Province of the
EASTERN CAPE
EDUCATION

Iphondo leMpuma Kapa: Isebe leMfundo
Provinsie van die Oos Kaap: Department van Onderwys
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NATIONAL/*NASIONALE* SENIOR CERTIFICATE/*SERTIFIKAAT*

GRADE/*GRAAD* 12

JUNE/*JUNIE* 2025

MATHEMATICS P2/*WISKUNDE V2* MARKING GUIDELINE/*NASIENRIGLYN*

MARKS/*PUNTE*: 150

This marking guideline consists of 18 pages.
Hierdie nasienriglyn bestaan uit 18 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 a question, mark the crossed-out version.
- Consistency accuracy applies in ALL aspects of the marking guideline. Stop marking at the second calculation error.
- Assuming answers/values in order to solve a problem is NOT acceptable.

GEOMETRY	
S	A mark for a correct statement. (A statement mark is independent of a reason).
R	A mark for the correct reason. (A reason mark may only be awarded only if the statement is correct.)
S/R	Award a mark if a statement and a reason are both correct.

***NEEM KENNIS*:**

- *Indien 'n kandidaat 'n vraag TWEE keer beantwoord, merk slegs die EERSTE poging.*
- *Indien 'n kandidaat 'n poging van 'n vraag deurgetrek het en dit nie oorgedoen het nie, merk die deurgetrekte weergawe.*
- *Volgehoue Akkuraatheid geld in ALLE aspekte van die nasienriglyn. Hou op merk by tweede berekeningsfout.*
- *Om antwoorde/waardes te aanvaar om 'n probleem op te los is NIE aanvaarbaar NIE.*

MEETKUNDE	
S	*'n Punt vir korrekte stelling.* *('n Stelling punt is onafhanklik van die rede).*
R	*'n Punt vir die korrekte rede.* *('n Rede punt mag net toegeken word as die stelling korrek is).*
S/R	*'n Punt word toegeken as die stelling en die rede beide korrek is.*

QUESTION/ *VRAAG* 1

1.1 50 motorists/*motoriste* — ✓ answer/*antwoord* (1)

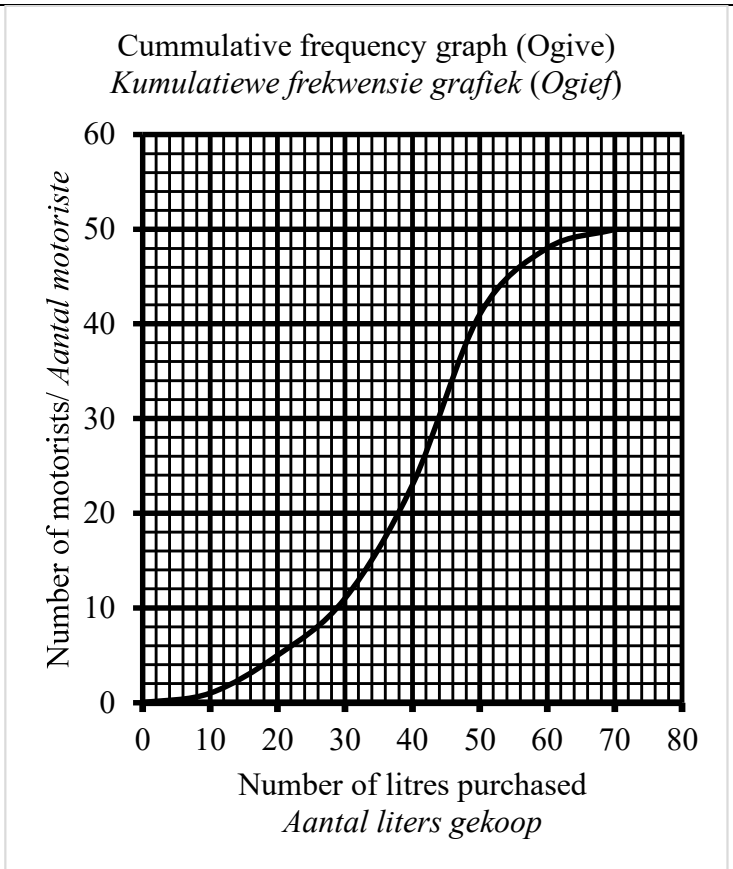
1.2 $40 \le x < 50$ — ✓ answer/*antwoord* (1)

1.3

No. of litres purchased *Aantal liters gekoop*	Frequency *Frekwensie*	Cumulative Frequency *Kumulatiewe Frekwensie*
$0 \le x < 10$	1	1
$10 \le x < 20$	4	5
$20 \le x < 30$	6	11
$30 \le x < 40$	12	23
$40 \le x < 50$	18	41
$50 \le x < 60$	7	48
$60 \le x < 70$	2	50

✓ correct frequency *korrekte frekwensie*
✓ {1, 5; 11}CM
✓ {23; 41; 48} CM
(3)

1.4



✓ grounding/*anker*
✓ plotting against the upper limit/*steek af teenoor die boonste limiet*
✓ shape/*vorm*
(3)

1.5 $Q_1 = 32$ (Accept/*Aanvaar* 31) — ✓ answer/*antwoord* (1)

1.6

$$\bar{x} = \frac{5\times1+15\times4+25\times6+35\times12+45\times18+55\times7+65\times2}{50}$$

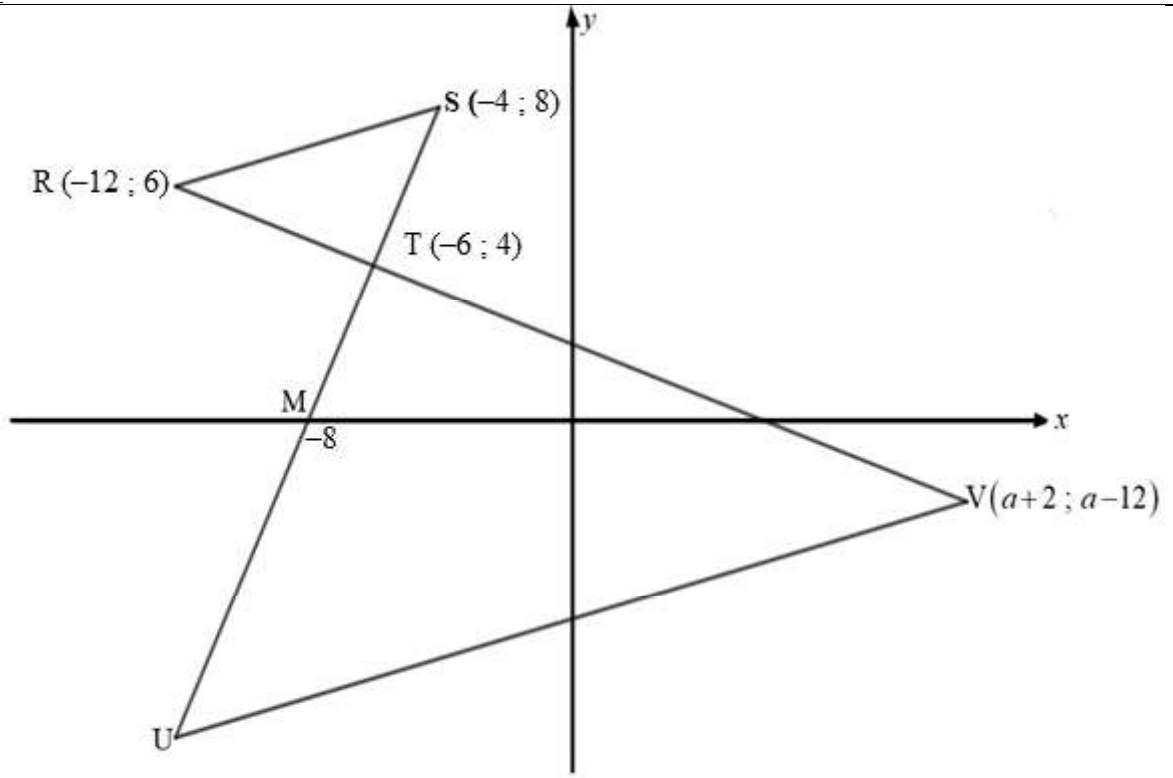
$$= \frac{1960}{50}$$

$$= 39,2$$

✓ correct frequency *korrekte frekwensie*
✓ division by 50/ *deel deur* 50
✓ answer/*antwoord*
(3)

1.7	75^{th} percentile/75^{ste} *persentiel* $= \frac{75}{100} \times 50$ $= 37,5$	✓ multiplication by 50/ *vermenigvuldig met* 50 ✓ answer / *antwoord*	(2)
1.8	$Q_3 = 48$ $IQR = Q_3 - Q_1 = 48 - 32 = 16$	✓ Q_3 ✓ answer/*antwoord*	(2)
1.9	No. of motorists that are greater or equal to 75^{th} percentile is 13 number of motorists at 75^{th} percentile or above $= 13$ Total reward for motorists at 75^{th} *or above* $= 13 \times 60 \times R0,40$ $= 312$ *Aantal motoriste gelyk aan of groter as die* 75^{ste} *persentiel is* 13 *Aantal motoriste by* 75^{ste} *persentiel of bo* = 13 *Totale beloning vir motoriste by* 75^{ste} *persentiel of bo* = 13 x 60 x R0,40 = R312,00	✓ 13 ✓ 312	(2)
			[18]

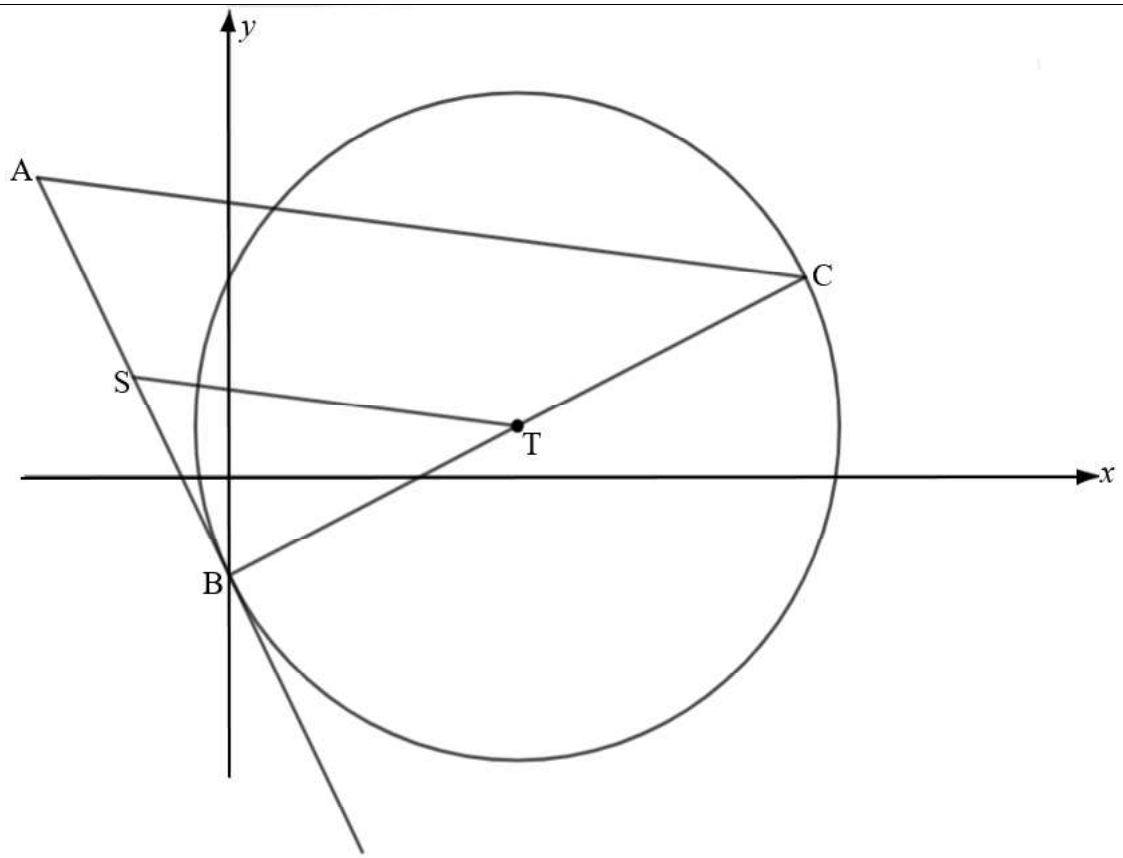
QUESTION/*VRAAG* 2



2.1	$m_{RV} = \frac{6-4}{-12+6}$ $= -\frac{1}{3}$	✓ substitution into correct formula *vervanging in korrekte formule* ✓ answer / *antwoord*	(2)
2.2	$RT = \sqrt{(-12+6)^2 + (6-4)^2}$ $= 2\sqrt{10}$	✓ substitution into correct formula *vervanging in korrekte formule* ✓ answer / *antwoord*	(2)
2.3	$\frac{a-12-4}{a+2+6} = -\frac{1}{3}$ $\frac{a-16}{a+8} = -\frac{1}{3}$ $3a-48 = -a-8$ $4a = 40$ $a = 10$	✓ $m_{RV} = m_{TV}$ ✓ simplification / *vereenvoudiging* ✓ answer/*antwoord*	(3)
2.4	$-8 = \frac{-4+x}{2}$; $0 = \frac{8+y}{2}$ $-12 = x$; $-8 = y$	✓ correct substitution/ *korrekte vervanging* ✓ both *x*-and *y*-value/ *beide x-en y-waarde*	(2)

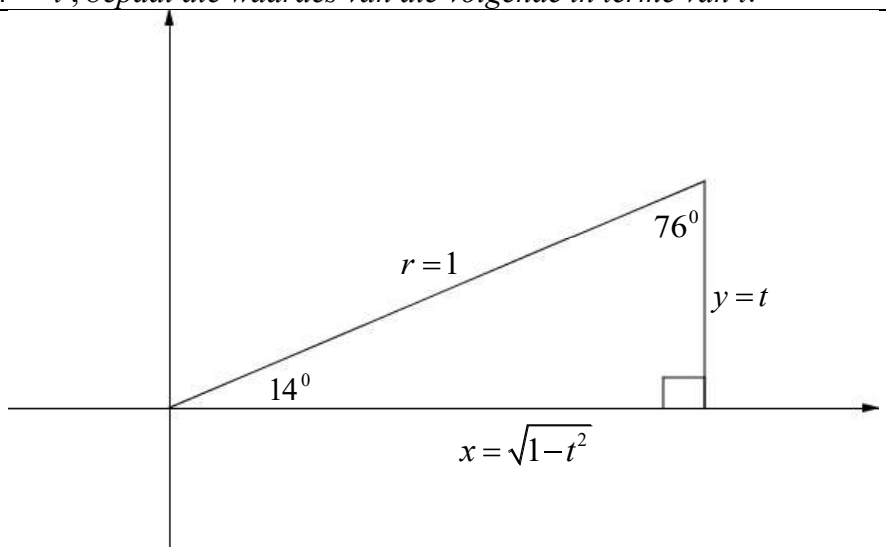
2.5	$m_{SU} = \frac{8-4}{-4+6}$ $= 2$ $y - 8 = 2(x+4)$ $y = 2x + 16$	✓ correct gradient / *korrekte gradiënt* ✓substitution of m_{SU} and *vervanging van* m_{SU} *en* S(–4 ; 8) or/*of* T(4 ; 6) or/*of* M(–8 ; 0) ✓ equation / *vergelyking*	(3)
2.6	$\tan\theta = m_{SU} = 2$ $\theta = 63,43°$ $\tan\alpha = m_{RV} = -\frac{1}{3}$ $\alpha = 161,57^0$ $\therefore \hat{TUV} = 161,57° - 63,43°$ [ext.∠of a Δ] $= 98,14°$ [buite∠van 'n Δ]	✓ $\theta = 63,43°$ ✓ $\alpha = 161,57°$ ✓ $161,57° - 63,43°$ ✓ answer / *antwoord*	(4)
		°	
2.7	$TV = 4 \times 2\sqrt{10}$ $= 8\sqrt{10}$ $UT = \sqrt{(-12+6)^2 + (-8-4)^2}$ $= 6\sqrt{65}$ Area of $\Delta TUV = \frac{1}{2} \times 8\sqrt{10} \times 6\sqrt{65} \times \sin 98,14°$ $= 168$	✓ $TV = 8\sqrt{10}$ ✓ $UT = 2\sqrt{73}$ ✓correct substitution/ *korrekte vervanging* ✓answer / *antwoord*	(4)
			[20]

QUESTION/*VRAAG* 3

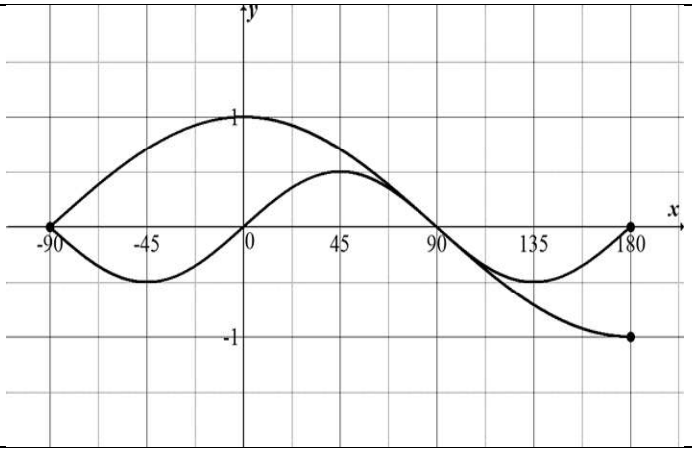


3.1	$x^2+y^2-12x-2y-8=0$ $(x-6)^2+(y-1)^2=45$ $T(6\,;1)$	✓ $(x-6)^2+(y-1)^2=45$ ✓ x-value / *waarde* ✓ y-value / *waarde*	(3)
3.2	$x^2+y^2-12x-2y-8=0$ $0^2+y^2-12(0)-2y-8=0$ $y^2-2y-8=0$ $(y-4)(y+2)=0$ $y\neq 4$ or / *of* $y=-2$ $B(0;-2)$	✓ $x=0$ ✓ standard form / *standaardvorm* ✓ $y=-2$	(3)

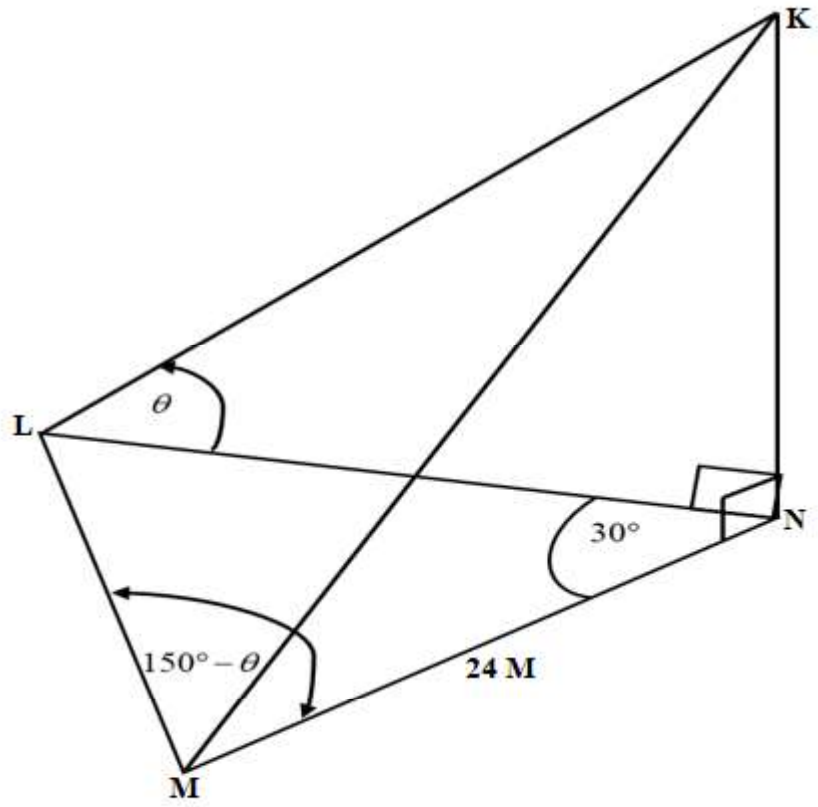
3.3	$y=-\frac{x}{8}+\frac{7}{8}$ $m_{ST}=-\frac{1}{8}$ $\tan\beta=-\frac{1}{8}$ $\beta=172,875^0$ Inclination of AC = inclination of ST *Inklinasie van* AC = *inklinasie van* ST AC||ST	✓ equation of ST in the form $y=mx+c$ *Vergelyking van ST in die vorm* $y=mx+c$ ✓ $m_{ST}=-\frac{1}{8}$ ✓ angle of inclination of ST *hoogtehoek van* ST	
	OR / *OF* $y=-\frac{x}{8}+\frac{7}{8}$ $m_{ST}=-\frac{1}{8}$ $=-0,125$ $m_{AC}=\tan 172,825$ $=-0.125$	**OR / *OF*** ✓ equation of ST in the form $y=mx+c$ *Vergelyking van ST in die vorm* $y=mx+c$ ✓ $m_{ST}=-0,125$ ✓ $m_{AC}=-0,125$	(3)
3.4.1	$ST=\sqrt{65}$ $AC=2ST$ [midpoint theorem] [*middelpunt – stelling*] $=2\sqrt{65}$	✓ AC = 2ST ✓answer / *antwoord*	(2)
3.4.2	$6=\frac{0+x}{2}$; $1=\frac{-2+y}{2}$ $x=12$; $y=4$ $C(12\ ;\ 4)$	✓ *x*-value / *waarde* ✓ *y*-value / *waarde*	(2)
3.4.3	$\left(2\sqrt{65}\right)^2=(-4-12^2+(k-4)^2$ $4=(k-4)^2$ $k-4=\pm 2$ $k=6$ *or* $k\neq 2$	✓ substitution into correct formula *vervanging in die korrekte formule* ✓ standard form/*standaardvorm* ✓ *k*-value/*waarde*	(3)
3.4.4	$A\hat{B}C=90°$ [diameter ⊥ tan] / [*middellyn* ⊥ *raaklyn*] ∴ AC is the diameter [line subt 90°] *AC is die middellyn* [*lynstuk onderspan* 90°] $M_{AC}(4\ ;\ 5)$ $r^2=65$ $(x-4)^2+(y-5)^2=65$	✓ $A\hat{B}C=90°$ ✓ midpoint of AC *middelpunt van* AC ✓ r^2 ✓ correct equation *korrekte vergelyking*	(4)
			[20]

QUESTION/*VRAAG* 4			
4.1	If $\sin 14° = t$, determine the values of the following in terms of t: *As* $\sin 14° = t$, *bepaal die waardes van die volgende in terme van* t:		
			
4.1.1	$x=\sqrt{1-t^2}$ Pyth theorem/*Pythagoras Stelling* $\cos 14^0 = \frac{\sqrt{1-t^2}}{1}$	✓ $x=\sqrt{1-t^2}$ ✓ answer / *antwoord*	(2)
4.1.2	$\sin 38°$ can be expressed as: $\sin 38°$ *kan uitgedruk word as*: $1-2\sin^2 38° = \cos 76°$ $\sin^2 38° = \frac{1-\cos 76°}{2}$ $\sin 38° = \sqrt{\frac{1-\cos 76°}{2}}$ $= \sqrt{\frac{1-t}{2}}$	✓ $\sin^2 38°$ ✓ $\sin 38°$ ✓ answer / *antwoord*	(3)
4.1.3	$\sin 59° = \sin(45°+14°)$ $= \sin 45°\cos 14° + \sin 14°\cos 45°$ $= \frac{\sqrt{2}}{2}\times\frac{\sqrt{1-t^2}}{1} + t\times\frac{\sqrt{2}}{2}$ $= \frac{\sqrt{2}\left(\sqrt{1-t^2}+t\right)}{2}$	✓ compound angle *saamgestelde hoek* ✓ expansion / *uitbreiding* ✓ ✓ each term / *elke term*	(4)

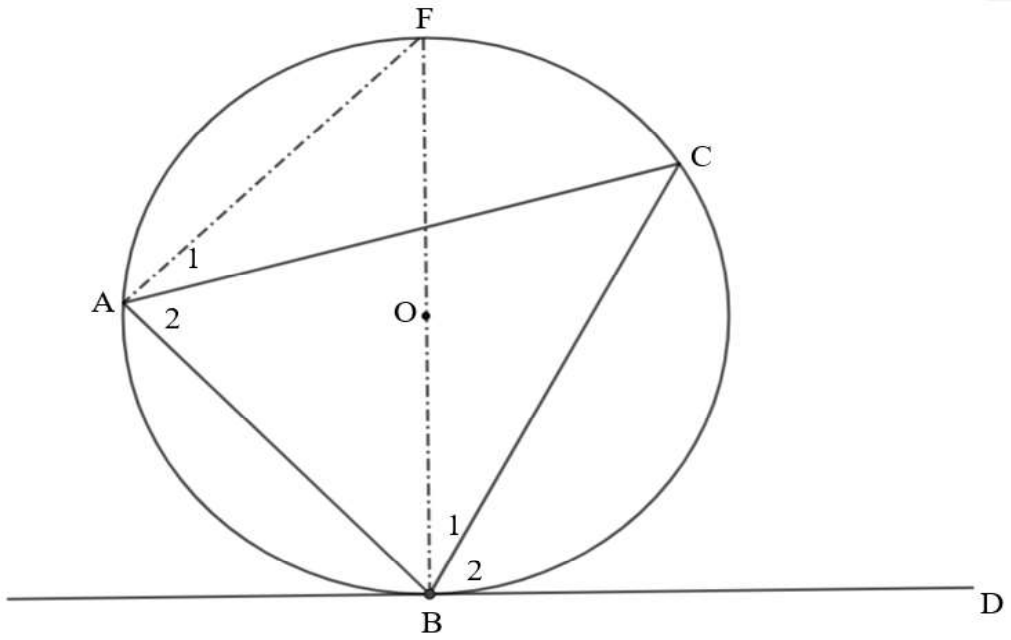
4.2	$\sin A.\tan\left(\frac{1}{2}A-360°\right)-1$ $=2\sin\frac{1}{2}A.\cos\frac{1}{2}A.\tan\frac{1}{2}A-1$ $=2\sin\frac{1}{2}A.\cos\frac{1}{2}A.\frac{\sin\frac{1}{2}A}{\cos\frac{1}{2}A}-1$ $=2\sin^2\frac{1}{2}A-1$ $=-\left(1-2\sin^2\frac{1}{2}A\right)$ $=-\cos A$	✓ $2\sin\frac{1}{2}A\cos\frac{1}{2}A$ ✓ $\tan\frac{1}{2}A$ ✓ $\frac{\sin\frac{1}{2}A}{\cos\frac{1}{2}A}$ ✓ simplification / *vereenvoudiging* ✓ factors / *faktore* ✓ answer / *antwoord*	(6)
4.3.1	$f(x)=\frac{2\cos x\cos(90°-x)}{\cos^2 x+\sin(180°+x).\cos(-x).\tan x}$ $=\frac{2\cos x.\sin x}{\cos^2 x+(-\sin x).\cos x\frac{\sin x}{\cos x}}$ $=\frac{2\cos x.\sin x}{\cos^2 x-\sin^2 x}$ $=\frac{\sin 2x}{\cos 2x}$ $=\tan 2x$	✓ $\sin x$ ✓ $-\sin x$ ✓ $\cos x$ ✓ $\frac{\sin x}{\cos x}$ ✓ $\sin 2x$ ✓ $\cos 2x$	(6)
4.3.2	$x=-45°$ and/*en* $x=45°$	✓ $x=-45°$ ✓ $x=45°$	(2)
4.4.1	$\cos(\theta+30^0)=\frac{1}{2}\sin\theta$ $\cos\theta\cos 30°-\sin\theta\sin 30°=\frac{1}{2}\sin\theta$ $\frac{\sqrt{3}}{2}\cos\theta-\frac{1}{2}\sin\theta-\frac{1}{2}\sin\theta=0$ $\frac{\sqrt{3}}{2}\cos\theta-\sin\theta=0$ $\sin\theta=\frac{\sqrt{3}}{2}\cos\theta$ $\tan\theta=\frac{\sqrt{3}}{2}$ $\theta=40,89°+180°.k$ or/*of* $\theta=220,89°+180°.k \quad k\in Z$	✓ correct expansion / *korrekte uitbreiding* ✓ standard form of equation / *standaardvorm van vergelyking* ✓ $\tan\theta=\frac{\sqrt{3}}{2}$ ✓ $\theta=40,89°+180°.k, \quad k\in Z$	(4)
4.4.2	$\theta=40,89°$ and/*en* $-139,11°$	✓✓ each value / *elke waarde*	(2)
			[29]

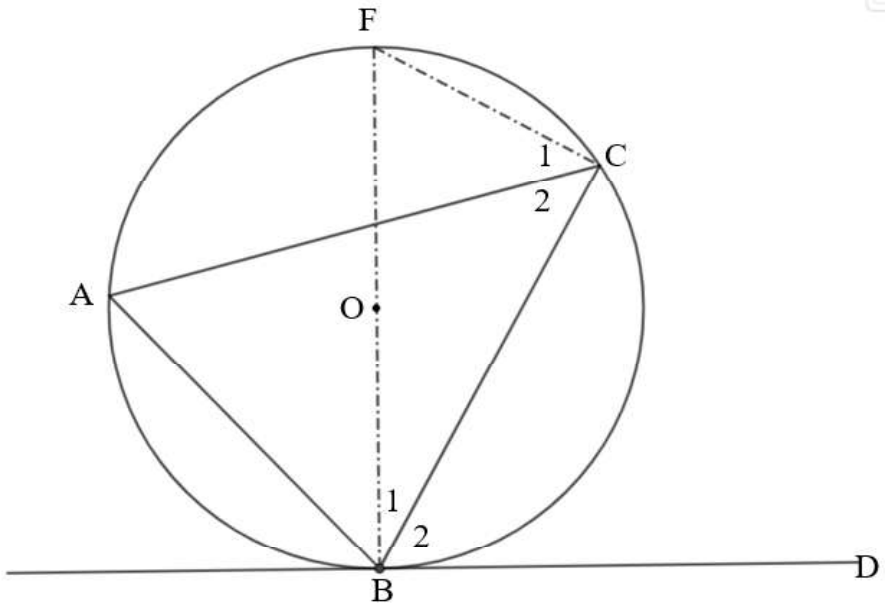
QUESTION/*VRAAG* 5			
5.1	Period/*Periode* = 720°	✓ answer / *antwoord*	(1)
5.2	$y \in [-2;0]$ **OR / *OF*** $-2 \le y \le 0$	✓ correct critical values/ *korrekte kritieke waardes* ✓ correct notation/ *korrekte notasie*	(2)
5.3		✓ correct *x*-intercepts *korrekte x-afsnitte* ✓ correct turning points *korrekte draaipunte* ✓ shape/*vorm*	(3)
5.4	$y = -\frac{1}{2}$	✓ answer / *antwoord*	(1)
5.5	$\sin x \cos x - \cos x = 0$ $\frac{1}{2}\sin 2x = \cos x$ $\therefore x = -90^0$ or $x = 90^0$	✓ identity/*identiteit* $\frac{1}{2}\sin 2x$ ✓ $x = -90°$ ✓ $x = -90°$	(3)
			[10]

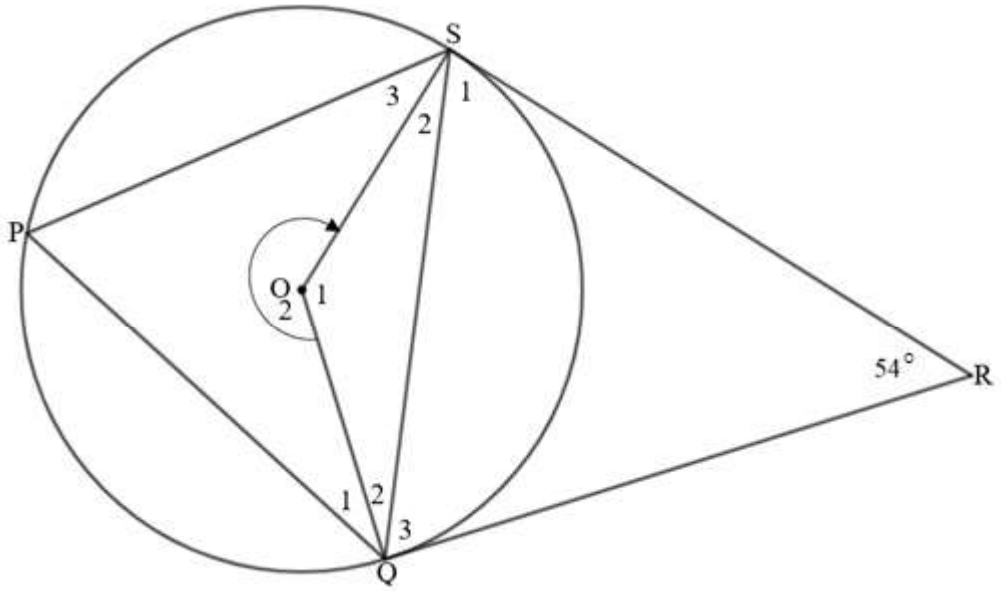
QUESTION/*VRAAG* 6



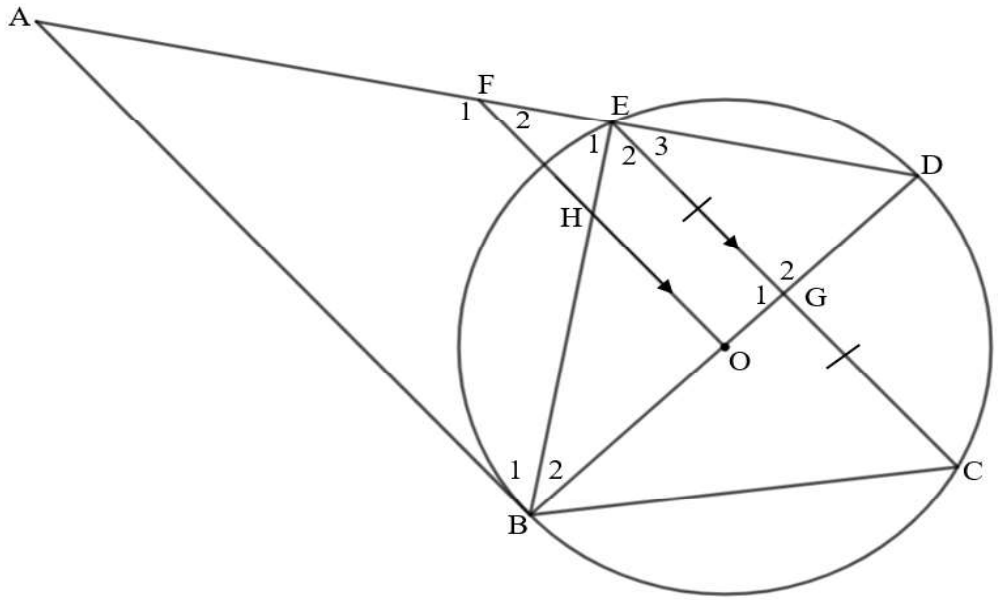
6.1	$M\hat{L}N = 180° - 30° - 150° + \theta = \theta$	✓ answer / *antwoord*	(1)
6.2	$\frac{LN}{\sin(150° - \theta)} = \frac{24}{\sin\theta}$ $LN = \frac{24 \times \sin(150° - \theta)}{\sin\theta}$ $= \frac{24[\sin 150° \cos\theta - \sin\theta \cos 150°]}{\sin\theta}$ $= \frac{24[\sin 30° \cos\theta - \sin\theta(-\cos 30°)]}{\sin\theta}$ $= \frac{24\left[\frac{1}{2}\cos\theta + \frac{\sqrt{3}}{2}\sin\theta\right]}{\sin\theta}$ $= \frac{12\cos\theta + 12\sqrt{3}\sin\theta}{\sin\theta}$	✓ correct substitution into sine rule/ *korrekte vervanging in die sinusreël* ✓ expansion of compound angle/ *uitbreiding van saamgestelde hoek* ✓ reduction for both trig ratios/ *reduksie vir beide trig. verhoudings* ✓ answer / *antwoord*	(4)

6.3	$\tan\theta = \frac{KN}{LN}$ $KN = \tan\theta \times \frac{12\cos\theta + 12\sqrt{3}\sin\theta}{\sin\theta}$ $= \frac{\sin\theta}{\cos\theta} \times \frac{12\cos\theta}{\sin\theta} + \frac{\sin\theta}{\cos\theta} \times \frac{12\sqrt{3}\sin\theta}{\sin\theta}$ $= 12 + 12\sqrt{3}\tan\theta$	✓ correct trig ratio/ *korrekte trig verhouding* ✓ correct substitution/ *korrekte vervanging* ✓ $\tan\theta$ in terms of $\sin\theta$ and $\cos\theta$ / $\tan\theta$ *in terme van* $\sin\theta$ *en* $\cos\theta$	(3)
6.4	$46 = 12 + 12\sqrt{3}\tan\theta$ $12\sqrt{3}\tan\theta = 34$ $\tan\theta = \frac{34}{12\sqrt{3}}$ $\theta = 58,56^0$	✓ substitution / *vervanging* ✓ $\tan\theta = \frac{34}{12\sqrt{3}}$ ✓ answer / *antwoord*	(3)
			[11]
QUESTION/*VRAAG* 7			
7.1			
	Constructions: Draw diameter BF and join FA Proof: $F\hat{B}D = 90°$ [tan ⊥ diameter] $\hat{A} = 90°$ [∠ in semi − circle] $\hat{A}_1 = \hat{B}_1$ [∠s same segment] $\therefore C\hat{A}B = C\hat{B}D$ $C\hat{B}D = \hat{A}$	✓ construction ✓ S/R ✓S ✓R ✓S/R	

	Konstruksies: Teken middellyn BF *en verbind* FA *Bewys*: $F\hat{B}D = 90°$ $[raaklyn \perp middellyn]$ $\hat{A} = 90°$ $[\angle in\ semi-sirkel]$ $\hat{A}_1 = \hat{B}_1$ $[\angle e\ in\ dieselfde\ segment]$ $\therefore C\hat{A}B = C\hat{B}D$ $C\hat{B}D = \hat{A}$	✓ *konstruksie* ✓ S/R ✓S ✓R ✓S/R	
	OR/*OF*		
			
	Constructions: Draw diameter BF and join FC	✓ construction	
	$F\hat{C}B = 90°$ $[\angle in\ semi-circle]$ $\hat{F} + \hat{B}_2 = 90°$ $[sum\ of\ \angle s\ in\ a\ \Delta]$ $F\hat{B}D = 90°$ $[tan \perp diameter]$ $\therefore \hat{B}_1 = \hat{F}$ $\therefore \hat{A}_1 = \hat{B}_1$ $[\angle s\ same\ segment]$ $\therefore C\hat{A}B = C\hat{B}D$ $C\hat{B}D = \hat{A}$	✓ S/R ✓S ✓R ✓S/R	

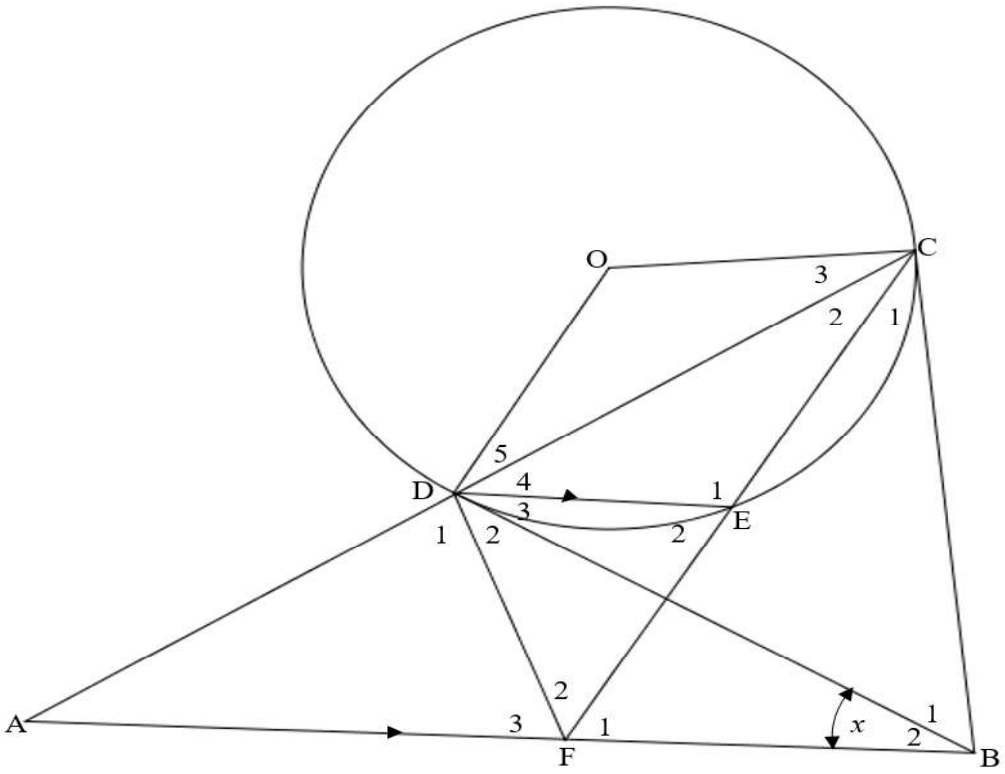
	Konstruksies: Teken middellyn BF *en verbind* FC $F\hat{C}B = 90°$ $[\angle\, in\, semi-sirkel]$ $\hat{F}+\hat{B}_2 = 90°$ $[som\ van\ \angle e\ in\ 'n\ \Delta]$ $F\hat{B}D = 90°$ $[raaklyn \perp middellyn]$ $\therefore \hat{B}_1 = \hat{F}$ $\therefore \hat{A}_1 = \hat{B}_1$ $[\angle e\ in\ dieselfde\ segment]$ $\therefore C\hat{A}B = C\hat{B}D$ $C\hat{B}D = \hat{A}$	✓ *konstruksie* ✓ S/R ✓S ✓R ✓S/R	(5)
7.2			
7.2.1	$QR = SR$ [tangents from same point] [*raaklyne vanaf dieselfde punt*] $\hat{Q}_3 = \hat{S}_1$ [∠s opp = sides] / [$\angle e$ *teenoor* = *sye*] $2\hat{Q}_3 = 180° - 54°$ [∠s in a Δ] / [$\angle e$ *in 'n* Δ] $\hat{Q}_3 = 63°$	✓ S/R ✓S ✓R ✓S	(4)
7.2.2	$\hat{P} = \hat{Q}_3 = 63°$ [tan chord theorem] / [*raaklyn – koord stelling*]	✓S ✓ R	(2)
7.2.3	$\hat{O}_1 = 2\hat{P} = 126°$ [∠ at centre = 2 × ∠ at circumference] [*Middelpunts* $\angle = 2 \times$ *omtrekshoek*]	✓S ✓ R	(2)
			[13]

QUESTION/*VRAAG* 8



8.1	$A\hat{B}D = 90°$ [tan ⊥ rad] / [*raaklyn ⊥ radius*] $\hat{G}_1 = 90°$ [line from centre to midpoint] [*lyn vanaf middelpunt van sirkel*] $\therefore A\hat{B}D = \hat{G}_1$ $\therefore AB \parallel EC$ [corresp. ∠s =] / [*ooreenkomstige ∠e*]	✓ S ✓R ✓ S/R ✓ R	(4)
8.2	$\hat{B}_1 = \hat{D}$ [tan chord theo] / [*raaklyn – koord stelling*] $\hat{D} = \hat{C}$ [∠s same seg] / [*∠e in dieslefde segment*] $\hat{B} = \hat{E}_2$ [alt. ∠s / *verw.∠e*, AB ∥ EC] $\therefore \hat{C} = \hat{E}_2$ $\therefore BE = BC$ [sides opp = ∠s] / [*sye teenoor = ∠e*]	✓ S/R ✓ S/R ✓S ✓R	(4)
8.3	$GD + GO = OB$ [radii] / [*radiusse*] $\frac{HE}{HB} = \frac{OG}{BO} = \frac{2}{5}$ [line ∥ to one side of a Δ/ prop theo, FO∥EC] / [*lyn ∥ aan een sy van 'n Δ eweredigh – st: FO∥EC*] $\frac{FE}{FA} = \frac{EH}{HB} = \frac{2}{5}$ [line ∥ to one side of a Δ/ prop theo, FO∥AB] / [*lyn ∥ aan een sy van 'n Δ eweredigh – st: FO∥EC*]	✓ S ✓R ✓S	(3)
8.4	$BE^2 = 20^2 - 12^2$ [Pyth theorem] / [*Pyth. Stelling*] $BE = 16$ $\therefore BE = BC = 16$	✓ Pyth theorem/ *Pyth Stelling* ✓ BE ✓ BC	(3)
			[14]

QUESTION/*VRAAG* 9



9.1	$\hat{B}_2 = \hat{D}_3 = x$ [alt.∠s, / *verw.∠e* : DE|| AB] $\hat{D}_3 = \hat{C}_2$ [tan chord theorem]/[*raaklyn – koord Stelling*] $\hat{B}_2 = \hat{C}_2$ ∴ CDFB is a cyclic quad [converse ∠s in the same seg] *CDFB is 'n koordevierhoek* [*omgekeerde – ∠e in dies.segment*]	✓ S/R ✓ S ✓R ✓R	(4)
9.2	$F\hat{B}C = \hat{D}_1$ [ext ∠ of a cyclic quad]/[*buite ∠ van koordevierhoek*] $\hat{C}_1 = \hat{D}_4$ [tan – chord theorem]/[*raaklyn – koord stelling*] $\hat{A} = \hat{D}_4$ [corresp.∠*s*, DE ∥ AB]/[*ooreenk.∠e*, DE ∥ AB] $\hat{A} = \hat{C}_1$ [both/*beide* $= D_4$] $\hat{F}_1 = \hat{F}_3$ [3rd/*de* ∠] ∴ ΔADF ||| ΔCBF [∠ ∠ ∠]	✓ S/R ✓ S/R ✓ S ✓ R	(4)

9.3	$\frac{AD}{CB}=\frac{DF}{BF}$ ||| Δs/*e* $AD=\frac{DF.CB}{BF}$ but/*maar*: CB = DB [tan from common point] [*raaklyn vanaf gemene punt*] $\therefore AD=\frac{DF.DB}{BF}$	✓ S ✓R ✓ simplification/ *vereenvoudiging* ✓ S/R	(4)
9.4	$\frac{AC}{AD}=\frac{CF}{FE}$ [line ||to one side of a Δ] [*lyn* || *aan een sy van 'n* Δ] $AD=\frac{AC.FE}{CF}$ $\frac{AC.FE}{CF}=\frac{DF.DB}{BF}$	✓ S ✓R ✓ $AD=\frac{AC.FE}{CF}$	(3)
			[15]
		TOTAL/*TOTAAL*:	**150**