education

Department:
Education
North West Provincial Government
REPUBLIC OF SOUTH AFRICA

PROVINCIAL ASSESSMENT/
PROVINSIALE ASSESSERING

GRADE 11/GRAAD 11

TECHNICAL MATHEMATICS P2/*TEGNIESE WISKUNDE V2*

MARKING GUIDELINES/*NASIENRIGLYNE*

JUNE 2024/*JUNIE 2024*

MARKS/*PUNTE*: 100

CODE/*KODE*	EXPLANATION/*VERDUIDELIKING*
A	Accuracy/Akkuraatheid
AO	Answer only/*Slegs antwoord*
CA	Consistent Accuracy/*deurlopende 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 8 pages.
Hierdie nasienriglyne bestaan uit 8 bladsye.

NOTE: / *LET WEL:*

- If a candidate answeres a question TWICE, only mark the FIRST attempt.
- *Indien 'n kandidaat 'n vraag TWEE keer beantwoord, slegs die EERSTE poging na.*
- If a candidate crossed out an answer and did not redo it, mark the crossed-out answer.
- *Indien 'n kandidaat 'n antwoord uitgekrap het en nie oorgedoen het nie, merk die uitgekrapte antwoord.*
- Consistent accuracy applies to ALL aspects of the marking memorandum.
- *Deurlopende akkuraatheid is op ALLE aspekte van die nasienriglyne van toepassing.*
- Assuming values/answers in order to solve a problem is unacceptable.
- *Om waardes/antwoorde net te aanvaar om die probleem op te los, is onaavaarbaar.*

QUESTION 1/*VRAAG 1*

1.1	$m_{BC} = \frac{y_B - y_C}{x_B - x_C}$ $= \frac{6-(-2)}{3-5}$ $= -4$	✓formula/*formule* ✓SF ✓answer/*antwoord* (3)
1.2	$m_{AC} = \frac{y_C - y_A}{x_C - x_A}$ $= \frac{-2-(-4)}{5-(-2)} = \frac{2}{7}$ $y = \frac{2}{7}x + c$ $-2 = \frac{2}{7}(5) + c$ $c = -\frac{24}{7}$ $y = \frac{2}{7}x - \frac{24}{7}$ **OR/*OF*** $y - y_1 = m(x - x_1)$ $y + 4 = \frac{2}{7}(x + 2)$ $y = \frac{2}{7}x - \frac{24}{7}$	✓SF ✓gradient/*gradiënt* ✓sub.(5;-2) ✓answer/*antwoord* (4) **OR/*OF*** ✓SF ✓gradient/*gradiënt* ✓sub.(-2;-4) ✓answer/*antwoord* (4)
1.3	$\tan\theta = m$ $\tan\theta = -4$ $\theta = \tan^{-1}(-4) + 180$ $\theta = 104,04°$	✓$tan\theta = -4$ ✓✓answer/*antwoord* (3)

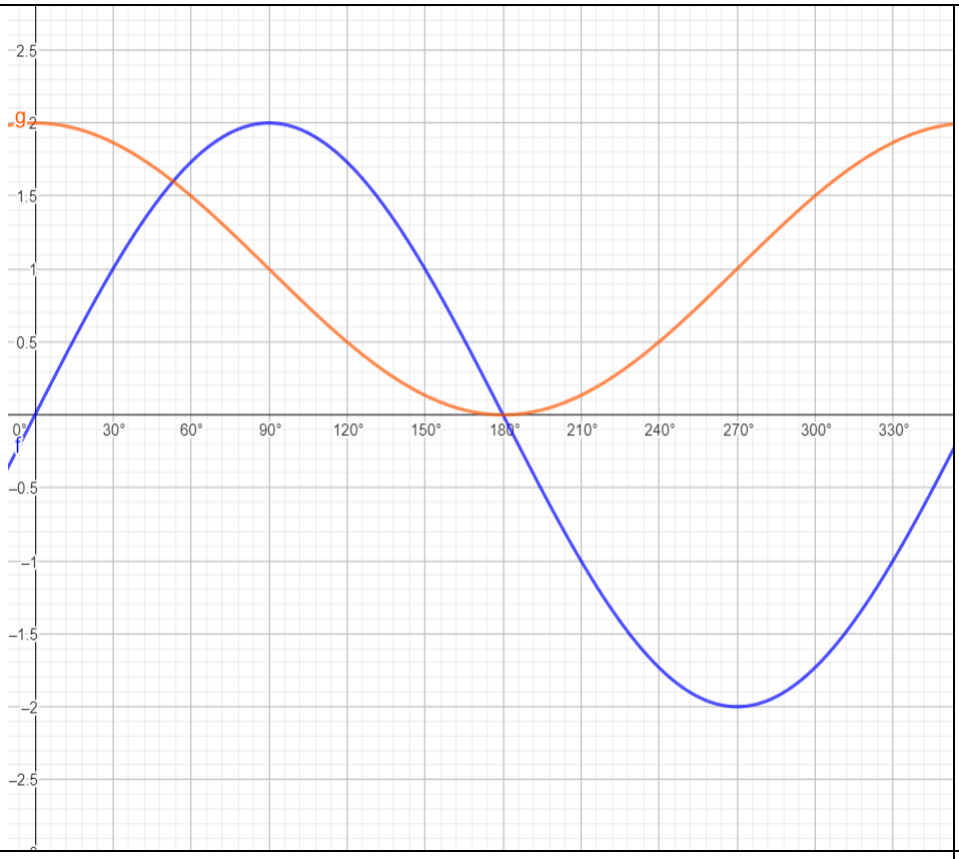
1.4	$M_{AC}\left(\frac{x_A+x_C}{2};\frac{y_A-y_C}{2}\right)$ $=\left(\frac{-2+5}{2};\frac{-4-2}{2}\right)$ $=\left(\frac{3}{2};-3\right)$	✓SF ✓answer/*antwoord* (2)
1.5	$AB=\sqrt{(x_A-x_B)^2+(y_A-y_B)^2}$ $=\sqrt{(-2-3)^2+(-4-6)^2}$ $=5\sqrt{5}$	✓formula/*formule* ✓SF ✓answer/*antwoord* (3)
1.6	$m=-4$ $y=-4x+c$ $-3=-4\left(\frac{3}{2}\right)+c$ $c=3$ $y=-4x+3$ **OR/*OF*** $y-y_1=m(x-x_1)$ $y+3=-4\left(x-\frac{3}{2}\right)$ $y+3=-4x+6$ $y=-4x+3$	✓$m=-4$ ✓sub.point/*vervang punt* ✓answer/*antwoord* (3) **OR/*OF*** ✓$m=-4$ ✓sub.point / *vervang punt* ✓answer/*antwoord* (3)
1.7	$M_{BC}\left(\frac{x_B+x_C}{2};\frac{y_B-y_C}{2}\right)$ $=\left(\frac{3+5}{2};\frac{6+(-2)}{2}\right)$ $=(4;2)$ $m_{BC}\times m_{perpBisector}=-1$ $-4\times m_{perpBisector}=-1$ $m_{perpBisector}=\frac{1}{4}$ $y=\frac{1}{4}x+c$ $2=\frac{1}{4}(4)+c$ $c=1$ $y=\frac{1}{4}x+1$ $4y-x=4$	✓SF ✓mid-pt ✓ $m_{BC}\times m_{perpBisector}=-1$ ✓ $y=\frac{1}{4}x+1$ (4)

1.8	$m_{AB} = \frac{y_B - y_A}{x_B - x_A}$ $= \frac{6-(-4)}{3-(-2)}$ $= 2$ $\tan\beta = m_{AB}$ $\tan\beta = 2$ $\beta = \tan^{-1}(2)$ $= 63,43°$ $\theta = \beta + A\hat{B}C \quad ext\angle\Delta$ $104,04° = 63,43° + A\hat{B}C$ $A\hat{B}C = 40,61°$	✓SF ✓gradient/*gradiënt* ✓ $\tan\beta = 2$ ✓63,43° ✓S/R ✓answer/*antwoord* (6)
		[28]

QUESTION 2/*VRAAG 2*

2.1.1	$m_{AB} = m_{BC}$ $\frac{-1-3}{-1-2} = \frac{p-(-1)}{-2-(-1)}$ $\frac{4}{3} = \frac{p+1}{-1}$ $\frac{4}{3} = -p-1$ $p = -\frac{7}{3}$	✓ $m_{AB} = m_{BC}$ ✓SF ✓answer/*antwoord* (3)
2.1.2	$m_{AB} \times m_{BC} = -1$ $\frac{4}{3} \times (-p-1) = -1$ $-p-1 = -\frac{3}{4}$ $p = -\frac{1}{4}$	✓ $m_{AB} \times m_{BC} = -1$ ✓S ✓answer/*antwoord* (3)
2.2	$BC = \sqrt{(0-2)^2 + (3-(-4))^2}$ $= \sqrt{53}$ $AB = \sqrt{(0-(-4))^2 + (3-(-3))^2}$ $= 2\sqrt{13}$ ABCD is not a square, sides are not equal *ABCD is nie 'n vierkant nie, sye is nie gelyk nie*	✓SF ✓ $= \sqrt{53}$ ✓SF ✓ $= 2\sqrt{13}$ ✓ not a square/*nie 'n vierkant* ✓conclusion/ *gevolgtrekking* (6)
		[12]

QUESTION 3 / *VRAAG 3*

3.1		$f(x)$ ✓shape/*vorm* ✓$x-$ *intercepts/ x-afsnitte* ✓turning points *draaipunte* $g(x)$ ✓shape/*vorm* ✓intercepts/ *afsnitte* (5)
3.2	$f\ -360°$ $g\ -360°$	✓answer/ *antwoord* ✓answer/ *antwoord* (2)
3.3	f: $a=2$	✓answer/ *antwoord* (1)
3.4	g: $y\in[0;2]$	✓endpoint/ *eindpunt* ✓notation/ *notasie* (2)
3.5	$180° \leq x \leq 360°$	✓endpoints/ *eindpunte* ✓notation/ *notasie* (2)
		[12]

QUESTION 4 / *VRAAG 4*

4.1.1	Supplementary / *Supplementêr*	✓answer/ *antwoord* (1)
4.1.2	Twice the angle subtended by the same chord at the circumference / *twee maal so groot soos die hoek by die middelpunt.*	✓answer/ *antwoord* (1)
4.2.1	$\hat{S} + \hat{E} = 180°$ *opp ∠'s cyclic quad* / *teenoorstaande ∠e van koordevierhoek* $y + 4y + 5 = 180°$ $5y = 175$ $y = 35°$	✓S ✓R ✓answer/ *antwoord* (3)
4.2.2	$\hat{R} + \hat{D} = 180$ *opp ∠'s cyclic quad* / *teenoorstaande ∠e van koordevierhoek* $4x + 3x - 20° = 180°$ $7x = 200°$ $x = 28{,}57°$	✓S ✓R ✓answer/ *antwoord* (3)
4.2.3	$\hat{D}_1 = \hat{R}$ *ext ∠ cyclic quad* / *buite ∠ van koordevierhoek* $\hat{D}_1 = 4x$ $= 4(28{,}57°)$ $= 114{,}28°$	✓S/R ✓answer/ *antwoord* (2)
		[10]

QUESTION 5 / *VRAAG 5*

5.1	$O\hat{B}T = O\hat{A}T = 90°$ *tan ⊥ rad* / *raaklyn ⊥ raaklyn*	✓S ✓✓R (3)
5.2	$\hat{B}_1 + \hat{B}_2 = 90°$ *tan ⊥ rad* / *raaklyn ⊥ raaklyn* $35° + \hat{B}_2 = 90°$ $\hat{B}_2 = 55°$	✓S/R ✓S (2)
5.3	$\hat{A}_1 = \hat{B}_1 = 35°$ *∠'s opp = sides* / *∠e teenoor = sye*	✓S/R ✓S (2)
5.4	$\hat{A}_2 = \hat{B}_2 = 55°$ *∠'s opp = sides* / *∠e teenoor = sye* $\hat{O}_1 + \hat{A}_2 + \hat{B}_2 = 180°$ *sum ∠'s Δ* / *som van binnehoeke van Δ* $\hat{O}_1 + 55° + 55° = 180°$ $\hat{O}_1 = 70°$	✓S ✓R ✓S/R ✓S (4)
5.5	$\hat{O}_1 = 2\hat{E}$ *∠ at center = 2∠ circumference* / *∠ by mid.pt = 2x∠ omtrek* $70° = 2\hat{E}$ $\hat{E} = 35°$ OR / OF $\hat{B}_1 = \hat{E} = 35°$*tan − chord* / *raaklyn-koord* OR / OF	✓S/R ✓S (2) ✓S/R ✓S (2)

	$\widehat{A}_1 = \widehat{E} = 35° \; tan - chord$ / *raaklyn-koord*	✓S/R ✓S (2)
		[13]

QUESTION 6 / *VRAAG 6*

6.1	$BC = 15$ cm *line drawn from centre / lyn getrek vanaf middelpunt*	✓S/R (1)
6.2	$B\widehat{C}A = 90°$ *line drawn from center / lyn getrek vanaf middelpunt*	✓S ✓R (2)
6.3	$OC = 2CD$ $OC = 2k$	✓✓answer/ *antwoord* (2)
6.4	$OB^2 = BC^2 + OC^2$ $OB^2 = (15)^2 + (2k)^2$ $= 225 + 4k^2$ $OB = 15 + 2k$	✓SF ✓answer/ *antwoord* (2)
6.5	$AB^2 = AC^2 + BC^2$ $(20)^2 = (5k)^2 + (15)^2$ $400 - 225 = 25k^2$ $175 = 25k^2$ $k^2 = 7$ $k = \sqrt{7}$	✓SF ✓simplification/ *vereenvoudiging* ✓simplification/ *vereenvoudiging* ✓answer/ *antwoord* (4)
6.6	$3k = radius$ $radius = 3\sqrt{7}$	✓S ✓answer/ *antwoord* (2)
		[13]

QUESTION 7/*VRAAG 7*

7.1.1	$102{,}635°$ $= 102°38'6''$	✓$102°$✓$38'$✓$6''$ (3)
7.1.2	$70°44'90''$ $= 70{,}76°$	✓✓✓$70{,}76°$ (3)
7.2	$s = r\theta$ $20 = 8\theta$ $\theta = 2{,}5\ rads$ $\theta = 2{,}5 \times \frac{180}{\pi}$ $= 143{,}24°$	✓formula/f*ormule* ✓SF ✓$2{,}5\ rads$ ✓$= 143{,}24°$ (4)
7.3	$\frac{\pi}{3} + \frac{3}{4}\pi - 135°$ $= \frac{\pi}{3} \times \frac{180°}{\pi} + \frac{3}{4}\pi \times \frac{180°}{\pi} - 135°$ $= 60° + 135° - 135°$ $= 60°$	✓$\frac{180°}{\pi}$ ✓$60°$ (2) **AO: FULL MARKS / VOL PUNTE**
		[12]
	TOTAL/*TOTAAL*:	**100**