education

Department:
Education
North West Provincial Government
REPUBLIC OF SOUTH AFRICA

PROVINCIAL ASSESSMENT/
PROVINSIALE ASSESSERING

GRADE/GRAAD 11

MATHEMATICS P2/ *WISKUNDE V2*

JUNE/*JUNIE* 2024

MARKING GUIDELINES/*NASIENRIGLYNE*

MARKS/*PUNTE*: 100

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

NOTE:

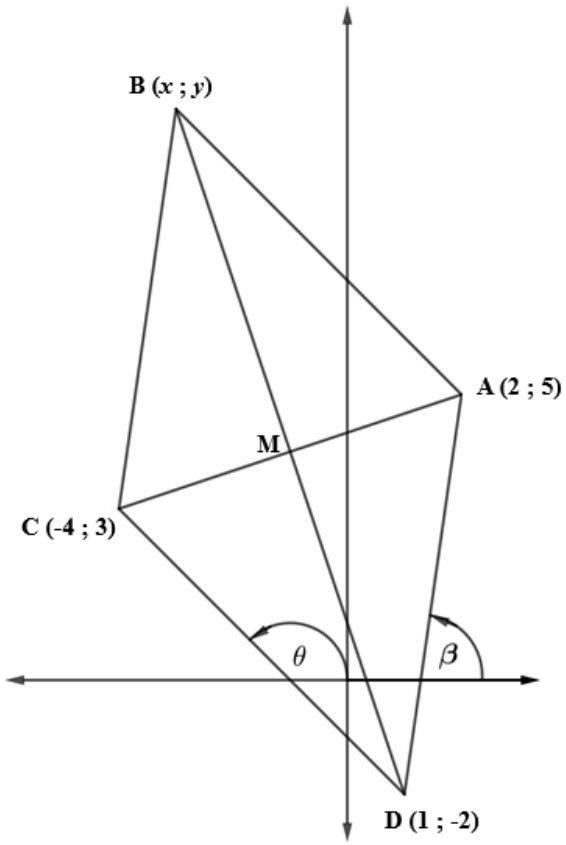
- If a candidate answers a question TWICE, only mark the FIRST attempt
- If a candidate has crossed out an attempt of a question and not redone the question, mark the crossed out version.
- Consistent accuracy applies in ALL aspects of marking memorandum. Stop marking at the second calculation error.
- Assuming answers/values in order to solve a problem is NOT acceptable.

NOTA:

- *As 'n kandidaat 'n vraag TWEE KEER beantwoord, sien slegs die EERSTE poging na.*
- *As 'n kandidaat 'n antwoord van 'n vraag doodtrek en nie oordoen nie, sien die doodgetrekte poging na.*
- *Volgehoue akkuraatheid word in ALLE aspekte van nasienriglyne toegepas. Hou op nasien by die tweede berekeningsfout.*
- *Om antwoorde/waardes aan te neem om 'n probleem op te los, word NIE toegelaat NIE.*

GEOMETRY / *MEETKUNDE*	
S	**A mark for correct statement** **(A statement mark is independent of a reason)**
	'n Punt vir 'n korrekte bewering ***('n Punt vir 'n bewering is onafhanklik van die rede)***
R	**A mark for the correct reason.** **(A reason mark may only be awarded if the statement is correct)**
	'n Punt vir 'n korrekte rede ***('n Punt word slegs vir die rede toegeken as die bewering korrek is)***
S/R	**Award a mark if statement AND reason are both correct**
	Ken 'n punt toe as die bewering EN rede beide korrek is

QUESTION/*VRAAG 1*

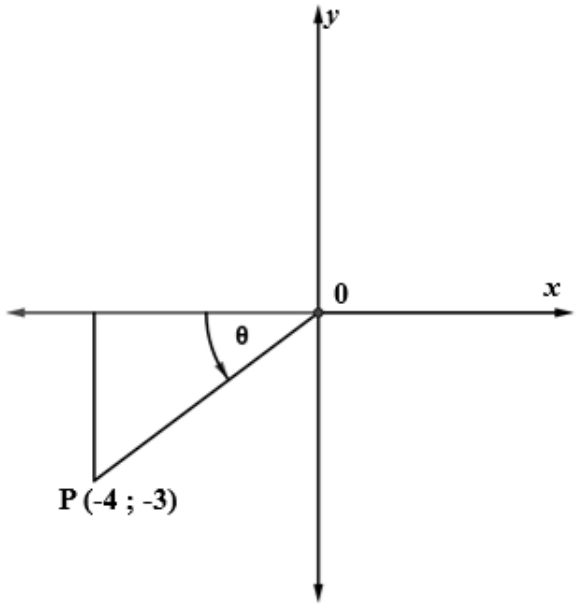


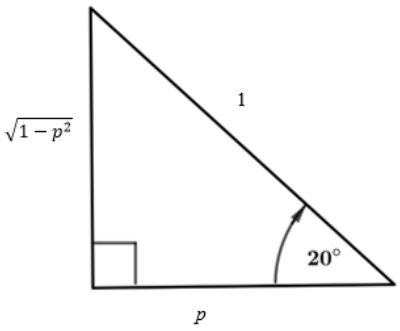
1.1	$d_{AC} = \sqrt{(2-(-4))^2 + (5-3)^2}$ $d_{AC} = \sqrt{40}$ $d_{AC} = 2\sqrt{10}$	✓correct substitution into distance formula/ *korrekte vervanging in afstand formule* ✓ $d_{AB} = \sqrt{40}$ or $2\sqrt{10}$ (2)
1.2	M $\left(\frac{-4+2}{2}; \frac{3+5}{2}\right)$ M (-1 ; 4)	✓ x = -1 ✓ y = 4 (2)
1.3	$m_{BD} = \frac{-2-4}{1-(-1)}$ $= -3$ $m_{AC} = \frac{5-3}{2-(-4)}$ $= \frac{1}{3}$ $m_{BD} \times m_{AC} = -3 \times \frac{1}{3} = -1$ $\therefore BD \perp AC$	✓ $m_{BD} = -3$ ✓ $m_{AC} = \frac{1}{3}$ ✓ $-3 \times \frac{1}{3} = -1$ (3)

1.4	$m_{DC} = \frac{3-(-2)}{-4-1}$ $= -1$ $\therefore y = -x + c$ Subst./ *Vervang* D (1 ; -2) into equation $-2 = -(1) + c$ $c = -1$ $\therefore y = -x - 1$ **OR/*OF*** $y - (-2) = -1(x - 1)$ $y = -x - 1$	✓$m_{DC} = -1$ ✓ Subst./*Vervang* D (1 ; -2) or C (-4 ; 3) / ✓ $y = -x - 1$ OR ✓$\square_{DC} = -1$ ✓ Subst./*Vervang* D (1 ; -2) or C (-4 ; 3) ✓ $y = -x - 1$ (3)
1.5	$tan\theta = m_{DC}$ $tan\theta = -1$ $\theta = 180° - 45°$ $\theta = 135°$	✓ $tan\theta = -1$ ✓$\theta = 180° - 45°$ ✓ $\theta = 135°$ (3)
1.6	$m_{AD} = \frac{5-(-2)}{2-1}$ $= 7$ $tan\beta = 7$ $\beta = 81{,}87°$ $\therefore A\hat{D}C = \theta - \beta$ ....exterior angle of Δ/ *buite hoek van* Δ $A\hat{D}C = 135° - 81{,}87°$ $A\hat{D}C = 53{,}13°$	✓$tan\beta = 7$ ✓$\beta = 81{,}87°$ ✓$A\hat{D}C = 135° - 81{,}87°$ ✓$A\hat{D}C = 53{,}13°$ (4)
1.7	$d_{DM} = \sqrt{\left(1-(-1)\right)^2 + (-2-4)^2}$ $d_{DM} = \sqrt{40}$ Area of ΔADC $= \frac{1}{2} \times MC \times AC$ $= \frac{1}{2} \times \sqrt{40} \times \sqrt{40}$ $= 20\ units^2$	✓$d_{DM} = \sqrt{40}$ ✓$\frac{1}{2} \times MC \times AC$ ✓$\frac{1}{2} \times \sqrt{40} \times \sqrt{40}$ ✓$20\ units^2$ (4)

1.8	$AB \parallel CD$ and/*en* $BC \parallel AD$ $x_A = 2$; $x_D = 1$ $y_A = 5$; $y_D = -2$ $\therefore x_A - x_D = 1$ $\therefore y_A - y_B = 7$ $\therefore x_C = -4$; $x_B = -4+1$ $\therefore y_C = 3$; $y_B = 3+7$ $\therefore x_B = -3$ $\therefore y_D = 10$ $\therefore$ B(-3 ; 10) **OR/*OF*** Diagonals of parallelogram ABCD have the same midpoint *Hoeklyne van parallelogram ABCD het dieselfde middelpunt.* $\therefore$M (-1 ; 4) is midpoint of BD $x_{B:} : \frac{1+x}{2} = -1$ $y_{B:} : \frac{-2+y}{2} = 4$ $x = -3$ $y = 10$ $\therefore$ B(-3 ; 10) **OR/*OF*** Translation D → C $(x ; y) \rightarrow (x - 5 ; y + 5)$ $\therefore$ Translation would be the same for A → B $(2 ; 5) \rightarrow (2 - 5 ; 5 + 5)$ $\therefore$ B (-3 ; 10)	✓ Method ✓ $x_B = -3$ ✓ $y_B = 10$ Answer only: Full marks ✓ Method ✓ $x_B = -3$ ✓ $y_B = 10$ Answer only: Full marks ✓ Method ✓ $x_B = -3$ ✓ $y_B = 10$ Answer only: Full marks (3)
1.9	$m_{AE} = \frac{5-k}{2-4}$ $m_{AD} = 7$ $\therefore m_{AE} = m_{AD}$ $\frac{5-k}{2-4} = 7$ $5 - k = -14$ $\therefore k = 19$	✓$m_{AE} = \frac{5-k}{2-4}$ ✓$\frac{5-k}{2-4} = 7$ ✓$k = 19$ (3)
		[27]

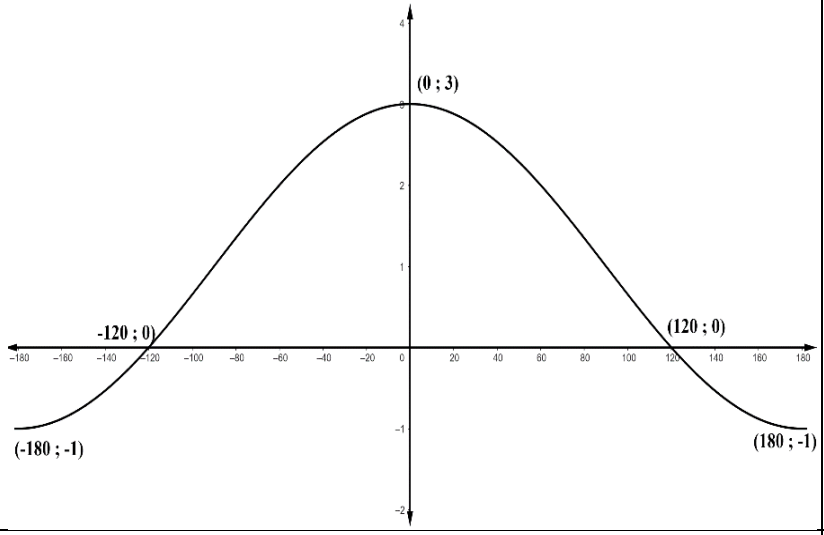
QUESTION/*VRAAG 2*

2.1.1	 $y^2 = (5)^2 - (-4)^2$ $\therefore y = -3$ $sin\theta = \frac{-3}{5}$	✓ using Pythagoras correctly ✓$y = -3$. ✓ $sin\theta = \frac{-3}{5}$ (3)
2.1.2	$tan\theta = \frac{-3}{-4} = \frac{-5}{k}$ $\therefore k = -\frac{20}{3}\ or\ -6\frac{2}{3}$	✓ $\frac{-3}{-4} = \frac{-5}{k}$ ✓ $k = -\frac{20}{3}\ or\ -6\frac{2}{3}$ (2)
2.2	$\frac{\sin(180° + x)\,.\cos(90° - x)}{\tan(180° - x)\,.\cos(360° - x)\,.\sin(-x)}$ $= \frac{(-\sin x).sinx}{-\tan x.(\cos x).(-\sin x)}$ $= \frac{-sinx}{-\frac{sinx}{cosx}\ .\ cosx\ .-1}$ = -1	✓$-\sin x$ ✓ $sinx$ ✓ $-\tan x$ ✓$\cos x$ ✓$-\sin x$ ✓$\tan x = \frac{sinx}{cosx}$ ✓ answer (7)

2.3	$sin\theta = \sqrt{\dfrac{(9)^{cos300°}}{\left(\frac{1}{4}\right)^{sin150°}.(8)^{tan225°}}}$ $sin\theta = \sqrt{\dfrac{(3^2)^{cos60°}}{(2^{-2})^{sin30°}.(2^3)^{tan45}}}$ $sin\theta = \sqrt{\dfrac{(3^2)^{\frac{1}{2}}}{(2^{-2})^{\frac{1}{2}}.(2^3)^1}}$ $sin\theta = \sqrt{\dfrac{3}{2^{-1}\times 8}}$ $sin\theta = \sqrt{\dfrac{3}{4}}$ $sin\theta = \dfrac{\sqrt{3}}{2}$ $\therefore \theta = 60° \text{ or } 120°$	✓ $cos60°$ ✓ $sin30°$ ✓ $tan45°$ ✓$3^2,\ 2^{-2}$& 2^3 ✓ $cos60° = \frac{1}{2}, sin30° = \frac{1}{2}$ & $tan45 = 1$ ✓$sin\theta = \frac{\sqrt{3}}{2}$ ✓ $\theta = 60°$ ✓ $\theta = 120°$ (8)
2.4		
2.4.1	$cos\ (-20°)$ $= cos20°$ $= p$	✓ $cos20°$ ✓ p (2)
2.4.2	*tan* 160º = - tan 20º **OR/*OF*** = - tan 20º $= -\frac{\sqrt{1-p^2}}{p}$ $= -\frac{\boldsymbol{sin20°}}{\boldsymbol{cos20°}}$ $= -\frac{\sqrt{1-p^2}}{p}$	✓- tan 20º ✓ $y = \sqrt{1-p^2}$ ✓$-\frac{\sqrt{1-p^2}}{p}$ (3)

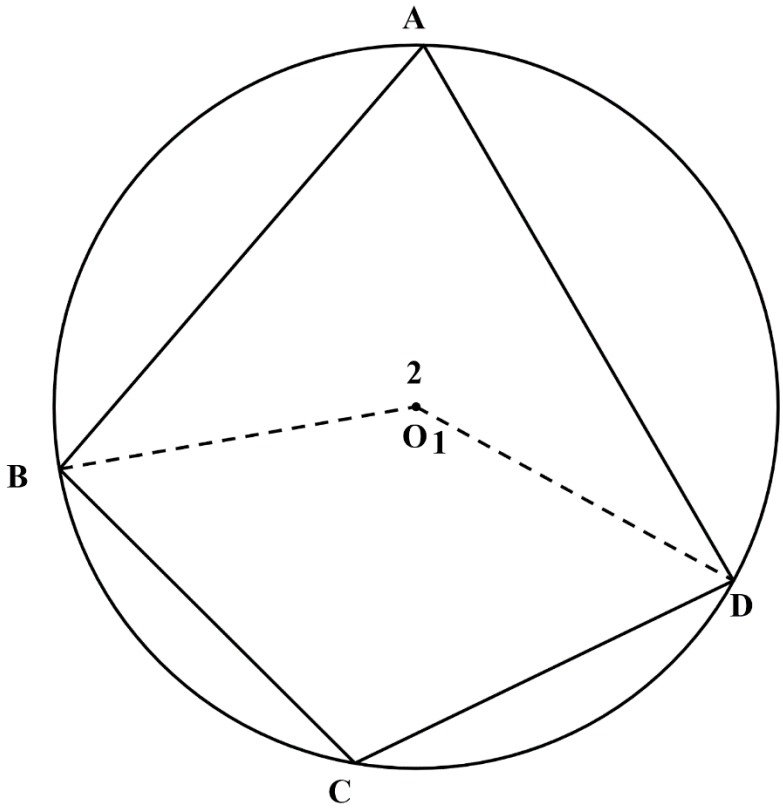
2.5	$\cos(90^o + x)\left[\frac{1}{tanx} + \frac{\sin x}{\sin(90° - x)}\right] = -\frac{1}{cosx}$ LH: $-sinx\left[\frac{1}{\frac{sinx}{cosx}} + \frac{sinx}{cosx}\right]$ $= -sinx\left[\frac{cosx}{sinx} + \frac{sinx}{cosx}\right]$ $= -sinx\left[\frac{cos^2x+sin^2x}{sinx.cosx}\right]$ $= -sinx\left[\frac{1}{sinx.cosx}\right]$ $= -\frac{1}{cosx}$ LH = RH	✓$\cos(90^o + x) = -sinx$ ✓$\sin(90° - x) = cosx$ ✓$tanx = \frac{sinx}{cosx}$ ✓$cos^2x + sin^2x$ ✓ $sinx.cosx$ ✓$cos^2x + sin^2x = 1$ (6)
		[31]

QUESTION/*VRAAG 3*

3.1	$3cos\theta - 2sin^2\theta = 0$ $3cos\theta - 2(1 - cos^2\theta) = 0$ $3cos\theta - 2 + 2cos^2\theta = 0$ $2cos^2\theta + 3cos\theta - 2 = 0$ $(2cos\theta - 1)(cos\theta + 2) = 0$ $cos\theta = \frac{1}{2}$ OR $cos\theta = -2$ ref $\angle$: 60° OR No solution 1 $\theta = 60° + k.360°, k\epsilon Z$ 4 $\theta = 360° - 60° + k.360°, k\epsilon Z$ $\theta = 300° + k.360°, k\epsilon Z$	✓$sin^2\theta = 1 - cos^2\theta$ ✓$2cos^2\theta + 3cos\theta - 2$ ✓ $cos\theta = \frac{1}{2}$ OR $cos\theta = -2$ ✓ $\theta = 60° + k.360°$ ✓ $\theta = 300° + k.360°$ ✓ $k \in Z$ (6)
3.2		✓Shape/*vorm* ✓intercepts with axis/ *afsnitte met asse* ✓Turning points/ *draaipunte* (3)
3.3.1	$-120° < \theta < 120°$	✓interval ✓notasion/ *notasie* (2)
3.3.2	720°	✓✓ answer (2)
		[13]

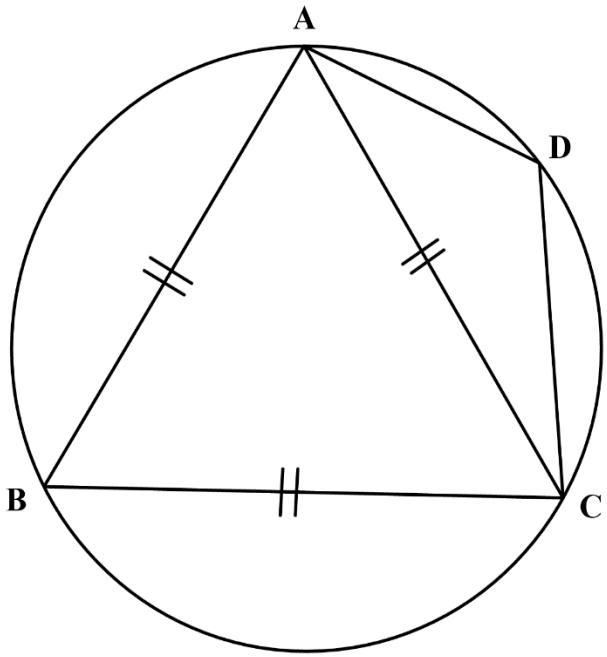
QUESTION/*VRAAG 4*

4.1

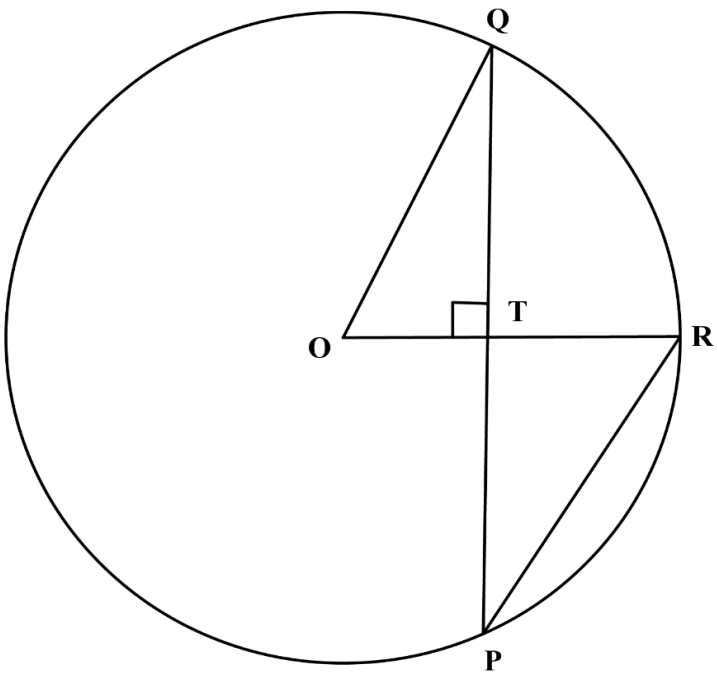


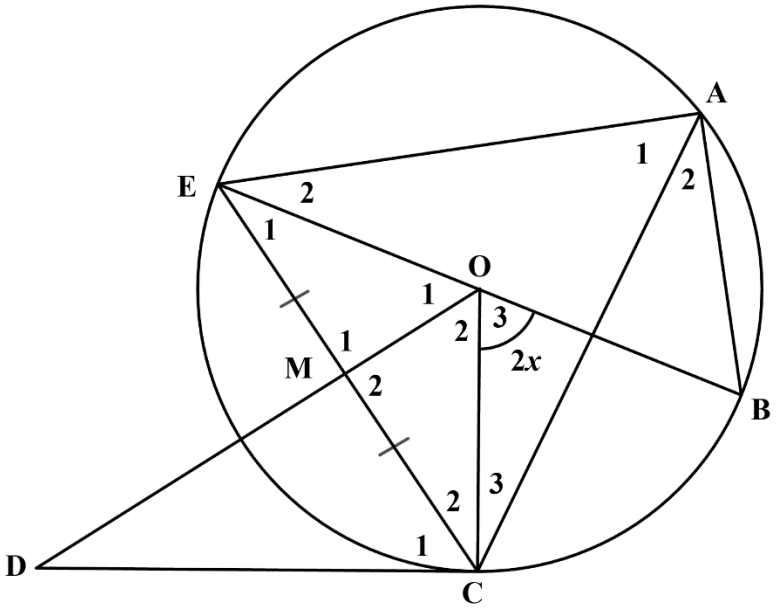
NOTE: If candidate fails to draw the construction or indicate the construction, it is an immediate BREAK DOWN. 0/5 marks.
NOTA: Indien kandidaat nie die konstruksie teken of aandui dat 'n konstruksie plaasvind nie, is dit 'n onmiddelike "BREAK DOWN" en daar word nie verder gemerk nie. 0/5 punte.

Construction: Connect BO and OD *Konstruksie: Verbind BO en OD*	✓ Construction/ *Konstruksie*
$\hat{O}_1 = 2\hat{A}$ [angle at centre = 2 × ∠ at circumference/ *middelpunts∠ = 2 × omtreks∠*]	✓S ✓R
$\hat{O}_2 = 2\hat{C}$ [angle at centre = 2 × ∠ at circumference/ *middelpunts∠ = 2 × omtreks∠*]	✓S/R
$\hat{O}_1 + \hat{O}_2 = 360°$ [$\angle^s$ around a point $= 360°$/ $\angle^e om\ 'n\ punt = 360°$]	✓S $\hat{O}_1 + \hat{O}_2 = 360°$
$\therefore 2\hat{A} + 2\hat{C} = 360°$ $\therefore \hat{A} + \hat{C} = 180°$	(5)

		
4.2	$\hat{B} = 60°$ [$\angle$s of equilateral Δ/ $\angle$e *van gelyksydige*Δ] $\hat{D} = 120°$ [opposite angles of cycl.quad/ *teenoorst hoeke KVH*]	✓S ✓S✓R (3)
		[8]

QUESTION/*VRAAG 5*

5.1		
5.1.1	$PQ = 24cm$ [line from centre ⊥ chord/ *lyn vanaf middelpunt ⊥ koord*]	✓S✓R (2)
5.1.2	$OT^2 = OQ^2 - QT^2$ [Pyth] $OT^2 = 13^2 - 12^2$ $OT = \sqrt{25}$ $OT = 5$ $\therefore TR = 13 - 5$ $\therefore TR = 8$ $PR^2 = TR^2 + PT^2$ [Pyth] $PR^2 = 8^2 + 12^2$ $PR = \sqrt{208}$ $\therefore PR = 4\sqrt{13}$ or PR = 14,42	✓ Subst into Pyth ✓$OT = 5$ ✓$TR = 8$ ✓$PR = \sqrt{208}$ (4)

5.2		
5.2.1	$\hat{E}_1 = x$ [angle at centre = 2 × ∠ at circumference/ *middelpunts∠ = 2 × omtreks∠* $\hat{A}_2 = x$ [∠s in the same segment/ ∠e *in dieselfde segment*] $\hat{C}_2 = x$ [∠s opp = radii/ *∠e teenoor = radiusse*]	✓S✓R ✓S✓R ✓S✓R (6)
5.2.2	$E\hat{A}B = 90°$ [∠ in semi circle/ *∠ in halwe sirkel*]	✓S✓R (2)
5.2.3	$\hat{M}_2 = 90$ [line from center to midpoint of chord/ *lyn vanaf middelpunt van sirkel na middelpunt van koord*] $\hat{C}_2 = x$ [proven/*bewys* in 5.2.1] $\therefore \hat{O}_2 = 90° - x$ [∠s of Δ/ ∠e *van* Δ]	✓S✓R ✓R (3)
5.2.4	$D\hat{C}O = 90°$ [radius ⊥ tangent / *radius ⊥ raaklyn*] $\therefore \hat{D} = 180° - (90° - x) - 90° = x$ [∠s of Δ/ ∠e *van* Δ] $\therefore \hat{D} = B\hat{E}C = x$ $\therefore DEOC$ is cycl. quad/ *KVH* [COVERSE ∠s in the same segment/ *OMGEKEERDE ∠e in dieselfde segment*] **OR** [= ∠s subt by line/ = *∠e onderspan deur lynstuk*] **OR/*OF*** $D\hat{C}O = 90°$ [radius ⊥ tangent / *radius ⊥ raaklyn*] $\therefore \hat{C}_1 = 90° - x$ But $\hat{O}_1 = 90° - x$ [∠s of Δ/ ∠e *van* Δ] $\therefore \hat{C}_1 = \hat{O}_1 = 90° - x$ $\therefore DEOC$ is cycl. quad/ *KVH* [COVERSE ∠s in the same segment/ *OMGEKEERDE ∠e in dieselfde segment*] **OR** [= ∠s subst by line/ = *∠e onderspan deur lynstuk*]	✓S✓R ✓S ✓R **OR/OF** ✓S✓R ✓S ✓R (4)
		[21]
	TOTAL/*TOTAAL*:	**100**