education

Department:
Education
North West Provincial Government
REPUBLIC OF SOUTH AFRICA

PROVINCIAL ASSESSMENT / *PROVINSIALE ASSESSERING*

GRADE/*GRAAD 11*

TECHNICAL MATHEMATICS P2/*TEGNIESE WISKUNDE V2*

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 nie*
NPU	No penalty for units / *Geen penalisering vir eenhede nie*
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 nie*

These marking guidelines consist of 12 pages.
Hierdie nasienriglyne bestaan uit 12 bladsye.

QUESTION 1/*VRAAG 1*

NOTE:/*NEEM KENNIS:*

- If a candidate answered a question TWICE, mark only the FIRST attempt./*Indien 'n kandidaat 'n vraag TWEE KEER beantwoord het, word slegs die EERSTE poging nagesien.*
- If a candidate crossed out an answer and did not redo it, mark the crossed-out answer./*Indien 'n kandidaat 'n antwoord doodgekrap het en nie oorgedoen het nie, word die doodgetrekte antwoord nagesien.*
- Consistent accuracy applies to ALL aspect of the marking memorandum./*Deurlopende akkuraatheid is van toepassing op ALLE aspekte van die nasienriglyne.*
- Assuming values/answers to solve a problem is unacceptable./*Aanname van waardes/antwoord om 'n probleem op te los is onaanvaarbaar.*

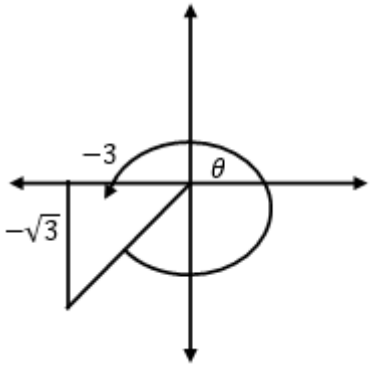
1.1	K(5;0)	✓5 ✓0 (2)
1.2	$AB=\sqrt{(x_B-x_A)^2+(y_B-y_A)^2}$ $=\sqrt{(2-(-4))^2+(5-3)^2}$ $=2\sqrt{10}$	✓SF ✓ $2\sqrt{10}=6,32$ (2)
1.3	$m_{BC}=\frac{y_B-y_C}{x_B-x_C}$ $=\frac{5-1}{2-5}$ $=-\frac{4}{3}$	✓formula/*formule* ✓SF ✓ $-\frac{4}{3}$ (3)
1.4	$m_{AB}=\frac{y_B-y_A}{x_B-x_A}$ $=\frac{5-3}{2-(-4)}$ $=\frac{1}{3}$ $y=\frac{1}{3}x+c$ $1=\frac{1}{3}(5)+c$ $c=-\frac{2}{3}$ $y=\frac{1}{3}x-\frac{2}{3}$ **OR/*OF*** $AB\|DC$ $y-y_1=m(x-x_1)$ $y-1=\frac{1}{3}(x-5)$ $y-1=\frac{1}{3}x-\frac{5}{3}$ $y=\frac{1}{3}x-\frac{5}{3}+1$ $y=\frac{1}{3}x-\frac{2}{3}$	✓SF ✓ $\frac{1}{3}$ ✓SF(5;1) ✓ $y=\frac{1}{3}x-\frac{2}{3}$ (4)
1.5	$D\left(0;-\frac{2}{3}\right)$	✓0 ✓ $-\frac{2}{3}$ (2)

1.6	$\tan\theta = \frac{1}{3}$	✓ $\tan\theta = \frac{1}{3}$
	$\theta = \tan^{-1}\left(\frac{1}{3}\right)$	
	$= 18,43°$	✓$18,43°$
	$m_{AD} = \frac{3-\left(-\frac{2}{3}\right)}{-4-0}$	✓SF
	$= -\frac{11}{12}$	
	$\tan\beta = -\frac{11}{12}$	✓ $-\frac{11}{12}$
	$\beta = \tan^{-1}\left(-\frac{11}{12}\right)$	
	$= -42,51°$	
	$\beta = 180° - 42,51°$	✓$137,49°$
	$= 137,49°$	
	$\theta + A\hat{D}C = \beta\ ext\angle\Delta$	
	$18,43° + A\hat{D}C = 137,49°$	✓S/R
	$A\hat{D}C = 119,06°$	✓ $A\hat{D}C = 119,06°$ (7)
1.7	No/*Nee*, $m_{AD} \neq m_{BC}$, AD is not parallel to BC/*AD is nie parallel aan BC nie*	✓no/*nee* ✓ $m_{AD} \neq m_{BC}$ ✓reason/*rede*
	OR/*OF*	**OR/*OF***
	No/*Nee*, $m_{AC} \neq m_{BD}$, diagonals do not bisect each other/*diagonale halveer nie mekaar nie*	✓no/*nee* ✓ $m_{AC} \neq m_{BD}$ ✓reason/*rede* (3)
		[23]

QUESTION 2/*VRAAG*

2.1	$m_{AB} = m_{BC}$ $\frac{p-1}{3-2} = \frac{-6-p}{-3-3}$ $p-1 = \frac{-6-p}{-6}$ $-6p+1 = -6-p$ $-5p = -12$ $p = \frac{12}{5}$	✓SF ✓S ✓S ✓ $p = \frac{12}{5}$ (4)
		[4]

QUESTION 3/*VRAAG 3*

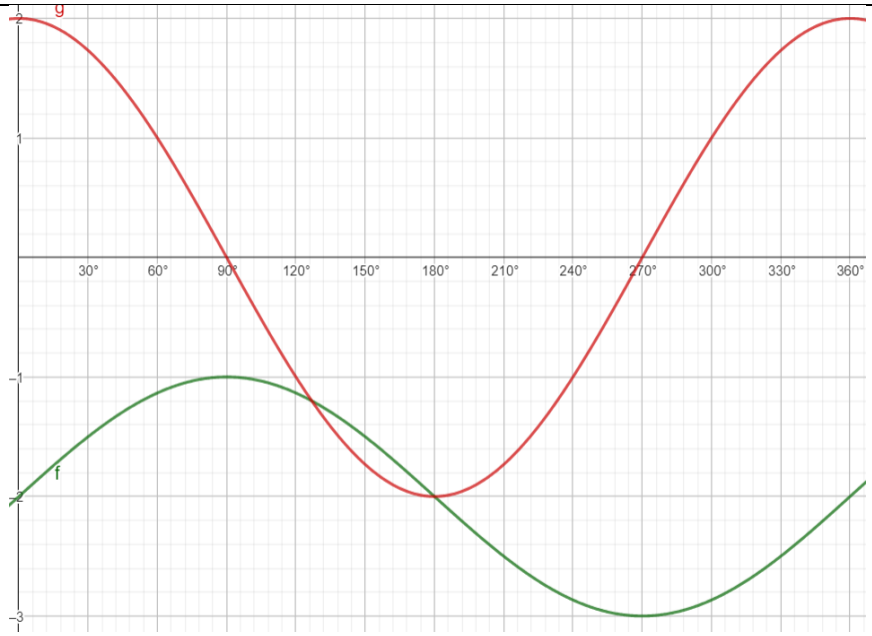
3.1.1	$\cos 3\theta$ $= \cos 3 \times 45$ $= -0,71$	✓SF ✓ $-0,71$ (2)
3.1.2	$\frac{\cos^2 \beta - 2}{\text{cosec}\,\theta}$ $= \frac{\cos^2(60) - 2}{\frac{1}{\sin(45)}}$ $= -1,24$	✓ $\cos^2(60)$ ✓ $\frac{1}{\sin(45)}$ ✓ $-1,16$ (3)
3.2.1	$\tan\theta = \frac{\sqrt{3}}{3}$ $r^2 = x^2 + y^2$ $= (3)^2 + \left(\sqrt{3}\right)^2$ $= 2\sqrt{3}$ $\sin\theta.\sec\theta$ $= \left(\frac{-\sqrt{3}}{2\sqrt{3}}\right).\left(\frac{2\sqrt{3}}{-3}\right)$ $= \frac{1}{\sqrt{3}}$  	✓correct quadrant/*korrekte kwadrant* ✓SF ✓ $2\sqrt{3}$ ✓ $\frac{-\sqrt{3}}{2\sqrt{3}}$ ✓ $\frac{2\sqrt{3}}{-3}$ ✓ $\frac{1}{\sqrt{3}}$ (6)

3.2.2	$\frac{\tan\theta}{\cot\theta}$ $=\frac{-\sqrt{3}}{-3}\div\frac{-3}{-\sqrt{3}}$ $=\frac{1}{3}$	✓$\frac{-\sqrt{3}}{-3}$ ✓$\frac{-3}{-\sqrt{3}}$ ✓$\frac{1}{3}$ (3)
3.2.3	$1-2\sin^2\theta$ $=1-2\left(\frac{-\sqrt{3}}{2\sqrt{3}}\right)^2$ $=\frac{1}{2}$	✓SF ✓$\frac{1}{2}$ (2)
3.3	$3\cos\beta=-1,02674$ $\cos\beta=-0,3422466667$ $ref\ \angle\cos^{-1}(0,3422466667)$ $=69,99°$ $\beta=180°+69,99°$ or $\beta=180°-69,99°$ $=249,99°$ $=110,01°$	✓S ✓$69,99°$ ✓$249,99°$ ✓$110,01°$ (4)
		[20]

QUESTION 4/*VRAAG 4*

4.1.1	$\sec^2 x - \tan^2 x = 1$	✓✓1 (2)
4.1.2	$1 - \cos^2 x = \sin^2 x$	✓$\sin^2 x$ (1)
4.2.1	$\frac{\cos(180° - \theta).\tan(360° - \theta).\cot(\pi + \theta)}{\cos(360° - \theta).\sin(180° + \theta)}$ $= \frac{(-\cos\theta)(-\tan\theta)\left(\frac{1}{\tan\theta}\right)}{(\cos\theta)(-\sin\theta)}$ $= -\frac{1}{\sin\theta}$ $= -\text{cosec}\,\theta$	✓$-\cos\theta$ ✓$-\tan\theta$ ✓$\frac{1}{\tan\theta}$ ✓$\cos\theta$ ✓$-\sin\theta$ ✓$-\frac{1}{\sin\theta}$ ✓ $-\text{cosec}\,\theta$ (7)
4.2.2	$\text{cosec}^2\beta + \sec^2\beta.\cos^2\beta - \sin^2\beta - \cot^2\beta - 1$ $= \cot^2\beta + 1 + \frac{1}{\cos^2\beta}.\cos^2\beta - \sin^2\beta - \cot^2\beta - 1$ $= 1 - \sin^2\beta$ $= \cos^2\beta$	✓ $\cot^2\beta + 1$ ✓$\frac{1}{\cos^2\beta}$ ✓ $1 - \sin^2\beta$ ✓$\cos^2\beta$ (4)
		[14]

QUESTION 5/*VRAAG 5*

5.1		$f(x)$ ✓shape/*vorm* ✓turning points/*draai punte* ✓y-intercept/*y-afsnitte* $g(x)$ ✓shape/*vorm* ✓turning point/*draai punte* ✓x and y-intercepts/*x- en y-afsnitte* (6)
5.2	Amplitude =1	✓answer/*antwoord* (1)
5.3	$x \leq 90°$ or $x \geq 270°$	✓ $x \leq 90°$ ✓ $x \geq 270°$ (2)
5.4	$90° \leq x \leq 270°$	✓endpoints/*eindpunte* ✓notation/*notasie* (2)
		[11]

QUESTION 6/*VRAAG 6*

6.1	$\sin 36° = \frac{AE}{EC}$ $\sin 36° = \frac{AE}{55}$ $AE = 55 \times \sin 36°$ $= 32,33\,m$	✓SF ✓S ✓ $32,33\,m$ (3)
6.2	BEC= 19° sum of ∠'s in Δ EBC= 125° ∠'s on a str line $\frac{BC}{\sin BEC} = \frac{EC}{\sin EBC}$ $\frac{BC}{\sin 19°} = \frac{55}{\sin 125°}$ $BC = \frac{55}{\sin 125°} \times \sin 19°$ $= 21,86\,m$	✓ BEC= 19° ✓ EBC= 125° ✓M ✓ SF ✓S ✓ $21,01m$ (6)
6.3	$\tan 36° = \frac{32,33}{AC}$ $AC = \frac{32,33}{\tan 36°}$ $= 44,50$	✓SF ✓S ✓ $44,50\,m$ (3)
		[12]

QUESTION 7/*VRAAG 7*

7.1.1	Opposite interior angle./*Teenoorstaande binne hoeke.*	✓answer/*antwoord* (1)
7.1.2	equal to the angel in the alternate segment./*gelyk aan die hoek in die teenoorgestelde segment.*	✓answer/*antwoord* (1)
7.2	$ON^2 = OM^2 + MN^2$ $= (6)^2 + (25)^2$ $= 661$ $= \sqrt{661}$ $OM + MP = \sqrt{661}$ $6 + MP = \sqrt{661}$ $MP = 19,71m$	✓Pythagoras ✓SF ✓ $\sqrt{661}$ or 25,71 ✓19,71 m ✓SF $MP = 30,58\,m$ (5)
		[7]

QUESTION 8/*VRAAG 8*

8.1.1	$\hat{B}_4 = 36° \angle's\ opp = sides$ $\hat{A} = 36°$ tan chord	✓S✓R ✓S✓R (4)
8.1.2	(a) $\hat{O}_1 = 2A \angle$ at center $= 2\angle$ at circumference $\hat{O}_1 = 2 \times 36°$ $= 72°$	✓S✓R (2)
	(b) $\hat{C}_3 + \hat{C}_4 = 90°\ tan \perp rad$ $\hat{C}_3 + 36° = 90°$ $\hat{C}_3 = 54°$	 ✓S✓R (2)
	(c) $\hat{D} = 180° - 36° - 36°\ sum \angle's\ \Delta$ $\hat{D} = 108°$	 ✓S✓R (2)
	(d) $A\hat{C}B = 62°\ tan - chord$	 ✓S✓R (2)
8.1.3	Tans drawn from the same pt/*Raaklyne getrek uit dieselfde punt.*	✓answer/*antwoord* (1)
8.2.1	$\hat{U}_1 = 90° - 35°\ \angle semi\ circle$ $= 55°$	✓S✓R (2)
8.2.2	$\hat{O}_1 = 40° + 55°\ ext \angle \Delta$ $= 95°$	✓S✓R (2)
8.2.3	$\hat{Q} + 35° = 180°\ opp \angle's\ cyclic\ quad$ $= 145°$	✓S✓R (2)
8.2.4	$\hat{P}_1 = 90° - 40°\ tan \perp rad$ =50°	✓S✓R (2)
8.2.5	$\hat{T}_1 = \hat{P}_1 = 50°\ tan - chord$ **OR** $\hat{T}_1 = 50\ sum \angle's\ \Delta$	✓S✓R ✓S✓R (2)
		[23]

QUESTION 9/*VRAAG 9*

9.1	$\widehat{Q}_4 = 72° \; tan - chord$	✓S✓R (2)
9.2	$\widehat{Q}_3 + \widehat{Q}_4 = 108° \; tan - chord$ $\widehat{Q}_3 = 108° - 72°$ $= 36°$	✓S✓R (2)
9.3	$\widehat{Q}_2 + \widehat{Q}_3 = 90° \angle semi \; cirlce$ $\widehat{Q}_2 + 36° = 90°$ $= 54°$ $\widehat{U}_1 = 180° - 90° - 72° \; sum \angle's \; \Delta$ $= 18°$	✓S✓R ✓S✓R (4)
		[8]

QUESTION 10/*VRAAG 10*

10.1.1	$s = r\theta$ $15,2 = 10\theta$ $\theta = 1,52\,rads$	✓formula/*formule* ✓SF ✓$1,52\,rads$ (3)
10.1.2	$\text{Area of sector} = \frac{r^2\theta}{2}$ $= \frac{(10)^2 \times (1,52)}{2}$ $= 76\ \text{m}^2$	✓formula/*formule* ✓SF ✓ $76\ \text{m}^2$ (3)
10.1.3	perimeter=10 m+10 m+15,2 m =35,2 m $\text{cost} = 35,2\,\text{m} \times \text{R}101,27$ $= \text{R}3564,70$	✓ 35,2 m ✓ $35,2\,\text{m} \times \text{R}101,27$ ✓ $\text{R}3564,70$ (3)
10.2.1	$\omega = 2\pi N$ $= 2\pi(20,5)$ $= 128,81$	✓formula/*formule* ✓SF ✓$128,81$ (3)
10.2.2	$V = \pi Dn$ $= \pi(150)(20,5)$ $= 19321$	✓formula/*formule* ✓SF ✓19321 (3)
10.3	$4h^2 - 4dh + x^2 = 0$ $4h^2 - 4(30)h + (15)^2 = 0$ $4h^2 - 12h + 225 = 0$ $h = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $= \frac{-(-120) \pm \sqrt{(-120)^2 - 4(4)(225)}}{2(4)}$ $h = 27,99\,\text{m}$ or $h = 2,01\,\text{m}$ $\therefore h = 27,99\,\text{m}$	✓formula/*formule* ✓SF ✓S ✓SF ✓ $h = 27,99\,\text{m}$ ✓ $h = 2,01\,\text{m}$ ✓ $h = 27,99\,\text{m}$ (7)
		[22]

QUESTION 11/*VRAAG 11*

11.1	$\frac{600\,\text{cm}}{100}=\frac{6\,\text{m}}{5}=1,2\,\text{m}$	✓ ÷100 ✓ 1,2 m (2)
11.2	$A_T = a\left(\frac{o_1+o_n}{2}+o_2+o_3+o_4+....o_{n-1}\right)$ $=1,2\left(\frac{17+12}{2}+20+26+10+23\right)$ $=112,2\,\text{m}^2$ **OR/*OF*** $A_T = a(m_1+m_2+m_3+m_4+...m_n)$ $=1,2\left(\frac{17+20}{2}+\frac{20+26}{2}+\frac{26+10}{2}+\frac{10+23}{2}+\frac{23+12}{2}\right)$ $=112,2\,\text{m}^2$	✓ formula/*formule* ✓ 1,2 ✓ SF ✓ $112,2\,\text{m}^2$ **OR/*OF*** ✓ formula/*formule* ✓ 1,2 ✓ SF ✓ $112,2\,\text{m}^2$ (4)
		[6]

TOTAL/*TOTAAL*: 150