



Province of the
EASTERN CAPE
EDUCATION

Iphondo leMpuma Kapa: Isebe leMfundo
Provinsie van die Oos Kaap: Department van Onderwys
Porafensie Ya Kapa Botjhabela: Lefapha la Thuto

NASIONALE SENIOR SERTIFIKAAT

GRAAD 11

NOVEMBER 2025

WISKUNDE V2

PUNTE: 150

TYD: 3 uur

Hierdie vraestel bestaan uit 16 bladsye, insluitend 'n inligtingsblad en 'n

INSTRUKSIES EN INLIGTING

Lees die volgende instruksies aandagtig deur voordat die vrae beantwoord word.

1. Hierdie vraestel bestaan uit 10 vrae.
2. Beantwoord AL die vrae in die SPESIALE ANTWOORDEBOEK wat voorsien word.
3. Dui ALLE berekeninge, diagramme, grafieke, ens. wat jy in die beantwoording van die vrae gebruik het, duidelik aan.
4. Slegs antwoorde sal NIE noodwendig volpunte verdien NIE.
5. Jy mag 'n goedgekeurde wetenskaplike sakrekenaar gebruik (nieprogrammeerbaar en niegrafies), tensy anders vermeld.
6. Indien nodig, rond antwoorde tot TWEE desimale plekke af, tensy anders vermeld.
7. Diagramme is NIE noodwendig volgens skaal geteken NIE.
8. 'n Inligtingsblad met formules is aan die einde van die vraestel ingesluit.
9. Skryf netjies en leesbaar.

VRAAG 1

Die volgende data stel die prystoekenning (in R1 000) voor vir die top tien mans, wat die 2025 20 km marathon voltooi, gelys in dalende volgorde vanaf 10^{de} plek tot die eerste plek. Neem kennis dat die prysgeld vir die 6^{de} plek en 3^{de} plek nie bekend gemaak was nie.

Die gemiddelde prys vir die beskikbare data is R21 770.

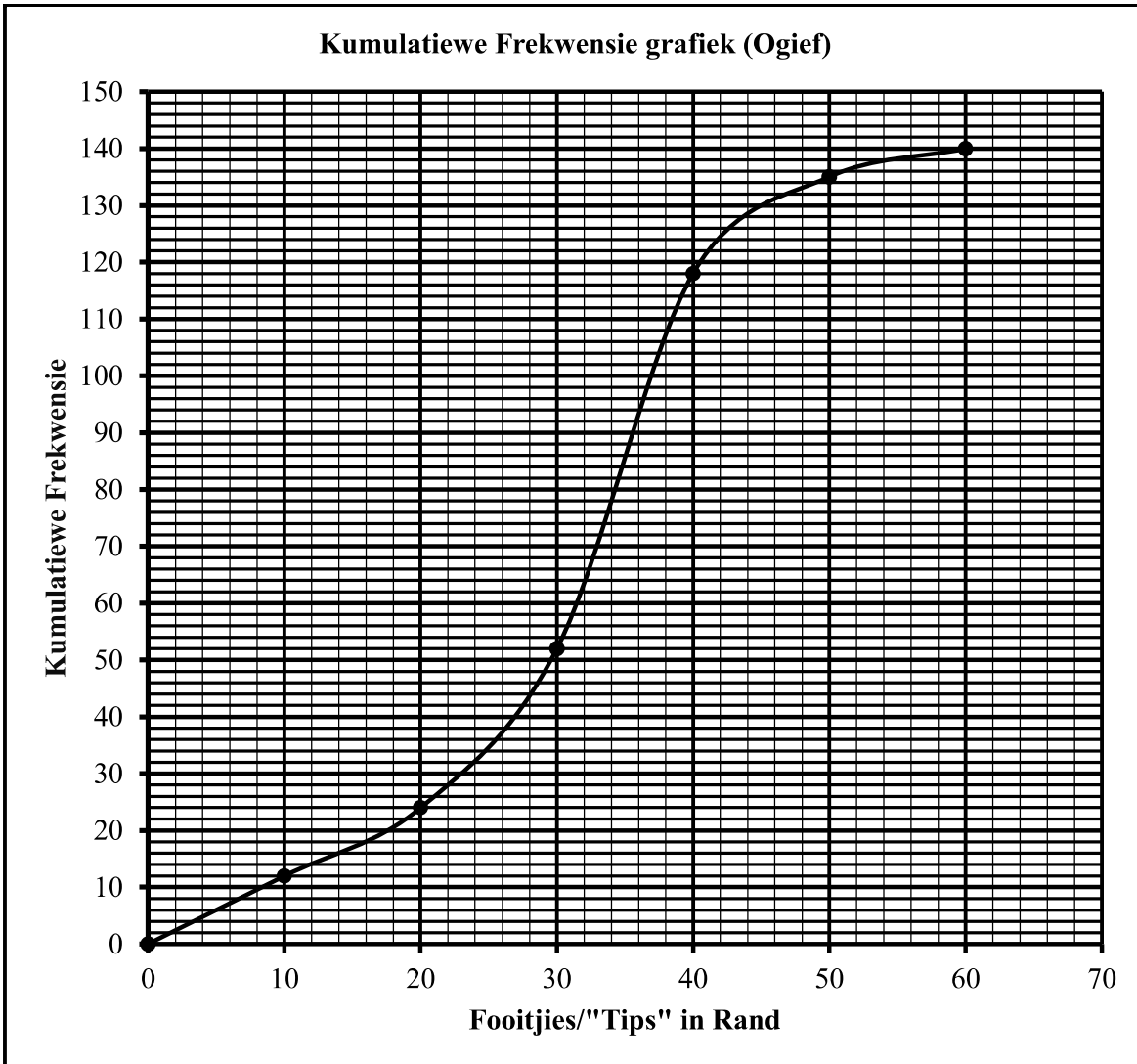
Pryse	3 600	4 500	5 400	6 200	x	12 300	15 800	y	43 800	87 500
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- 1.1 Bereken die waarde van x as die mediaan (Q_2) van die data 9 700 is. (2)
- 1.2 Bereken die waarde van y . (3)
- 1.3 Identifiseer enige uitskieter. (1)
- 1.4 Bepaal die standaardafwyking van die prysgeld. (2)
- 1.5 'n Bedrag van R200 word by elk van die top 10 deelnemers bygevoeg. Hoe sal hierdie verstelling, die gemiddelde, die mediaan en die standaardafwyking van die data affekteer? (3)

[11]

VRAAG 2

Die kumulatiewe frekwensiegrafiek stel data voor van 'n opname gedoen in 'n sekere restaurant wat die verspreiding van footjies / "tips" verdien deur werknemers gedurende hulle skof.

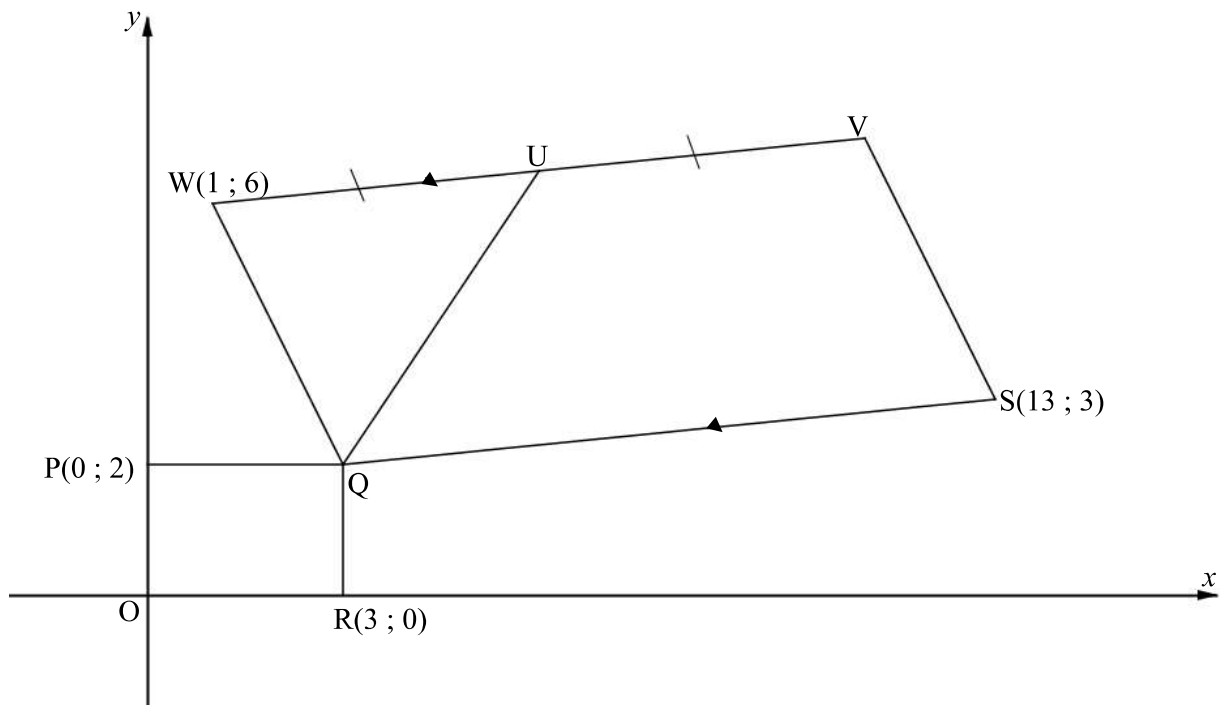


- 2.1 Hoeveel werknemers het aan die opname deelgeneem? (1)
- 2.2 Skryf die modaleklas van die data neer. (1)
- 2.3 Bepaal, vanaf die kumulatiewe frekwensiegrafiek, hoeveel werknemers R24 of minder verdien het. (2)
- 2.4 Bepaal die aantal werknemers wat $R20 \leq x \leq R40$ verdien het. (2)
- 2.5 Bepaal die 25^{ste} persentiel en boonste kwartiel van die data. (2)
- 2.6 Bereken die interkwartielvariasiewydte van die data. (2)

[10]

VRAAG 3

In die diagram is, $W(1; 6)$, V , S en Q die hoekpunte van 'n vierhoek, $WVSQ$. $P(0; 2)$ is die punt waar lyn PQ die y -as sny en $R(3; 0)$ is die punt waar lyn QR die x -as sny. $WV \parallel QS$ en $WU = UV$. $PQRO$ is 'n reghoek.

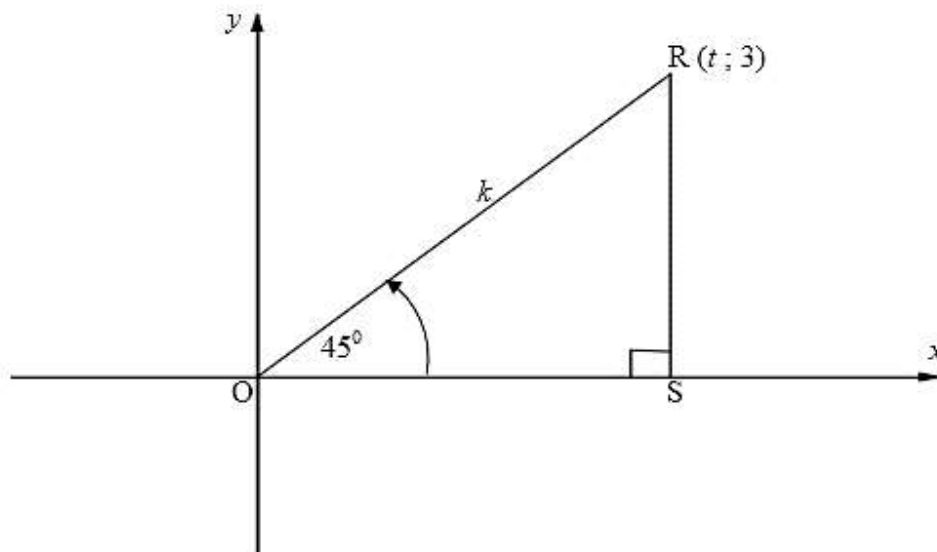


- 3.1 Skryf die koördinate van Q neer. (1)
- 3.2 Bereken die gradiënt van QS . (2)
- 3.3 Bepaal die vergelyking van WV . (3)
- 3.4 As dit verder gegee word dat die vergelyking van QU , $y = \frac{3}{2}x - \frac{5}{2}$ is, toon aan dat die koördinate van V , $(11; 7)$ is. (5)
- 3.5 Bewys dat $WVSQ$ 'n parallelogram is. (4)
- 3.6 Bepaal die lengte van WV . **Laat jou antwoord in wortelvorm.** (2)
- 3.7 Bereken die grootte van $\hat{WUQ}$. (4)
- 3.8 Bepaal die verhouding: $\frac{\text{Oppervlakte van } PQRO}{\text{Oppervlakte van } \triangle QUW}$ (6)

[27]

VRAAG 4

- 4.1 In die diagram hieronder is O die oorsprong. $OR = k$, $\hat{ROS} = 45^\circ$, $R(t; 3)$ is 'n punt in die eerste kwadrant en punt S lê op die x -as sodat $OS \perp RS$.



Bereken, sonder die gebruik van 'n sakrekenaar, die waarde(s) van die volgende:

- 4.1.1 t (2)
- 4.1.2 k (2)
- 4.2 Gegee: $8\cos^2 \alpha - 2 = 0$
- 4.2.1 Bepaal die waarde van $\cos \alpha$, waar $\cos \alpha > 0$ en $0^\circ < \alpha < 180^\circ$ (2)
- 4.2.2 Bepaal, vervolgens of andersins, deur 'n diagram te gebruik, die waarde van $4[\tan^2 \alpha - \cos^2 \alpha]$ (3)
- 4.3 Gegee:
$$\frac{\cos x \cdot \tan x}{2[\sin x \cdot \cos(x - 90^\circ) + \cos x \cdot \cos(-x)]}$$
- 4.3.1 Vereenvoudig die uitdrukking hierbo tot 'n enkel trigonometriese funksie van x . (6)
- 4.3.2 Skryf, vervolgens of andersins, die periode van die uitdrukking in VRAAG 4.3 neer. (1)
- 4.4 Vereenvoudig:
$$\frac{\cos 42^\circ \sin 48^\circ - \tan^2(-45^\circ)}{\cos^2 132^\circ}$$
 sonder die gebruik van 'n sakrekenaar. (5)

4.5 Gegee die identiteit: $\tan \beta - \sin \beta \cdot \cos \beta = \tan \beta \cdot \sin^2 \beta$

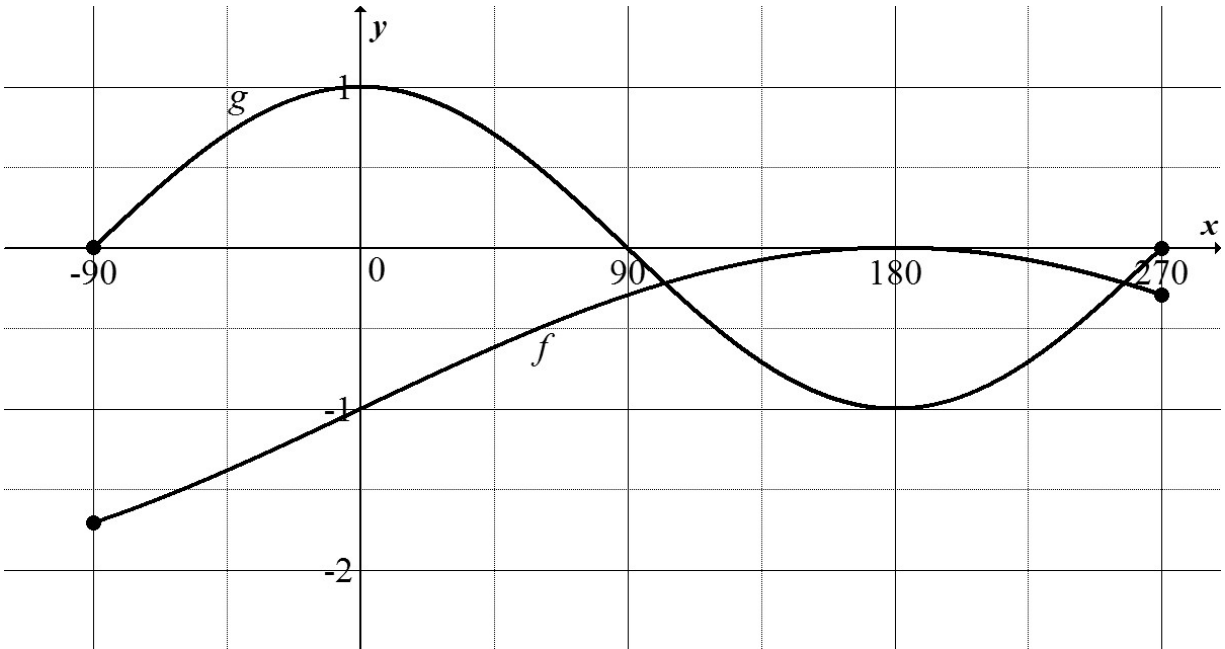
4.5.1 Bewys die identiteit hierbo. (3)

4.5.2 Vir watter waarde(s) van β sal die identiteit in VRAAG 4.5 ongedefinieerd wees in die interval $\beta \in [-180^\circ; 180^\circ]$? (2)

4.6 Bepaal die algemene oplossing: $3 \sin \theta = -2 \cos^2 \theta$ (6)
[32]

VRAAG 5

Gegee: $f(x) = a \sin\left(\frac{x}{2}\right) - 1$ en $g(x) = \cos x + q$, $x \in [-90^\circ; 270^\circ]$



Gebruik die grafieke om die volgende vrae te beantwoord waar $x \in [-90^\circ; 270^\circ]$:

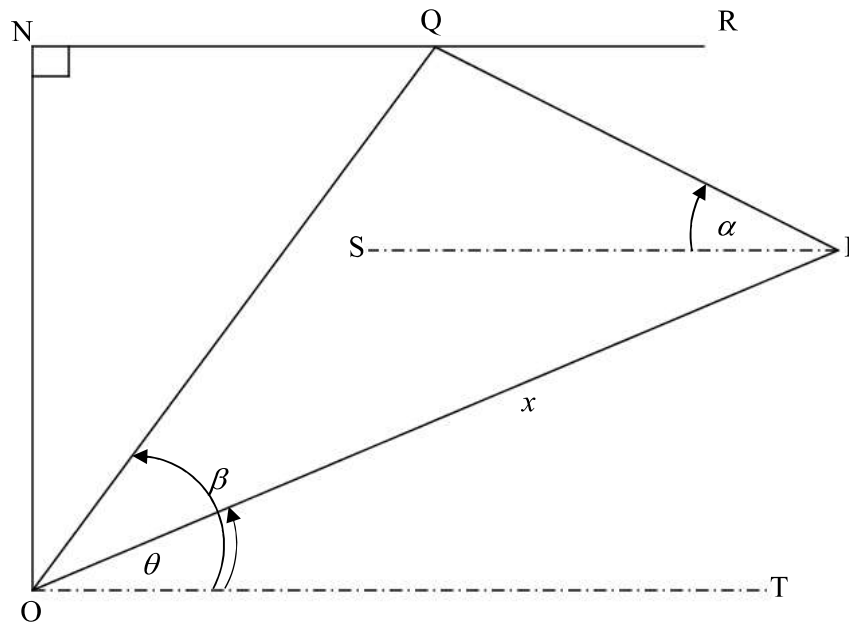
- 5.1 Bepaal die waardes van a en q (2)
- 5.2 Skryf die terrein van f neer (2)
- 5.3 Skryf die amplitude van g neer (1)
- 5.4 Skryf die waarde(s) van x neer, waar $f(x) - g(x) = -2$ (1)
- 5.5 Vir watter waardes van x , is $f(x)g(x) \leq 0$? (2)
- 5.6 Die grafiek van h word verkry deur die grafiek van g , 90° na links te skuif. Bepaal die vergelyking van h in sy eenvoudigste vorm. (2)

[10]

VRAAG 6

'n Man wat by punt O, op 'n horisontale vlak staan, neem twee helikopters by punte P en Q waar. Die siglyn vanaf punt O na elke helikopter vorm hoogthoeke, θ en β met die horisontale vlak. Addisioneel is 'n tweede man in die helikopter by punt P geplaas en neem die helikopter by punt Q waar, en sy siglyn vorm 'n hoogthoek, α met die horisontale vlak by P gemeet na die lyn PQ.

$ON \perp NR$ en $OP = x$.



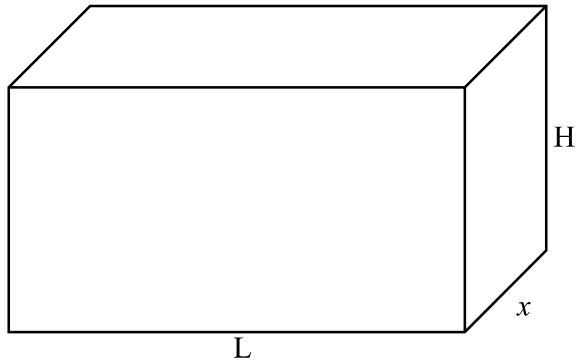
6.1 Toon aan dat: $\angle Q\hat{O}P = 180^\circ - (\beta + \alpha)$ (2)

6.2 Toon aan dat: $OQ = \frac{x \cdot \sin(\alpha + \theta)}{\sin(\beta + \alpha)}$ (3)

6.3 Bepaal die waarde van x as $\theta = 15^\circ$, $\beta = 60^\circ$, $\alpha = 30^\circ$ en $OQ = 5\sqrt{2}$ (2)
[7]

VRAAG 7

'n Toe reghoekige boks het 'n lengte(L) wat tweemaal die breedte(B) is, en die hoogte(H) is 3 cm meer as die breedte. Die buite-oppervlakte van die boks is 784 cm^2 . Die lengte van die breedte is $x \text{ cm}$.



$$P = 2l + 2b$$

$$A = l \times b$$

$$V = lbh$$

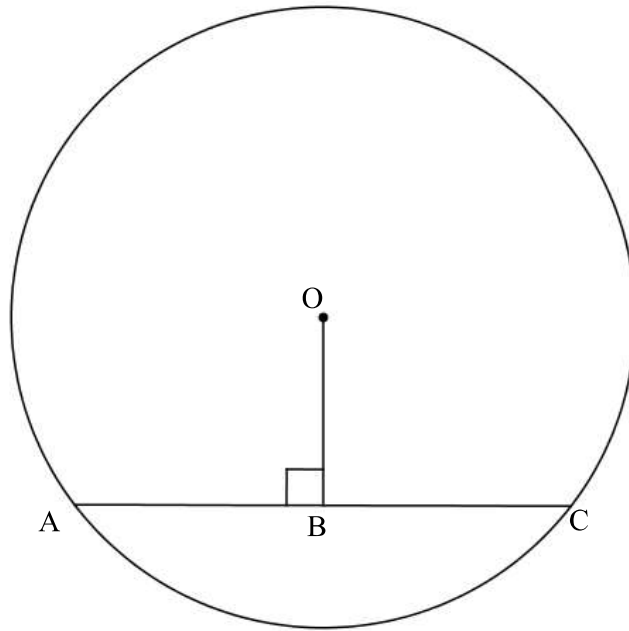
$$SA = 2lb + 2lh + 2bh$$

- 7.1 Skryf die lengte(L) en hoogte(H) van die boks in terme van x neer. (2)
- 7.2 Skryf 'n uitdrukking vir die totale buite oppervlakte van die reghoekige boks in terme van x neer. (3)
- 7.3 Bepaal, vervolgens of andersins, die waarde van x . (4)
- 7.4 Bereken die volume van die boks. (2)

[11]

VRAAG 8

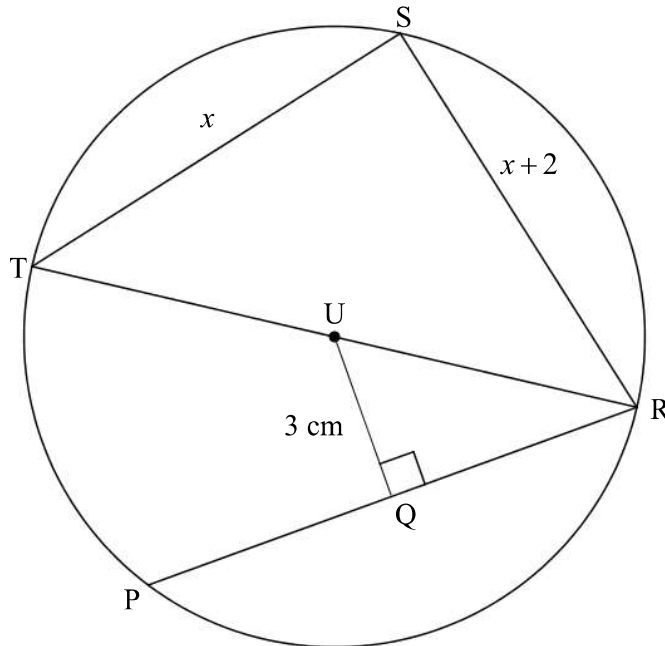
- 8.1 In die diagram hieronder is O die middelpunt van die sirkel. AC is 'n koord. OB is loodreg op die koord geteken.



Gebruik die diagram hierbo om die stelling te bewys wat meld dat die lyn geteken vanaf die middelpunt van die sirkel loodreg op die koord, die koord halveer, d.w.s bewys dat $AB = BC$.

(5)

- 8.2 In die diagram is TR die middellyn van die sirkel wat deur die middelpunt U gaan. P, R, S en T is punte op die omtrek van die sirkel. UQ is 'n lyn vanaf die middelpunt sodat $UQ \perp PR$ en PR is geteken.
- $TS = x \text{ cm}$, $SR = (x + 2) \text{ cm}$, $PR = 8 \text{ cm}$ en $UQ = 3 \text{ cm}$



Bereken, met redes, die lengte van:

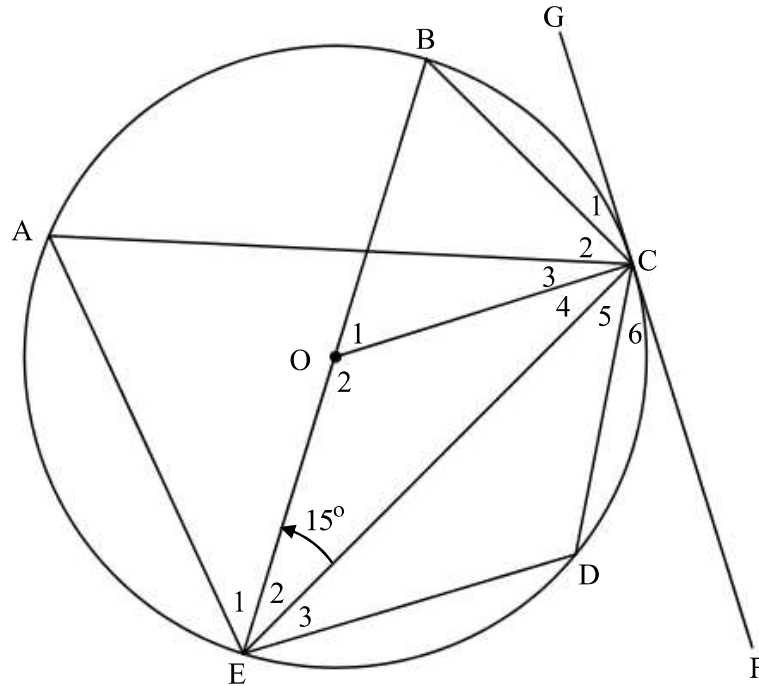
8.2.1 UR (4)

8.2.2 TS (6)

[15]

VRAAG 9

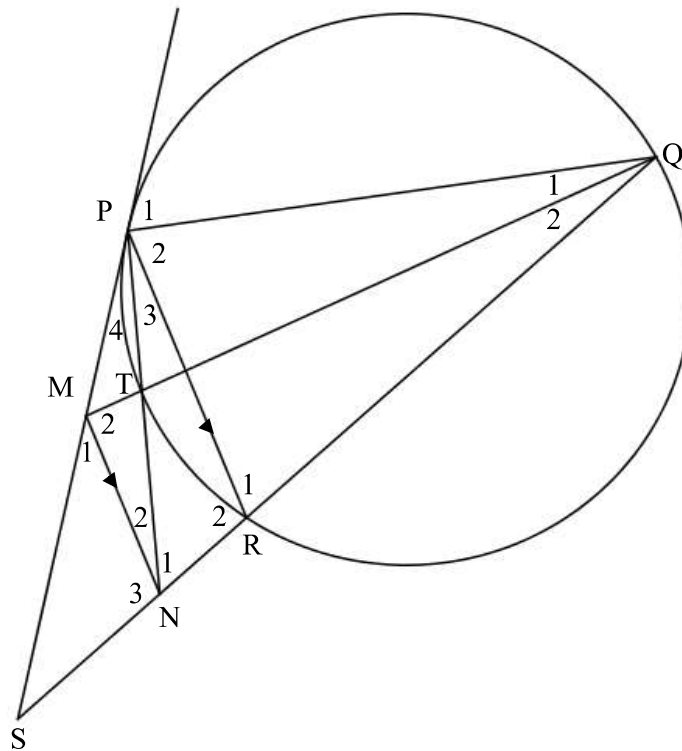
- 9.1 In die diagram hieronder is O die middelpunt van die sirkel. ACDE en BCDE is koordevierhoeke. GCF is 'n raaklyn aan die sirkel by punt C. Koord CE en lyn OC is geteken. $\hat{E}_2 = 15^\circ$.



Bepaal, met redes, die groottes van die volgende hoeke hieronder:

- | | |
|-------------------|-----|
| 9.1.1 $\hat{O}_1$ | (2) |
| 9.1.2 $\hat{A}$ | (2) |
| 9.1.3 $\hat{D}$ | (2) |
| 9.1.4 $\hat{ECF}$ | (2) |
| 9.1.5 $\hat{OCG}$ | (2) |

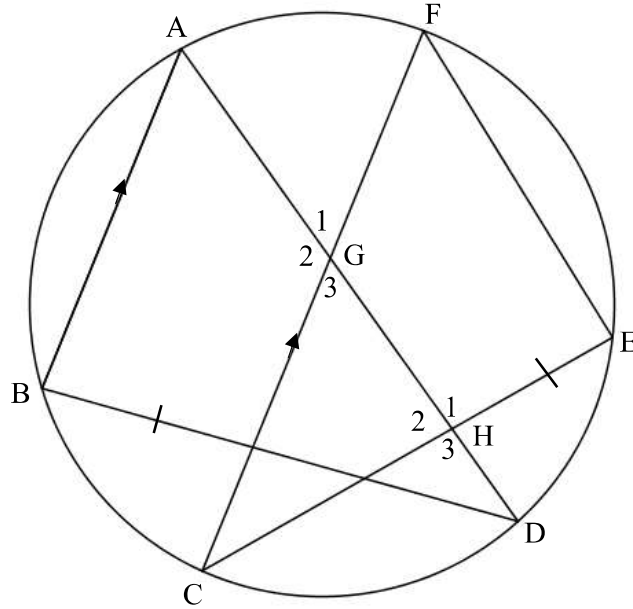
- 9.2 In die diagram hieronder is P, Q, R en T punte op die omtrek van die sirkel. PS is 'n raaklyn aan die sirkel by P. Koord QR is verleng na S. M en N is punte op PS en RP onderskeidelik sodat $MN \parallel PR$. PN is geteken. QT is verleng na M.



- 9.2.1 Noem TWEE ander hoeke elk gelyk aan $\hat{P}_1$ (4)
- 9.2.2 Bewys dat MNQP 'n koordevierhoek is. (4)
- 9.2.3 Bewys dat PN vir $\hat{SPR}$ halveer. (4)
- [22]

VRAAG 10

In die diagram hieronder is A, B, C, D, E en F punte op die omtrek van die sirkel. AD sny CF by punt G en CE by punt H. $AB \parallel FC$ en $CE = BD$.



Bewys dat $AD \parallel FE$

[5]

TOTAAL: 150

INLIGTINGSBLAD: WISKUNDE

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$A = P(1 + ni)$$

$$A = P(1 - ni)$$

$$A = P(1 - i)^n$$

$$A = P(1 + i)^n$$

$$F = \frac{x \left[(1 + i)^n - 1 \right]}{i}$$

$$P = \frac{x \left[1 - (1 + i)^{-n} \right]}{i}$$

$$T_n = a + (n - 1)d$$

$$S_n = \frac{n}{2} (2a + (n - 1)d)$$

$$T_n = ar^{n-1}$$

$$S_n = \frac{a(r^n - 1)}{r - 1}; \quad r \neq 1$$

$$S_\infty = \frac{a}{1 - r}; \quad -1 < r < 1$$

$$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$$

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$M\left(\frac{x_1 + x_2}{2}; \frac{y_1 + y_2}{2}\right)$$

$$y = mx + c \quad y - y_1 = m(x - x_1)$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \tan \theta$$

$$(x - a)^2 + (y - b)^2 = r^2$$

$$\text{In } \triangle ABC: \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C} \quad a^2 = b^2 + c^2 - 2bc \cdot \cos A \quad \text{area } \triangle ABC = \frac{1}{2} ab \cdot \sin C$$

$$\sin(\alpha + \beta) = \sin \alpha \cdot \cos \beta + \cos \alpha \cdot \sin \beta$$

$$\sin(\alpha - \beta) = \sin \alpha \cdot \cos \beta - \cos \alpha \cdot \sin \beta$$

$$\cos(\alpha + \beta) = \cos \alpha \cdot \cos \beta - \sin \alpha \cdot \sin \beta$$

$$\cos(\alpha - \beta) = \cos \alpha \cdot \cos \beta + \sin \alpha \cdot \sin \beta$$

$$\cos 2\alpha = \begin{cases} \cos^2 \alpha - \sin^2 \alpha \\ 1 - 2\sin^2 \alpha \\ 2\cos^2 \alpha - 1 \end{cases}$$

$$\sin 2\alpha = 2\sin \alpha \cdot \cos \alpha$$

$$\bar{x} = \frac{\sum x}{n} \quad \sigma^2 = \frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n}$$

$$P(A) = \frac{n(A)}{n(S)}$$

$$P(A \text{ of } B) = P(A) + P(B) - P(A \text{ en } B)$$

$$\hat{y} = a + bx$$

$$b = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sum (x - \bar{x})^2}$$



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Porofensie Ya Kapa: Botjhabetsi: Lefapha la Thuto

LEARNER'S NAME AND SURNAME:

LEERDER NAAM EN VAN:

GRADE 11/GRAAD 11

**NATIONAL
SENIOR CERTIFICATE/
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SENIOR SERTIFIKAAT**

GRADE 11/GRAAD 11

NOVEMBER 2025

**MATHEMATICS P2/WISKUNDE V2
SPECIAL ANSWER BOOK/SPEZIALE ANTWOORDEBOEK**

Marker/ <i>Merker</i>				Moderator's Initials / <i>Moderator se paraaf</i>																
Question <i>Vraag</i>	Mark <i>Punt</i>			Initial <i>Parafeer</i>	Marks <i>Punte</i>			S M	Marks <i>Punte</i>			D M	Marks <i>Punte</i>			P M	Marks <i>Punte</i>			N M
1																				
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TOTAL <i>TOTAAL</i>																				

[SM = School/Skool Mod : DM = District/Distrik Mod : PM = Provincial/Provinsiale Mod : NM = National/Nasionale Mod]

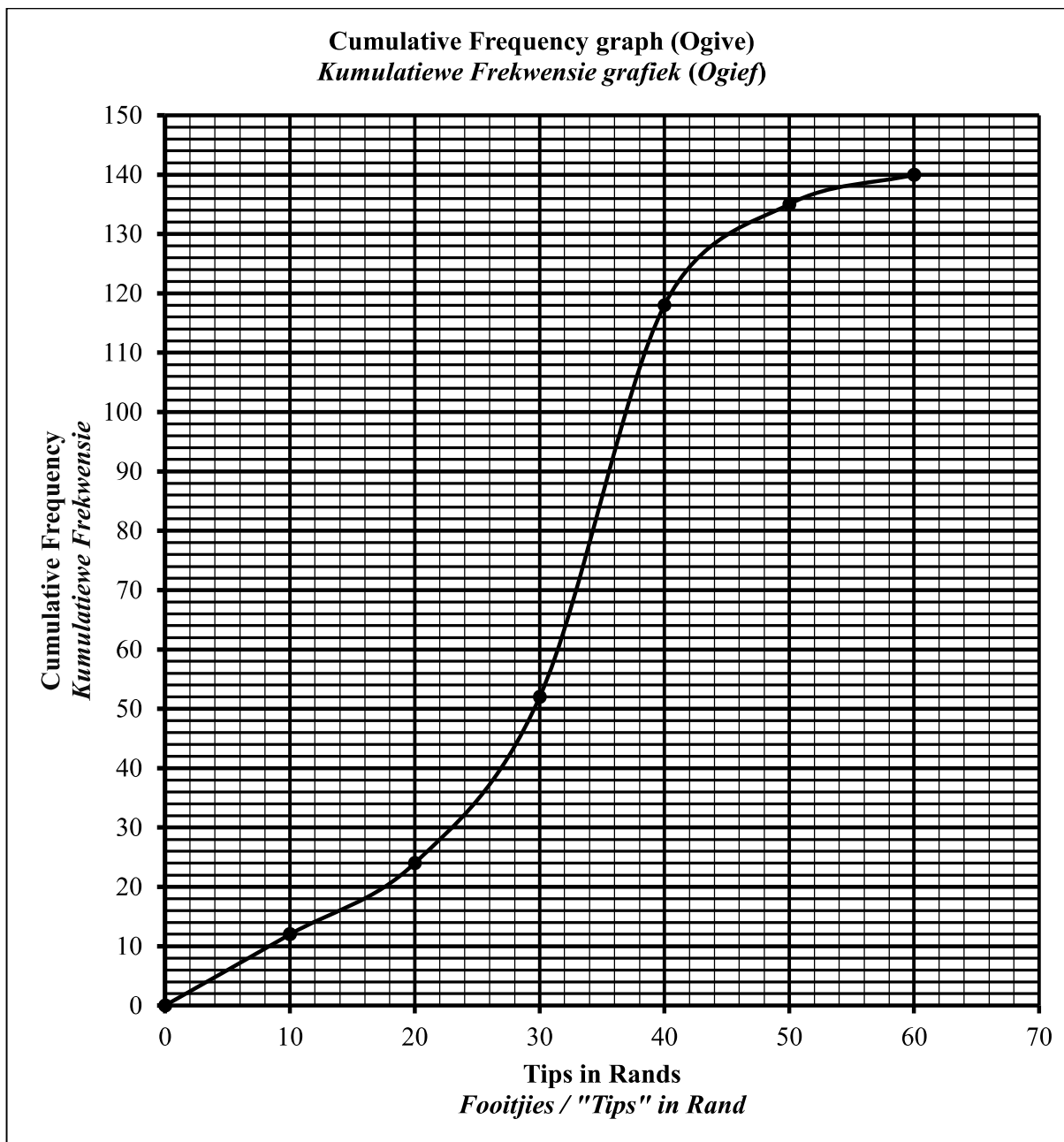
This special answer book consists of 23 pages. /
Hierdie spesiale antwoordeboek bestaan uit 23 bladsye.

QUESTION/VRAAG 1Data Set / *Datastel*:

Prizes / <i>Pryse</i>	3 600	4 500	5 400	6 200	x	12 300	15 800	y	43 800	87 500
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	Solution/<i>Oplossing</i>	Marks/ <i>Punte</i>
1.1		(2)
1.2		(3)
1.3		(1)
1.4		(2)
1.5		(3)
		[11]

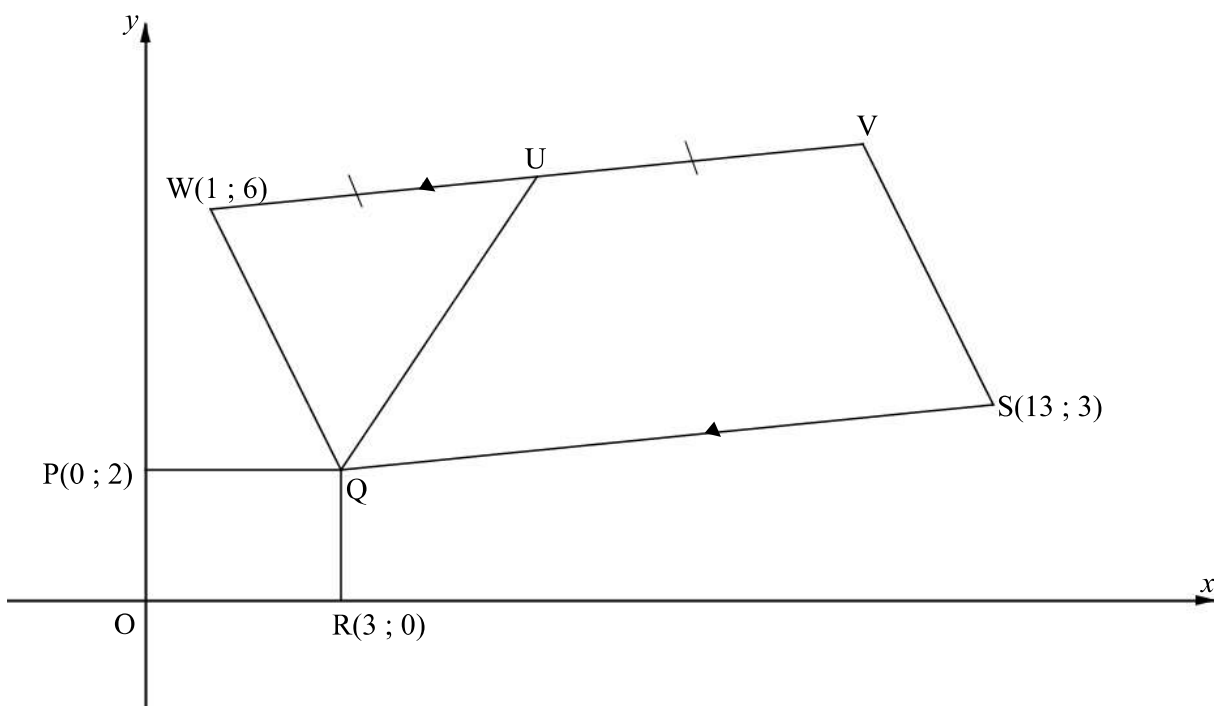
QUESTION/VRAAG 2



	Solution/Oplossing	Marks/ Punte
2.1		(1)
2.2		(1)

	Solution/<i>Oplossing</i>	Marks/ <i>Punte</i>
2.3		(2)
2.4		(2)
2.5		(2)
2.6		(2)
		[10]

QUESTION/VRAAG 3

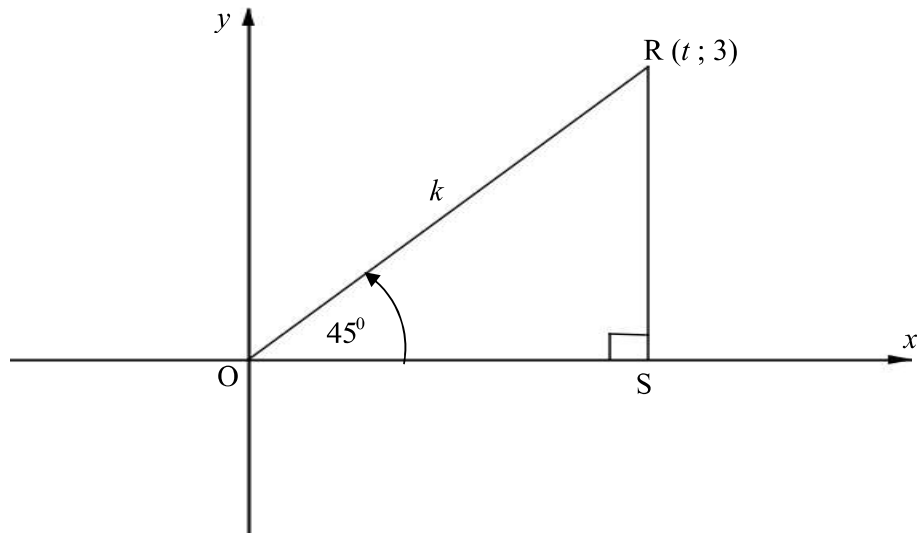


	Solution/Oplossing	Marks/ Punte
3.1		(1)
3.2		(2)
3.3		(3)

	Solution/<i>Oplossing</i>	Marks/ <i>Punte</i>
3.4		(5)
3.5		(4)

	Solution/<i>Oplossing</i>	Marks/ <i>Punte</i>
3.6		(2)
3.7		(4)
3.8		(6)
		[27]

QUESTION/VRAAG 4



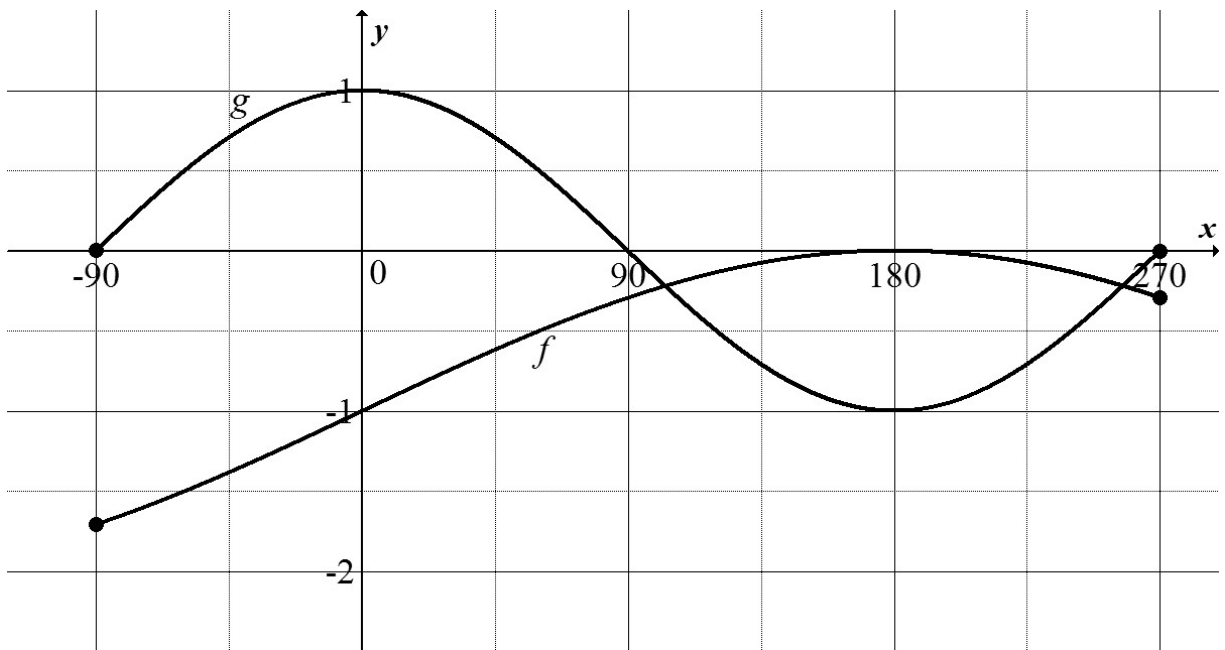
	Solution/Oplissing	Marks/ Punte
4.1.1		(2)
4.1.2		(2)
4.2.1		(2)

	Solution/<i>Oplossing</i>	Marks/ <i>Punte</i>
4.2.2		
		(3)
4.3.1		
		(6)
4.3.2		
		(1)

	Solution/<i>Oplossing</i>	Marks/ <i>Punte</i>
4.4		(5)
4.5.1		(3)
4.5.2		(2)

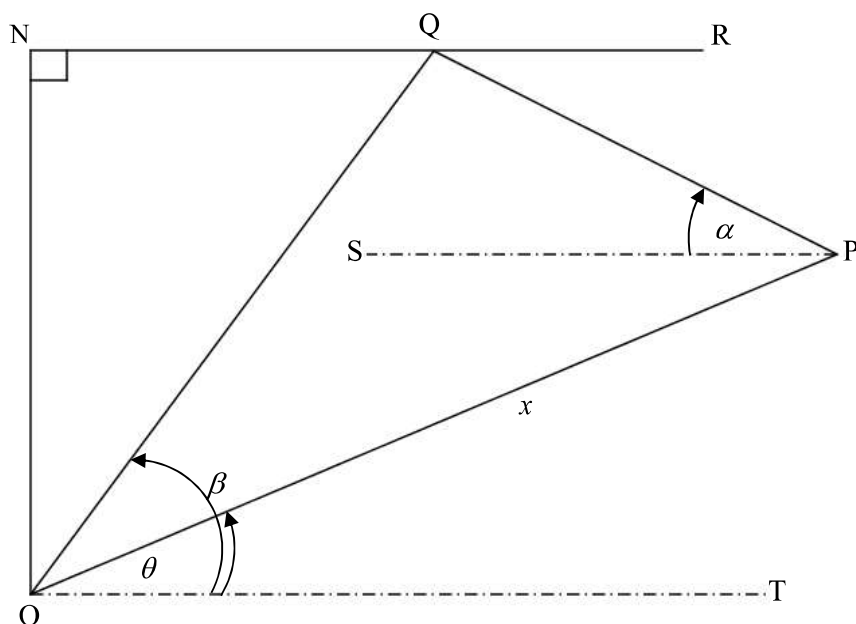
	Solution/<i>Oplossing</i>	Marks/ <i>Punte</i>
4.6		
		(6)
		[32]

QUESTION/VRAAG 5



	Solution/Oplissing	Marks/ Punte
5.1		(2)
5.2		(2)
5.3		(1)
5.4		(1)
5.5		(2)
5.6		(2)
		[10]

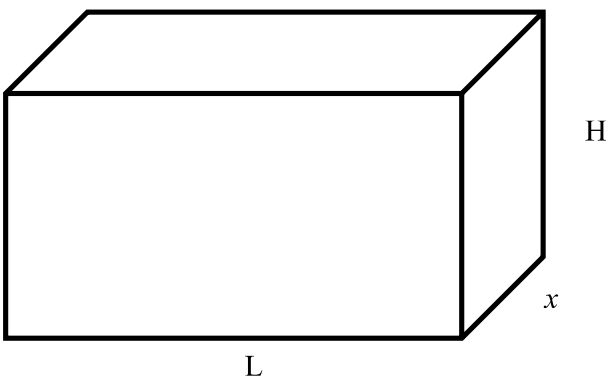
QUESTION/VRAAG 6



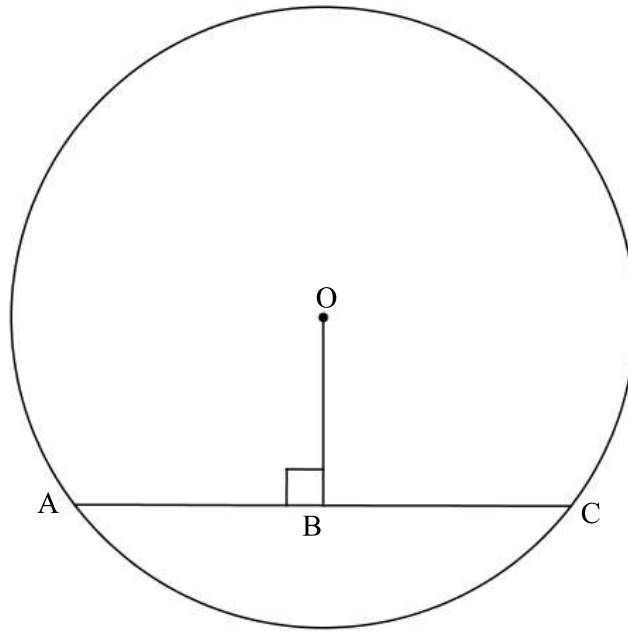
	Solution/Oplissing	Marks/ Punte
6.1		(2)
6.2		(3)

	Solution/<i>Oplossing</i>	Marks/ <i>Punte</i>
6.3		(2)
		[7]

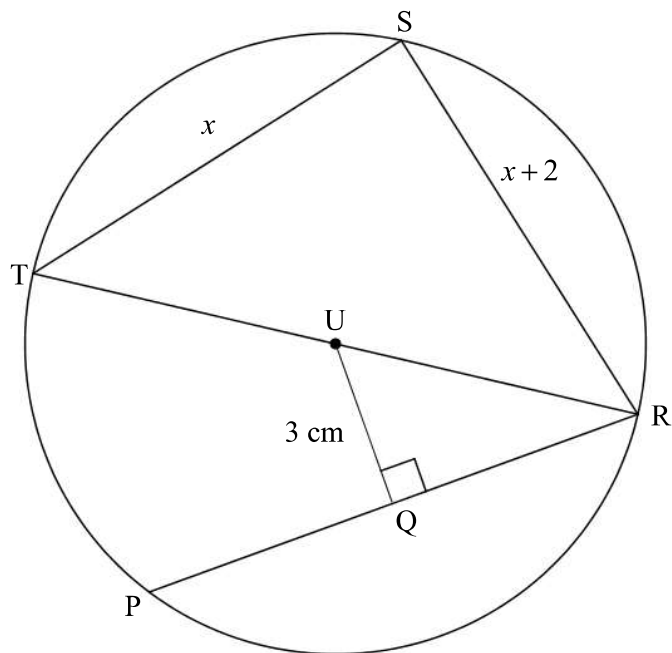
QUESTION/VRAAG 7



	Solution/Oplissing	Marks/ Punte
7.1		(2)
7.2		(3)
7.3		(4)
7.4		(2)
		[11]

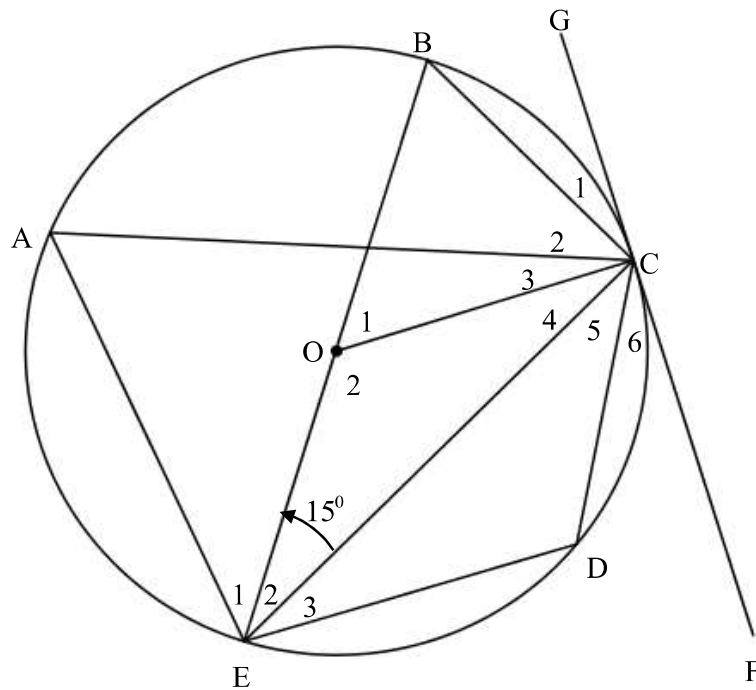
QUESTION/*VRAAG 8*

	Solution/<i>Oplossing</i>	Marks/ <i>Punte</i>
8.1		
		(5)



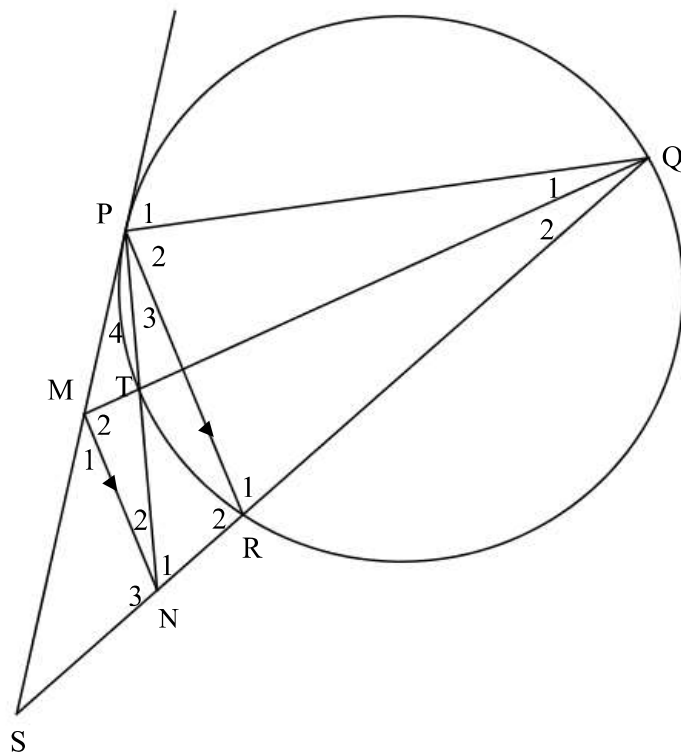
8.2.1		(4)
8.2.2		(6)
		[15]

QUESTION/VRAAG 9



	Solution/Oplissing	Marks/ Punte
9.1.1		(2)
9.1.2		(2)
9.1.3		(2)
9.1.4		(2)
9.1.5		(2)

9.2



	Solution/Oplossing	Marks/ Punte
9.2.1		(4)
9.2.2		(4)

	Solution/<i>Oplossing</i>	Marks/ <i>Punte</i>
9.2.3		
		(4)
		[22]

[illegible]



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NASIONALE
SENIOR SERTIFIKAAT**

GRADE/*GRAAD* 11

NOVEMBER 2025

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

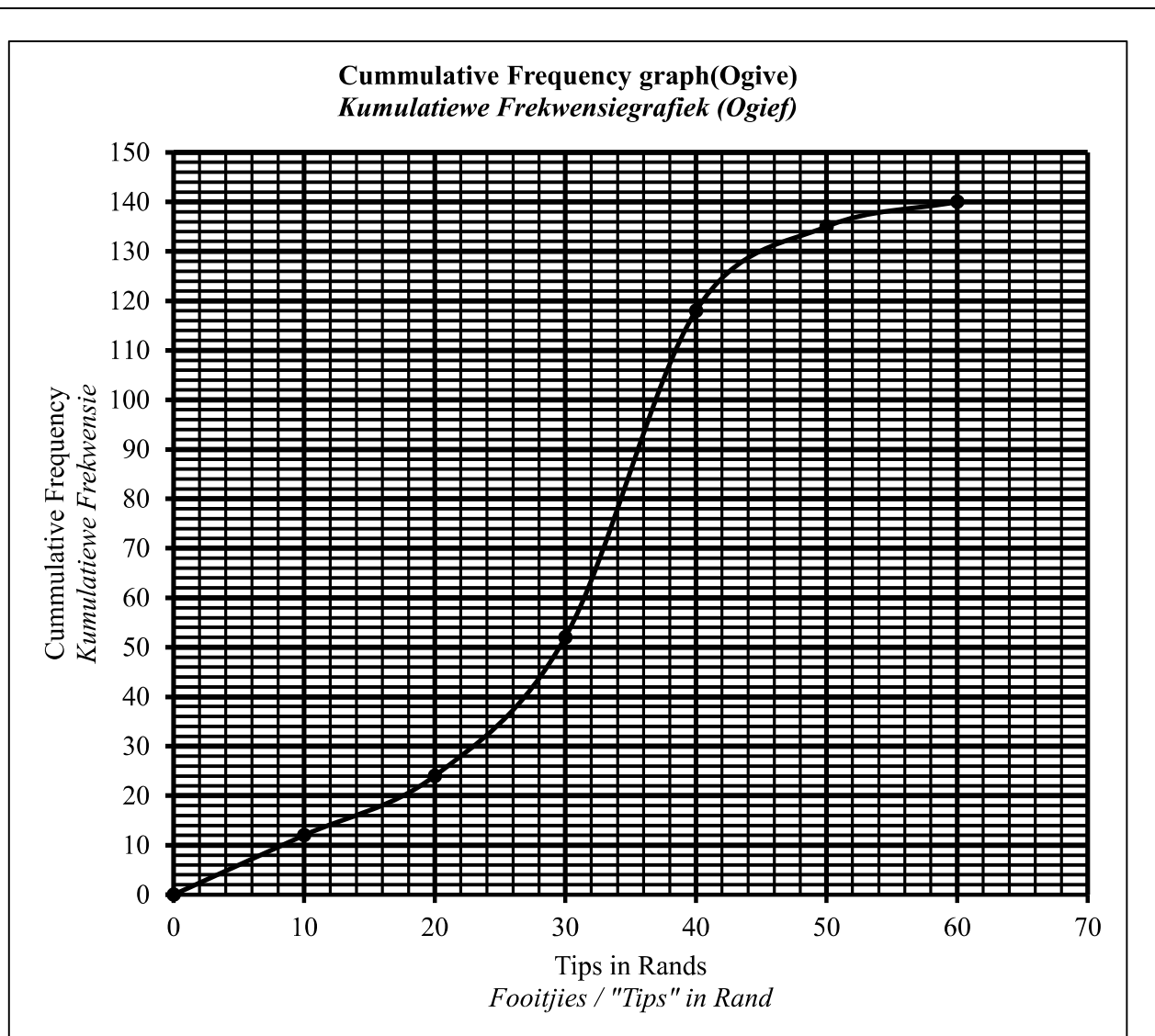
MARKS/*PUNTE*: 150

This marking guideline consists of 16 pages./
Hierdie nasienriglyn bestaan uit 16 bladsye.

QUESTION 1/VRAAG 1

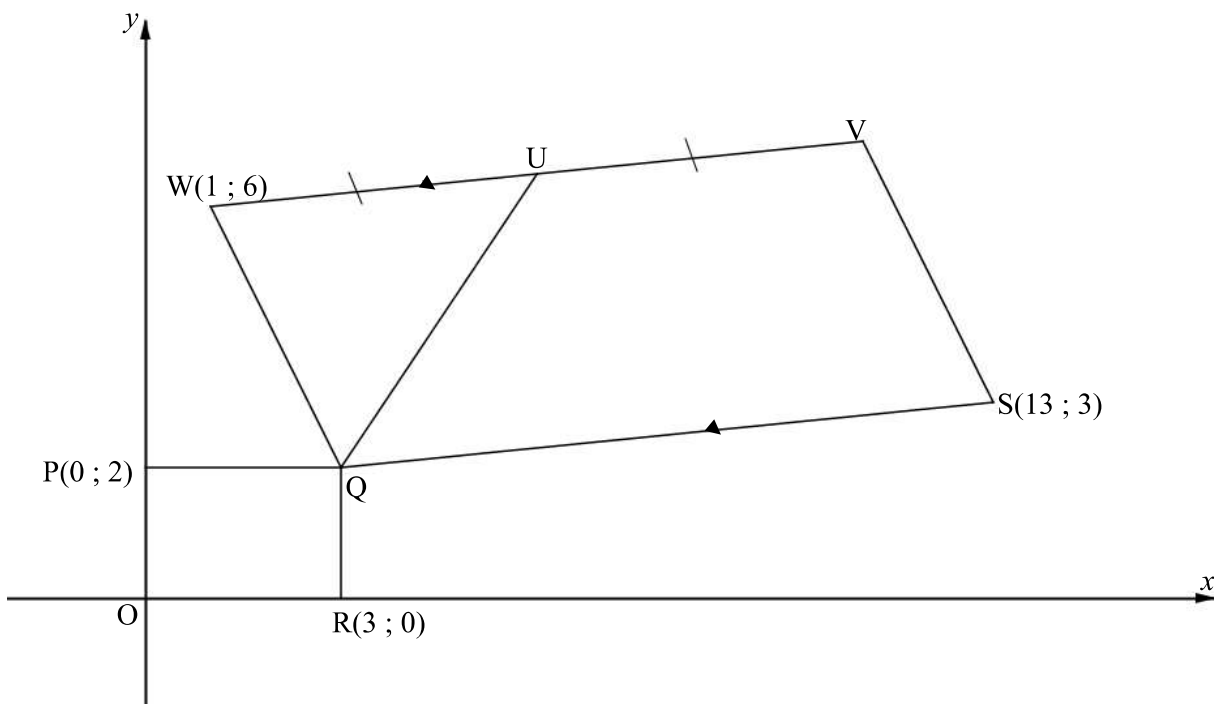
Data Set/ <i>Datastel</i> :										
Prizes/ <i>Pryse</i>	3 600	4 500	5 400	6 200	x	12 300	15 800	y	43 800	87 500
1.1	$\frac{x + 12300}{2} = 9700$ $x = 7100$					✓ method/ <i>metode</i> ✓ answer/ <i>antwoord</i>			(2)	
1.2	$\frac{y + 186200}{10} = 21770$ $y = 31500$					✓ correct equation <i>korrekte vergelyking</i> ✓ $y + 186200$ ✓ answer/ <i>antwoord</i>			(3)	
1.3	outlier/ <i>uitskieter</i> = 87 500					✓ answer/ <i>antwoord</i>			(1)	
1.4	$\delta = 25258,19$					✓✓ answer/ <i>antwoord</i>			(2)	
1.5	Mean will increase by R200 <i>Gemiddelde sal vermeerder met R200</i> Median will increase by R200 <i>Mediaan sal vermeerder met R200</i> Standard deviation will remain the same <i>Standaardafwyking sal dieselfde bly</i>					✓ increase by R200 <i>vermeerder met R200</i> ✓ increase by R200 <i>vermeerder met R200</i> ✓ remain the same <i>bly dieselfde</i>			(3)	
									[11]	

QUESTION 2/VRAAG 2



2.1	140 employees/werknemers	✓ answer/antwoord	(1)
2.2	$30 < x \leq 40$	✓ answer/antwoord	(1)
2.3	Reading from the graph / lees vanaf grafiek 32 employees/werknemers	✓ Reading/lees ✓ answer/antwoord	(2)
2.4	$118 - 24 = 94$	✓ $118 - 24$ ✓ answer/antwoord	(2)
2.5	25 th percentile is at 35 = R25 25 ^{ste} persentiel is by 35 = R25 75 th percentile is at 105 = R38 75 ^{ste} persentiel is by 105 = R38	✓ Q_1 ✓ Q_3	(2)
2.6	$IQR/IKW = Q_3 - Q_1 = R38 - R25$ $= R13$	✓ method/metode ✓ answer/antwoord	(2)
			[10]

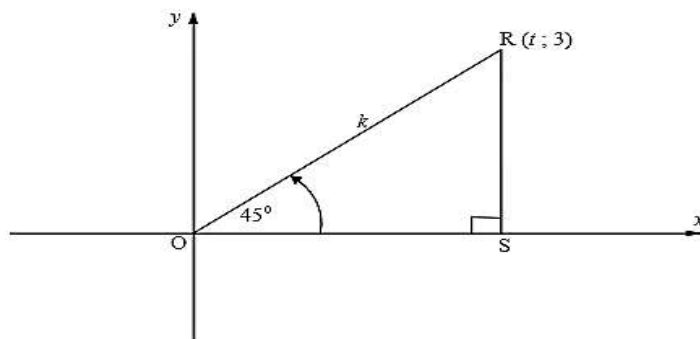
QUESTION 3/VRAAG 3



3.1	Q(3;2)	✓ answer/antwoord	(1)
3.2	$m_{QS} = \frac{3-2}{13-3}$ $= \frac{1}{10}$	✓ correct substitution korrekte vervanging ✓ answer/antwoord	(2)
3.3	$m_{VW} = m_{QS} = \frac{1}{10}$ $6 = \frac{1}{10}(1) + c$ $c = \frac{59}{10}$ $y = \frac{1}{10}x + \frac{59}{10}$ OR/OF $y - 6 = \frac{1}{10}(x - 1)$ $y = \frac{1}{10}x + \frac{59}{10}$	✓ gradient of VW gradiënt van VW ✓ substitution/vervanging ✓ answer/antwoord	(3)
3.4	$\frac{3}{2}x - \frac{5}{2} = \frac{1}{10}x + \frac{59}{10}$ $\frac{7}{5}x = \frac{42}{5}$ $x_U = 6$ $y_U = \frac{3}{2}(6) - \frac{5}{2} = \frac{13}{2}$ $6 = \frac{1+x_V}{2}; \frac{13}{2} = \frac{6+y_V}{2}$ $11 = x_V; 5 = y_V$	✓ equating equations gelykstel van vergelykings ✓ simplification vereenvoudiging ✓ x-value / x-waarde ✓ y-value / y-waarde ✓ method/metode	(5)

3.5	$M_{WS}\left(\frac{13+1}{2}; \frac{3+6}{2}\right)$ $M_{WS}\left(7; \frac{9}{2}\right)$ $M_{QV}\left(\frac{11+3}{2}; \frac{7+2}{2}\right)$ $M_{QV}\left(7; \frac{9}{2}\right)$ $\therefore WVSQ$ is a parm (Diag. bisect each other.) $WVSQ$ is 'n $\parallel^m$ (Hoeklyne halveer mekaar)	✓ correct substitution <i>korrekte vervanging</i> ✓ coordinates of midpt of WS <i>koördinate van midpt van WS</i> ✓ coordinates of midpt of QV <i>koördinate van midpt van QV</i> ✓ reason/rede	(4)
3.6	$WV = \sqrt{(1-11)^2 + (6-7)^2}$ $= \sqrt{101}$	✓ correct substitution <i>korrekte vervanging</i> ✓ answer/antwoord	(2)
3.7	Let inclination of WV to be θ and QU be α <i>Laat inklinasie van WV, θ wees en van QU, α wees</i> $\tan \theta = m_{WV} = \frac{1}{10}$ $\theta = 5,71^\circ$ $\tan \alpha = m_{QU} = \frac{3}{2}$ $\alpha = 56,31^\circ$ $\therefore \hat{WUQ} = \hat{UQS} = 50,6^\circ$ [alt $\angle$ s, $WV \parallel QS$] [verv. $\angle$ e, $WV \parallel QS$]	✓ $\tan \theta = m_{WV}$ ✓ size of θ / grootte van θ ✓ size of α / grootte van α ✓ answer/antwoord	(4)
3.8	$WU = \frac{\sqrt{101}}{2}$ $UQ = \sqrt{(6-3)^2 + \left(\frac{13}{2} - 2\right)^2} = \frac{3\sqrt{13}}{2}$ <i>A. of $\triangle QUW$</i> $= \frac{1}{2} \times \frac{3\sqrt{13}}{2} \times \frac{\sqrt{101}}{2} \times \sin(50,60^\circ)$ $= 10,50$ $\frac{\text{Area of PQRO}}{\text{Area of } \triangle QUW} = \frac{2 \times 3}{10,50}$ $= \frac{4}{7}$	✓ WU ✓ UQ ✓ correct subst. in to Area rule <i>korrekte verv. in oppervl. reël</i> ✓ A. of $\triangle$. / Oppervl. van $\triangle$ ✓ correct subst. in A. of rect. <i>korrekte verv. in Opp. van regh</i> ✓ answer/antwoord	(6)
			[27]

QUESTION 4 / VRAAG 4

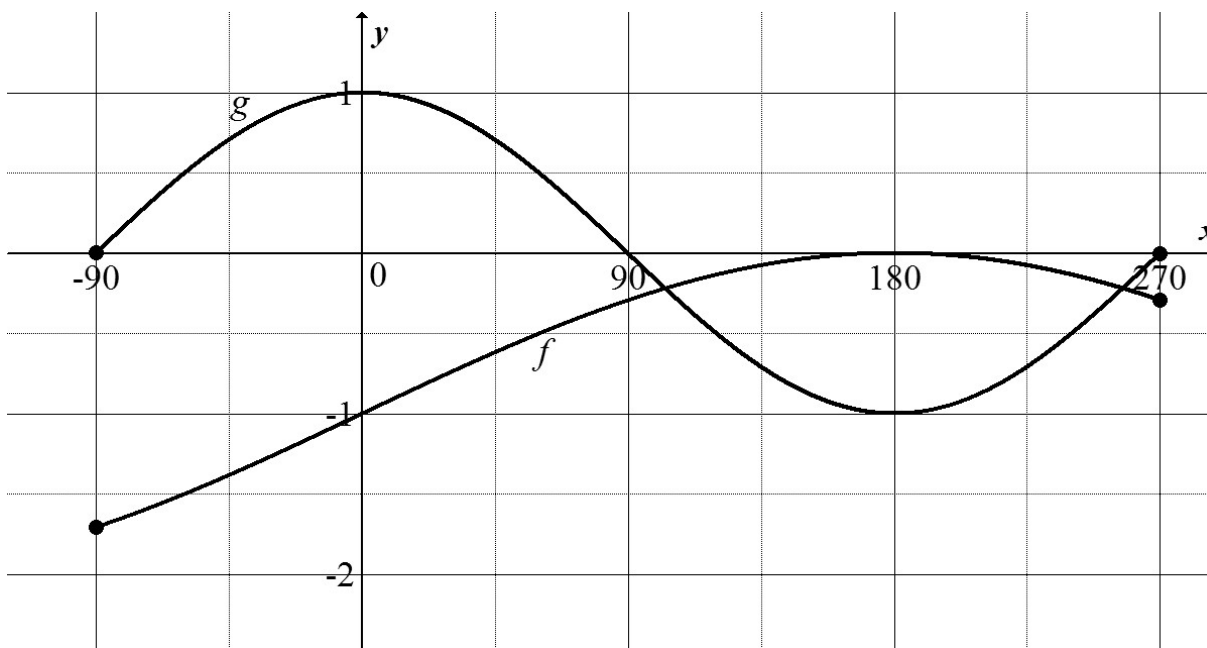


4.1.1	$\tan 45^\circ = \frac{3}{t}$ $t = 3$	✓ correct trig ratio <i>korrekte trig. verhouding</i> ✓ t-value/waarde	(2)
4.1.2	$\sin 45^\circ = \frac{3}{k}$ $k = 3\sqrt{2}$ OR / OF $\cos 45^\circ = \frac{t}{k} = \frac{3}{k}$ $k = 3\sqrt{2}$	✓ correct trig ratio <i>korrekte trig. verhouding</i> ✓ k-value/waarde	(2)
4.2.1	$8\cos^2 \alpha - 2 = 0$ $\cos^2 \alpha = \frac{1}{4}$ $\cos \alpha = \frac{1}{2}$	✓ simplification <i>vereenvoudiging</i> ✓ answer/antwoord	(2)
4.2.2	OR / OF $y = \sqrt{2^2 - 1^2} \quad \text{Pyth}$ $= \sqrt{3}$ $4\left[\tan^2 \alpha - \cos^2 \alpha\right] = 4\left[\left(\frac{\sqrt{3}}{1}\right)^2 - \left(\frac{1}{2}\right)^2\right]$ $= 11$	✓ diagram/diagram OR / OF ✓ $y = \sqrt{3}$ ✓ correct substitution <i>korrekte vervanging</i> ✓ answer/antwoord	(3)

4.3.1	$\frac{\cos x \cdot \tan x}{2[\sin x \cdot \cos(x - 90^\circ) + \cos x \cdot \cos(-x)]}$ $= \frac{\cos x \cdot \frac{\sin x}{\cos x}}{2[\sin x(\sin x) + \cos x(\cos x)]}$ $= \frac{\sin x}{2[\sin^2 x + \cos^2 x]}$ $= \frac{\sin x}{2(1)}$ $= \frac{\sin x}{2}$	$\checkmark \frac{\sin x}{\cos x}$ $\checkmark \sin x \quad \checkmark \cos x$ $\checkmark$ simplification <i>vereenvoudiging</i> $\checkmark \sin^2 x + \cos^2 x = 1$ $\checkmark$ answer/antwoord	(6)
4.3.2	Period/Periode = 360°	$\checkmark$ answer/antwoord	(1)
4.4	$\frac{\cos 42^\circ \sin 48^\circ - \tan^2(-45^\circ)}{\cos^2 132^\circ}$ $= \frac{\cos 42^\circ \cdot \cos 42^\circ - (-\tan 45^\circ)^2}{(\cos(90^\circ + 42^\circ))^2}$ $= \frac{\cos^2 42^\circ - (-1)^2}{(-\sin 42^\circ)^2}$ $= \frac{\cos^2 42^\circ - 1}{\sin^2 42^\circ}$ $= \frac{1 - \sin^2 42^\circ - 1}{\sin^2 42^\circ}$ $= -1$	$\checkmark \sin 48^\circ = \cos 42^\circ$ $\checkmark (-\tan 45^\circ)^2$ $\checkmark (-\sin 42^\circ)^2$ $\checkmark \cos^2 42^\circ = 1 - \sin^2 42^\circ$ $\checkmark$ answer/antwoord	(5)
4.5.1	$\text{LHS/LK} = \tan \beta - \sin \beta \cdot \cos \beta$ $= \frac{\sin \beta}{\cos \beta} - \sin \beta \cdot \cos \beta$ $= \frac{\sin \beta - \sin \beta \cos^2 \beta}{\cos \beta}$ $= \frac{\sin \beta(1 - \cos^2 \beta)}{\cos \beta}$ $= \tan \beta \cdot \sin^2 \beta$ $= \text{RHS / RK}$	$\checkmark \frac{\sin \beta}{\cos \beta}$ $\checkmark$ simplification <i>vereenvoudiging</i> $\checkmark$ common factor <i>gemeenskaplike faktor</i>	(3)
4.5.2	$\beta = -90^\circ$ and / en $\beta = 90^\circ$	$\checkmark \beta = -90^\circ \quad \checkmark \beta = 90^\circ$	(2)

4.6	$3 \sin \theta = -2 \cos^2 \theta$ $2(1 - \sin^2 \theta) + 3 \sin \theta = 0$ $2 - 2 \sin^2 \theta + 3 \sin \theta = 0$ $2 \sin^2 \theta - 3 \sin \theta - 2 = 0$ $(2 \sin \theta + 1)(\sin \theta - 2) = 0$ $\sin \theta = -\frac{1}{2}$ or / of $\sin \theta \neq 2$ $\theta = 210^\circ + 360.k \quad \theta = 330^\circ + 360.k, \quad k \in \mathbb{Z}$	$\checkmark 1 - \sin^2 \theta$ $\checkmark$ standard form <i>standaardvorm</i> $\checkmark$ factors/faktore $\checkmark$ both equations <i>beide vergelykings</i> $\checkmark \theta = 210^\circ + 360.k$ $\checkmark \theta = 330^\circ + 360.k, \quad k \in \mathbb{Z}$	(6)
			[32]

QUESTION 5/VRAAG 5

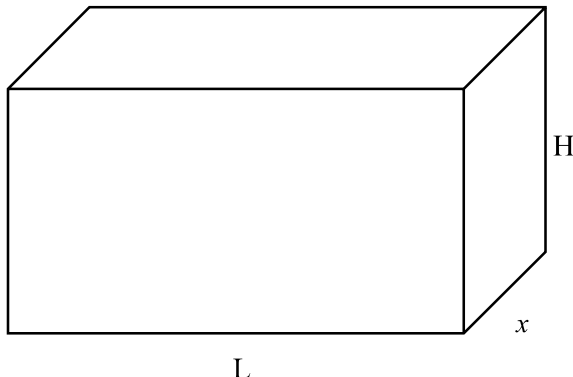


5.1	$a = 1$ $q = 0$	✓ value of a / waarde van a ✓ value of q / waarde van q	(2)
5.2	$y \in [-2; 0]$ or / of $-2 \leq y \leq 0$	✓ correct critical value korrekte kritieke waarde ✓ correct notation korrekte notasie	(2)
5.3	Amplitude = 1	✓ correct answer korrekte antwoord	(1)
5.4	$x = 0^\circ$	✓ answer / antwoord	(1)
5.5	$-90^\circ \leq x \leq 90^\circ$	✓✓ correct answer korrekte antwoord	(2)
5.6	$h(x) = g(x + 90^\circ)$ $= \cos(x + 90^\circ)$ $= -\sin x$	✓ $\cos(x + 90^\circ)$ ✓ $-\sin x$	(2)
			[10]

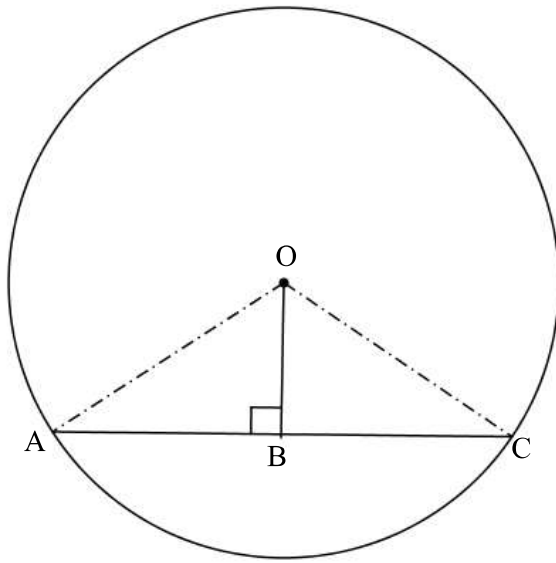
QUESTION 6/VRAAG 6

6.1	$\hat{SPO} = \theta + \alpha$ [alt. $\angle$ s, verw. $\angle$ e : $SP \parallel OT$] $\therefore$ $\hat{QOP} = \beta - \theta$ $\hat{QOP} = 180^\circ - (\theta + \alpha) - (\beta - \theta)$ [$\angle$ sin Δ / $\angle$ ein Δ] $= 180^\circ - (\beta + \alpha)$	$\checkmark \hat{SPO} = \theta + \alpha$ $\checkmark$ using sum of angles in Δ <i>gebruik van som van $\angle$e in Δ</i>	(2)
6.2	$\frac{OQ}{\sin \hat{P}} = \frac{OP}{\sin \hat{QOR}}$ $\frac{OQ}{\sin(\alpha + \theta)} = \frac{x}{\sin[180^\circ - (\beta + \alpha)]}$ $OQ = \frac{x \cdot \sin(\alpha + \theta)}{\sin(\beta + \alpha)}$	$\checkmark$ application of sine rule <i>toepassing van sinusreël</i> $\checkmark$ correct substitution <i>korrekte vervanging</i> $\checkmark$ reduction $\sin(\beta + \alpha)$ <i>reduksie $\sin(\beta + \alpha)$</i>	(3)
6.3	$\frac{5\sqrt{2}}{\sin 45^\circ} = \frac{x}{\sin 90^\circ}$ $x = 10$	$\checkmark$ correct substitution <i>korrekte vervanging</i> $\checkmark$ answer/antwoord	(2)
			[7]

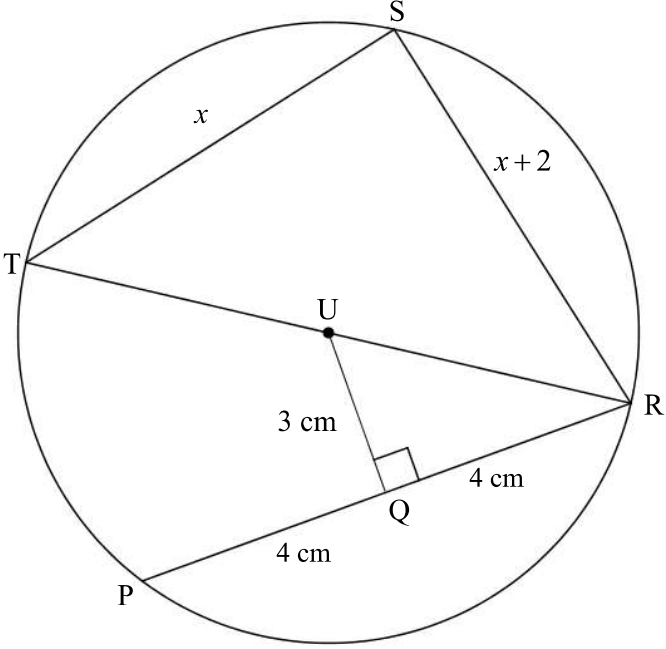
QUESTION 7/VRAAG 7

			
7.1	$L = 2x$ $H = 3 + x$	✓ $L = 2x$ ✓ $H = 3 + x$	(2)
7.2	$SA = 2(2x \times x) + 2(x(3 + x)) + 2(2x(3 + x))$ $= 4x^2 + 6x + 2x^2 + 12x + 4x^2$ $= 10x^2 + 18x$	✓ correct substitution / <i>korrekte vervanging</i> ✓ simplification / <i>vereenvoudiging</i> ✓ answer / <i>antwoord</i>	(3)
7.3	$10x^2 + 18x = 784$ $10x^2 + 18x - 784 = 0$ $5x^2 + 9x + 392 = 0$ $(5x + 49)(x - 8) = 0$ $x \neq \frac{40}{5}$ or $x = 8$	✓ correct substitution/ <i>korrekte vervanging</i> ✓ standard form/ <i>standaardvorm</i> ✓ factors/ <i>faktore</i> ✓ correct answer/ <i>korrekte antwoord</i>	(4)
7.4	$V = (8)(2 \times 8)(3 + 8)$ $= 1408$	✓ correct substitution into volume / <i>korrekte vervanging in volume</i> ✓ answer/ <i>antwoord</i>	(2)
			[11]

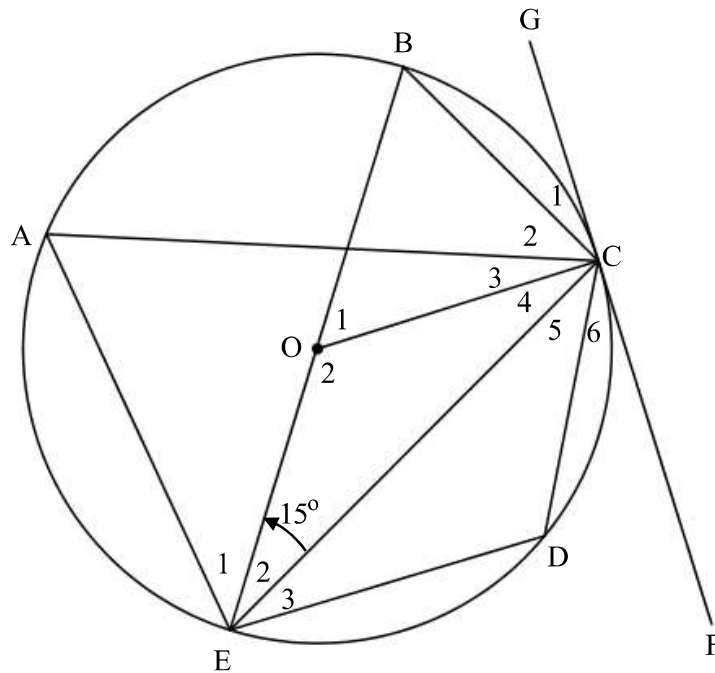
QUESTION 8/VRAAG 8



8.1	Constructions: Join OA and OC <i>Konstruksies: Verbind OA en OC</i> Proof in $\triangle AOB$ and $\triangle COB$ <i>Bewys in $\triangle AOB$ en $\triangle COB$</i> 1. $AO = CO$ [radii] / [<i>radiusse</i>] 2. $\hat{A}BC = \hat{C}BO = 90^\circ$ [$\angle$s on a str. line] / [<i>le oopreguitlyn</i>] 3. $OB = OB$ [common] / [<i>gemeen</i>] $\therefore \triangle AOB \equiv \triangle COB$ [<i>RHS</i>] / [<i>90° Sk S</i>] $\therefore AB = BC$	✓ construction <i>konstruksie</i> ✓ S/R ✓ S/R ✓ S ✓ R	(5)
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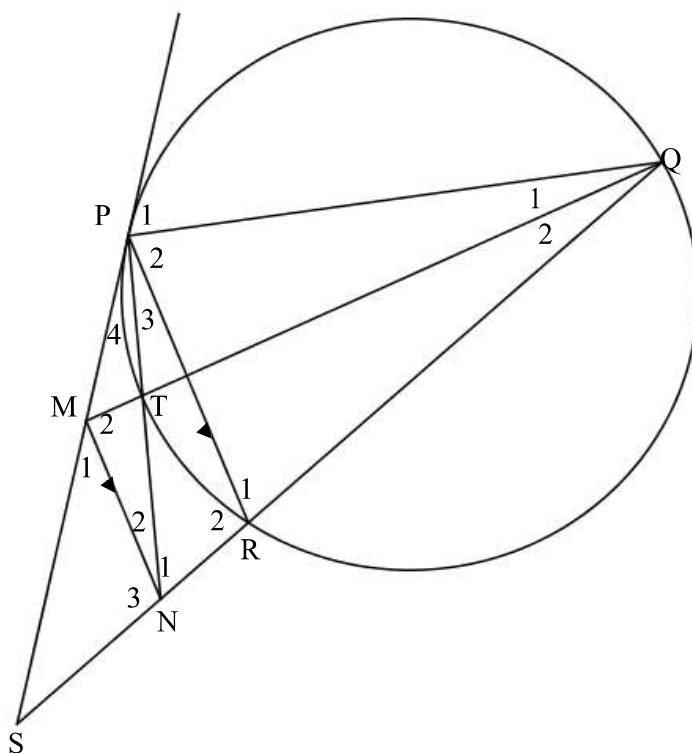
8.2			
8.2.1	$PQ = QR = 4 \text{ cm}$ [line from centre $\perp$ to chord] [lyn vanaf middelpunt $\perp$ op koord] $UR = \sqrt{4^2 + 3^2}$ [Pyth.theo]/ [Stelling van Pythagoras] $= 5$	$\checkmark$ S $\checkmark$ R $\checkmark$ correct substitution/ korrekte vervanging $\checkmark$ answer/antwoord	(4)
8.2.2	$TR = 2(UR) = 10$ [diameter]/[middellyn] $\hat{S} = 90^\circ$ [$\angle$ in semi – circle]/[$\angle$ in semi – sirkel] $10^2 = x^2 + (x + 2)^2$ [Pyth. theo]/[Stelling van Pythagoras] $100 = x^2 + x^2 + 4x + 4$ $2x^2 + 4x - 96 = 0$ $x^2 + 2x - 48 = 0$ $(x - 6)(x + 8) = 0$ $x = 6 \text{ or / of } x \neq -8$ $\therefore TS = 6$	$\checkmark$ S $\checkmark$ R $\checkmark$ correct substitution/ korrekte vervanging $\checkmark$ standard form / standaardvorm $\checkmark$ factors / faktore $\checkmark$ correct value of x / korrekte waarde van x	(6)
			[15]

QUESTION 9 / VRAAG 9



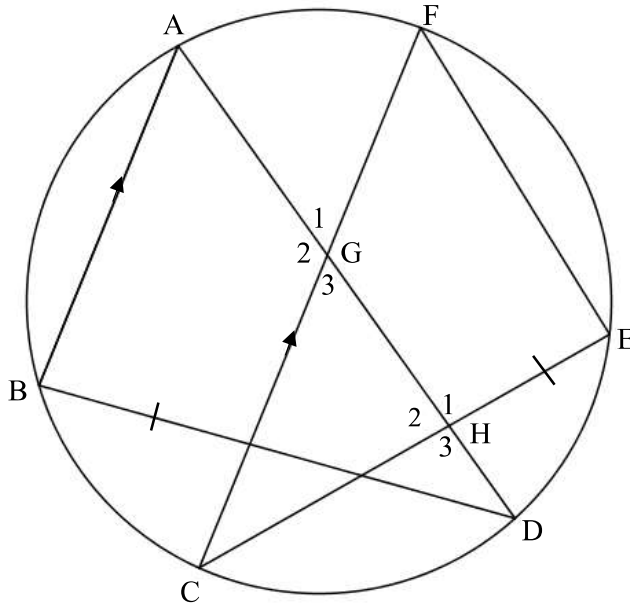
9.1.1	$\hat{O}_1 = 30^\circ$ [$\angle$ at centre = $2\angle$ at circumf.] [Middelpunts $\angle = 2 \times$ Omtreks $\angle$]	✓ S ✓ R	(2)
9.1.2	$\hat{O}_2 = 150^\circ$ $\hat{A} = 75^\circ$ [$\angle$ s on a str.line]/[$\angle$ opreguitlyn] [$\angle$ at centre = $2\angle$ at circumf.] [Middelpunts $\angle = 2 \times$ Omtreks $\angle$]	✓ S ✓ S/R	(2)
9.1.3	$\hat{D} = 105^\circ$ [opp. $\angle$ s of a cyclic quad] [Teenoorst. $\angle$ e van koordevierhoek]	✓ S ✓ R	(2)
9.1.4	$\hat{ECF} = 75^\circ$ [tan chord theo.]/[raaklyn-koord stelling]	✓ S ✓ R	(2)
9.1.5	$\hat{OCG} = 90^\circ$ [rad $\perp$ tan]/[radius $\perp$ raaklyn]	✓ S ✓ R	(2)

9.2



9.2.1	$\hat{P}_1 = \hat{R}_1$ [tan chord theo] / [raaklyn – koord stelling] $\hat{P}_1 = \hat{M}\hat{N}\hat{Q}$ [corresp. $\angle$ s, / ooreenk. $\angle$ e : $MN \parallel PR$] $\hat{R}_1 = \hat{P}\hat{T}\hat{Q}$ [$\angle$ s same seg] / [$\angle$ e in dies. segment]	$\checkmark$ S $\checkmark$ R $\checkmark$ S $\checkmark$ R Any 2 angles with reasons / Enige 2 hoeke met redes	(4)
9.2.2	$\hat{S}\hat{P}\hat{Q} = \hat{Q}$ [tan chord theo] / [raaklyn – koord stelling] $\hat{S}\hat{P}\hat{Q} = \hat{M}_1$ [corresp. $\angle$ s, / ooreenk. $\angle$ e : $MN \parallel PR$] $\therefore \hat{Q}_1 = \hat{M}_1$ $\therefore MNQP$ is a cyclic quad [conv. ext. $\angle$ of a cyclic quad] <i>MNQP is 'n koordevh. [omgek. buite $\angle$ van koordevh]</i>	$\checkmark$ S $\checkmark$ R $\checkmark$ S $\checkmark$ R	(4)
9.2.3	$\hat{P}_3 = \hat{N}_2$ [alt. $\angle$ s, $MN \parallel PR$] / [verw. $\angle$ e : $MN \parallel PR$] $\hat{N}_2 = \hat{Q}_1$ [$\angle$ s same seg] / [$\angle$ e in dies. segment] $\hat{Q}_1 = \hat{P}_4$ [tan chord theo] / [raaklyn – koord stelling] $\therefore \hat{P}_3 = \hat{P}_4$ <i>PN bisects $\hat{S}\hat{P}\hat{R}$ / PN halveer $\hat{S}\hat{P}\hat{R}$</i>	$\checkmark$ S/R $\checkmark$ S $\checkmark$ R $\checkmark$ S/R	(4)
			[22]

QUESTION 10/VRAAG 10



$\hat{G}_3 = \hat{A}$	[corresp. $\angle$ s / ooreenk. $\angle$ e, $GC \parallel AB$]	✓ S	✓ R	
$\hat{A} = \hat{F}$	[$\angle$ s subt by = chords] / [$\angle$ e onderspan deur = koorde]	✓ S	✓ R	
$\therefore \hat{G}_3 = \hat{F}$		✓ R		
$\therefore AB \parallel FE$	[corresp. $\angle$ s, =] / [ooreenkomstige $\angle$ e =]			[5]

TOTAL/TOTAAL: 150