat x die eerste onewe getal wees* $x+(x+2)+(x+4)=45$ $x+x+2+x+4=45$ $3x+6=45$ $3x=39$ $x=\frac{39}{3}$ $x=13$	✓ $x+(x+2)+(x+4)=45$ (M) ✓ $3x+6=45$ ✓answer/*antwoord*	**A** **A** **A** **(3)**
			[29]

QUESTION 4/*VRAAG 4*

4.1	$\Delta=b^2-4ac$ $\Delta=(-3)^2-4(2)(5)$ $\Delta=9-40$ $\Delta=-31$	✓**F** ✓**SF** ✓answer/*antwoord*	**A** **CA** **CA** **(3)**
4.2	Non-real root/Geen reële wortels	✓answer /*antwoord*	**A** **(1)**
4.3	$\Delta=b^2-4ac$ $0=(-1)^2-4(4)(p)$ $0=1-16p$ $16p=1$ $p=\frac{1}{16}$	✓substituting 0 /*vervang met 0* ✓**S** ✓answer/*antwoord*	**A** **CA** **CA** **(3)**
			[7]

QUESTION 5/*VRAAG 5*

5.1	$x = 0$ and/*en* $y = -1$	✓ $x = 0$ ✓ $y = -1$	**A** **A** **(2)**
5.2	Let/*Laat* $y = 0$ $0 = \frac{2}{x} - 1$ $1 = \frac{2}{x}$ $x = 2$	✓ $y = 0$ ✓**S** ✓answer/*antwoord*	**A** **A** **A** **(3)**
5.3	$r = 3$	✓answer/*antwoord*	**A** **(1)**
5.4		Hyperbola/*hiperbool* ✓shape/*vorm* ✓asymptote/*asimptote* ✓ x intercept/*afsnit* Circle/*sirkel* ✓shape/*vorm* ✓intercepts/*afsnitte*	 **A** **A** **CA** **A** **CA** **(5)**
5.5 (a)	$y = x - 1$	✓answer/*antwoord*	**A** **(1)**
(b)	$y \in \mathbb{R}$; $y \neq -1$	✓ $y \in \mathbb{R}$; ✓ $y \neq -1$	**A** **A** **(2)**
(c)	$-3 \leq x \leq 3$	✓end points/*eindpunte* ✓notation/*notasie*	**A** **A** **(2)**
5.6	$y = -1 + 2$ $y = 1$	✓answer/*antwoord*	**A** **(1)**
			[17]

QUESTION 6/*VRAAG 6*

6.1			
6.1.1	$x=-\frac{b}{2a}$ $x=-\frac{2}{2(1)}$ $x=-1$ $y=(-1)^2+2(-1)-3$ $y=-4$ $C(-1;-4)$	✓ $x=-\frac{2}{2(1)}$ ✓answer/*antwoord* ✓ $y=-4$ ✓ $C(-1;-4)$	**A** **A** **CA** **CA** **(4)**
6.1.2	$0=x^2+2x-3$ $0=(x+3)(x-1)$ $x=-3$ or/*of* $x=1$ $A(-3;0)$ or/*of* $B(1;0)$	✓ $y=0$ ✓factors/*faktore* ✓ both x values/*beide x waardes* ✓ both coordinates/*beide koördinate*	**A** **A** **CA** **CA** **(4)**
6.1.3	$(0;-3)$	✓answer /*antwoord*	**A** **(1)**
6.1.4	$m=\frac{-4-0}{-1-(-3)}$ $=\frac{-4}{2}$ $=-2$ $y=-2x+c$ $-4=-2(-1)+c$ $c=-4-2$ $c=-6$	✓**SF** ✓value of m/*waarde van m* ✓substituting point C/*vervang punt C* ✓ value of c/*waarde van c*	**A** **A** **CA** **CA** **(4)**
6.1.5	$CE=\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$ $=\sqrt{((0)-(-1))^2+((-6)-(-4))^2}$ $=2.24 units$	✓**SF** ✓answer/*antwoord*	**A** **A** **(2)**
6.2			
6.2.1	$AB=2(OC)$ $=2(3)$ $=6 units$	✓ $AB=2(OC)$ ✓answer/*antwoord*	**A** **A** **(2)**
6.2.2	$h(x)=-\sqrt{9-x^2}$	✓✓ answer/*antwoord*	**A** **(2)**
6.2.3	Decreasing / *Dalend*	✓ answer/*antwoord*	**A** **(1)**

6.2.4	$-1=a^{-1}-4$ $3=\frac{1}{a}$ $a=\frac{1}{3}$	✓substituting point E/*vervang punt E* ✓ **S** ✓answer/*antwoord*	**A** **A** **A** **(3)**
6.2.5	$k(x)=\left(\frac{1}{3}\right)^x-4+2$ $k(x)=\left(\frac{1}{3}\right)^x-2$	✓ $k(x)=\left(\frac{1}{3}\right)^x-4+2$ ✓ $k(x)=\left(\frac{1}{3}\right)^x-2$	**A** **A** **(2)**
			[25]

QUESTION 7/*VRAAG 7*

7.1	$A = P(1+i)^n$ $A = 35000\left(1+\frac{0.086}{12}\right)^{7\times12}$ $= R63764,78$	✓**F** ✓**SF** ✓answer/*antwoord*	**A** **A** **A** **(3)**
7.2	$i_{eff} = \left(1+\frac{i}{m}\right)^m - 1$ $= \left(1+\frac{0.075}{4}\right)^4 - 1$ $= 0.771\times100$ $= 7.71\%$	✓**F** ✓**SF** ✓answer/*antwoord*	**A** **A** **CA** **(3)**
7.3	$A = P(1+in)$ $222392,32 = 155000(1+5i)$ $1.43479816129 = 1+5i$ $5i = 0,43479816129$ $i = 0.0869\times100$ $i = 8,7\%$	✓**F** ✓**SF** ✓**S** ✓answer/*antwoord*	**A** **A** **CA** **CA** **(4)**
7.4	$A = 20000\left(1+\frac{0.125}{12}\right)^{2\times12}$ $= R25647.32$ $A = 25647.32\left(1+\frac{0.098}{4}\right)^{4\times4}$ $= R37777.52$	✓**SF** ✓answer/*antwoord* ✓**SF** ✓4years/*4 jaar* ✓answer/*antwoord*	**A** **A** **CA** **CA** **CA** **(5)**
			[15]
			TOTAL/*TOTAAL*: 150

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