



Province of the
EASTERN CAPE
EDUCATION

igqondo leMnyama Kapa, Tshaka kaMkhonto
Provincie van die Oos-Kaap / Oos-Koewet van Oos-Kaap
Provincie Ya Kapa MnyamaKapa, Tshaka ka Mkhonto

LEARNER'S NAME & SURNAME
LEERDER SE NAAM EN VAN

Solns

GRADE/GRAAD 12

**NATIONAL/NASIONALE
SENIOR
CERTIFICATE/SERTIFIKAAT**

GRADE 12/GRAAD 12

SEPTEMBER 2025

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

Marker/Merker				Moderator's Initials / Moderator se paraaf									
Question Vraag	Mark Punt		Initial Parafeer	Marks Punte	S M	Marks Punte	D M	Marks Punte	P M	Marks Punte	N M		
1													
2													
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10													
TOTAL TOTAAL													

This special answer book consists of 22 pages. /
Hierdie spesiale antwoordeboek bestaan uit 22 bladsye.

QUESTION/VRAAG 1

Data Set / Datasel:

15	17	20	20	20	21	22	24
29	29	30	11t	11t+2	36	38	55

$$T_1; \dots; T_8 \quad T_9; \dots; T_{16}$$

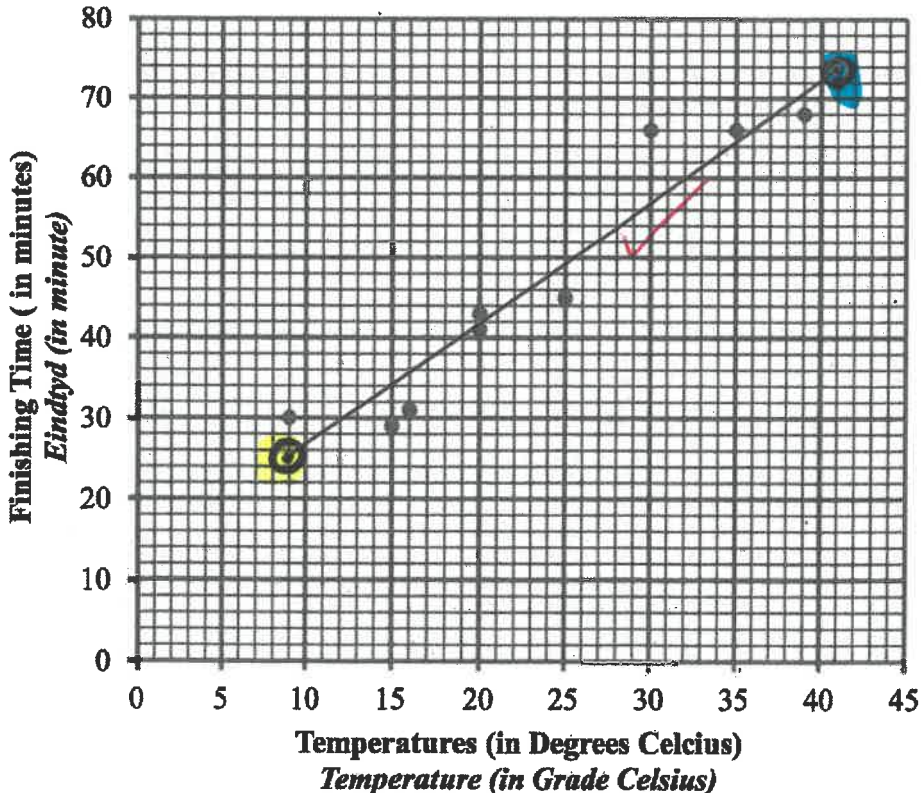
$$T_1 \quad T_8 \quad T_9 \quad T_{16}$$

$$Q_1 = T_{4,5} \quad M = T_{8,5} \quad Q_3 = T_{12,5}$$

	Solution/Oplissing	Marks Punte
1.1	Mode = 20 ✓ →	1 (1)
1.2	$Q_1 = \frac{20+20}{2} = 20$ ✓ $Q_3 = \frac{11t+11t+2}{2} = 11t+1$ ✓ $Q_3 - Q_1 = 14 \therefore 11t+1-20=14$ $11t = 33$ $t = 3$ ✓ →	3 (3)
1.3	$T_{12} = 11t = 11 \cdot 3 = 33$ $T_{13} = 33+2 = 35$ $\bar{x} = \frac{15+17+20+\dots+38+55}{16}$ $= \frac{444}{16}$ ✓ $= 27,75 \text{ yrs}$ ✓ →	2 (2)
1.4	$\sigma = 9,86$ ✓ →	1 (1)
1.5	Below $(\bar{x} - \sigma) = 27,75 - 9,86$ ✓ $= 17,89$ ✓ $\therefore 2 \text{ visitors}$ ✓ →	3 (3)
		[10]

QUESTION/VRAAG 2

Year / Jaar	1	2	3	4	5	6	7	8	9	10
Temperatures (degrees Celsius) x Temperatuur (grade Celsius) x	41	9	30	15	25	20	20	35	39	16
Finishing times of athletes (in minutes) y Eindtye van atlete (in minute) y	72	30	66	29	45	43	41	66	68	31

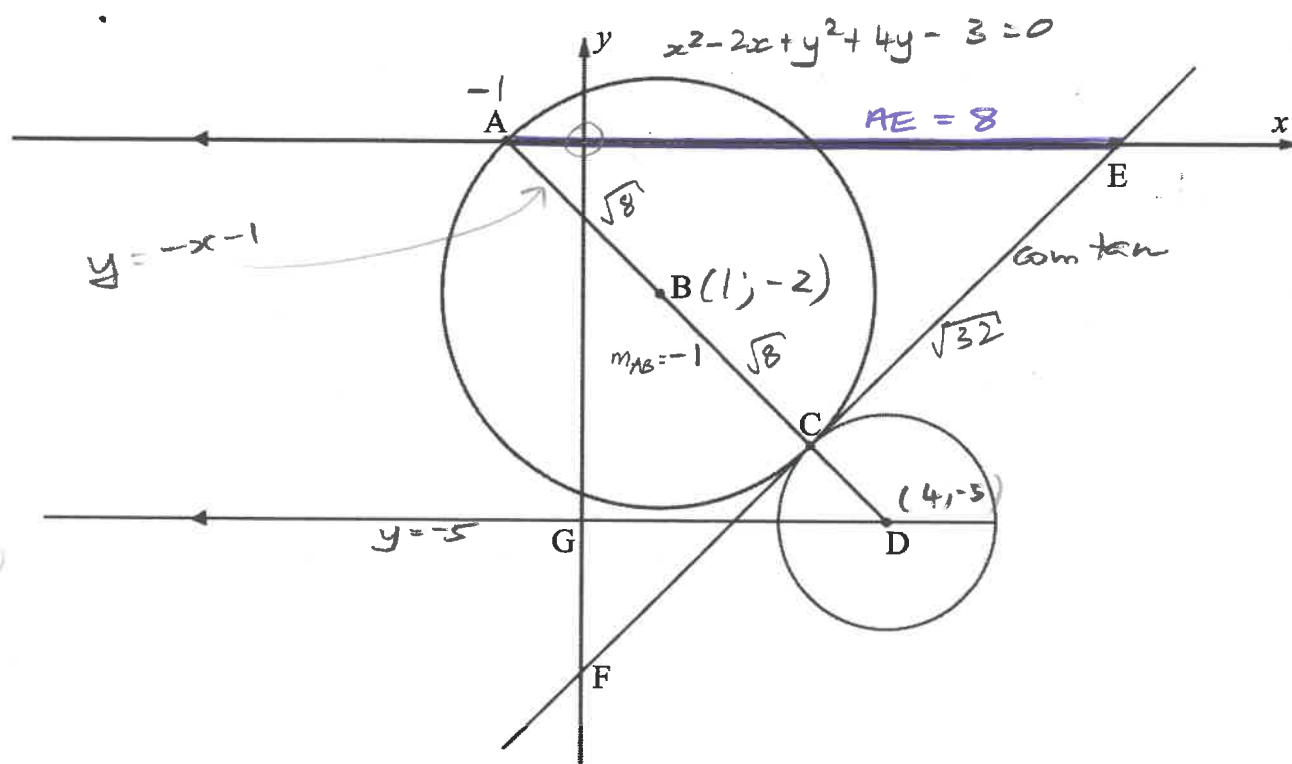
	Solution/Oplissing	Marks Punte
2.1	$r = 0,96$ ✓	1 (1)
2.2	very strong ✓ positive correlation	1 (1)
2.3	$A = 10,92$ ✓ $B = 1,53$ ✓ $\therefore y = 10,92 + 1,53x$ ✓	3 (3)
2.4	$57 = 10,92 + 1,53x$ ✓ $\therefore x = 30$ ✓ $30,11 \dots$ Nearest No	2 (2)
2.5	Temperatures versus Finishing Time Temperatuur teenoor Eindtyd  Finishing Time (in minutes) Eindtyd (in minute) Temperatures (in Degrees Celcius) Temperatuur (in Grade Celsius) $x = 41$ $y = 72$ $y = 10,92 + 1,53(41)$ $y = 10,92 + 62,67$ $y = 73,59$ $72 - 73,59 = -1,59$ $\therefore x = 41$ NB $x \in [9, 41]$	2 (2)
		9

3.3	$AD \quad m = \frac{-6 - (-8)}{3 - (-3)} = \frac{1}{3} \checkmark$ $y = \frac{1}{3}x + c$ $sub \ D(3; -6)$ $-6 = \frac{1}{3}(3) + c \checkmark$ $-7 = c$ $\therefore y = \frac{1}{3}x - 7 \checkmark$	3
		(3)
3.4	$\tan \hat{G}_1 = -\frac{4}{3} \quad \tan \hat{F}_1 = 2$ $ref^{\wedge} = 53,13...^{\circ} \quad ref^{\wedge} = 63,43...^{\circ}$ $\tan - in \quad \tan + in$ $II: \hat{G}_1 = 126,86...^{\circ} \quad I: \hat{F}_1 = 63,43...^{\circ}$ $\hat{G}_2 = 53,13...^{\circ} \quad \wedge's \text{ on str line} = 180^{\circ}$ $\hat{F}_2 = 63,43...^{\circ} \quad \text{vert opp } \wedge's =$ $\therefore \hat{CKD} = 116,57^{\circ} \checkmark \text{ ext } \wedge \Delta$	5
		(5)
3.5	$AC = 2 \cdot KC \quad \therefore k \text{ is midpt } AC$ $6\sqrt{5} = 2 \cdot KC \quad \therefore KC = 3\sqrt{5} \checkmark$ $K(0; -2) \checkmark \quad \text{y int of } y = -\frac{4}{3}x - 2$ $KD = \sqrt{(-6 - (-2))^2 + (3 - 0)^2} = \sqrt{25} = 5 \checkmark$ $\therefore \text{area } \triangle CKD = \frac{1}{2} (3\sqrt{5})(5) \sin 116,57^{\circ}$ $= 15 \sqrt{2}$ OR pg 6	5
		(5)
3.6	$x = 3 \checkmark$	1
		(1)

3.7	$KE = -2 - (-7) = 5$ ✓	5
	$CD = 4 - (-6) = 10$ ✓	
	$OH = 3$ ✓	
	$\text{area EKCD} = \frac{1}{2}(5+10) \times 3 = \frac{45}{2}$ ✓	
	$\frac{\text{area } \triangle CKD}{\text{area EKCD}} = \frac{15}{45/2}$	
	$= \frac{2}{3}$ ✓	
		(5)
		[23]

3.5. $CD = 4 - (-6) = 10$
 $\perp$ h of K above $CD = 3$
 $\therefore \text{area } \triangle CKD = \frac{1}{2}(10)(3)$
 $= 15 \text{ u}^2$

QUESTION/VRAAG 4



	Solution/Oplossing	Marks/ Punte
4.1	$x^2 - 2x + (-1)^2 + y^2 + 4y + (+2)^2 = 3 + (-1)^2 + (+2)^2$ $(x-1)^2 + (y+2)^2 = 8$ $\therefore B(1; -2)$	3
4.2	$x \text{ int: } x^2 - 2x - 3 = 0 \quad y = 0$ $(x+1)(x-3) = 0$ $x = -1 \text{ or } 3$ $\therefore A(-1; 0)$	3

4.3	$m_{AB} = \frac{-2-0}{1-(-1)} \checkmark \quad A(-1;0) \quad B(1;-2)$ $= -1 \checkmark$ →	2 (2)
4.4	$AC = 2 \times (\sqrt{8}) \checkmark \quad \text{diam, } r = \sqrt{8}$ $\angle ACE = 90^\circ \checkmark \quad \text{tan } \perp \text{ rad}$ $8^2 = (2\sqrt{8})^2 + CE^2 \checkmark \quad \text{Pythag}$ $32 = CE^2$ $CE = \sqrt{32} \quad 4\sqrt{2}$ $= 5,66 \checkmark \quad \text{accept surd form}$ → OR pg	4 (4)
4.5	$ABCD : \quad y = -x + c$ $\text{Sub } A(-1;0)$ $0 = -(-1) + c \checkmark$ $-1 = c$ $\therefore y = -x - 1 \checkmark$ $\text{Sub } D(x; -5)$ $-5 = -x - 1 \checkmark$ $x = 4$ $\therefore D(4; -5) \checkmark$ →	4 (4)
4.6	$AD = \sqrt{(-5-0)^2 + (4-(-1))^2} \quad A(-1;0) \quad D(4;-5)$ $= \sqrt{50}$ $r = \sqrt{50} - 2\sqrt{8} = \sqrt{2} \checkmark$ $(x-4)^2 + (y+5)^2 = (\sqrt{2})^2$ $(x-4)^2 + (y+5)^2 = 2$ →	3 (3)
	✓ LHS ✓ RHS	[19]

4.4 $A(-1; 0) \quad B(1; -2) \quad C(x_c; y_c)$

$AB = BC$ radius

$$\therefore 1 = \frac{-1 + x_c}{2} \quad -2 = \frac{0 + y_c}{2}$$

$$2 = -1 + x_c \quad -4 = y_c$$

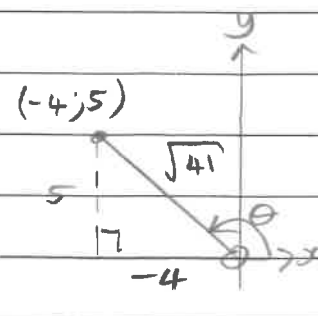
$$3 = x_c$$

$$\therefore C(3; -4)$$

$A(-1; 0) \xrightarrow{8} E(7; 0)$

$$\begin{aligned} \therefore CE &= \sqrt{(0 - (-4))^2 + (7 - 3)^2} \quad \checkmark \\ &= \sqrt{32} \\ &= \underline{5,66} \quad \checkmark \quad 4\sqrt{2} \end{aligned}$$

QUESTION/VRAAG 5

	Solution/Oplissing	Marks/ Punte
5.1.1	$\tan \theta = -\frac{5}{4} \quad \frac{y}{x} = \frac{5}{-4}$ $r = \sqrt{41} \text{ Pyth}$ $\cos \theta = \frac{x}{r}$ $= \frac{-4}{\sqrt{41}}$ 	2 (2)
5.1.2	$2 \sin^2 \theta = 2 \left(\frac{y}{r} \right)^2$ $= 2 \left(\frac{5}{\sqrt{41}} \right)^2$ $= 2 \cdot \frac{25}{41}$ $= \frac{50}{41}$	2 (2)
5.1.3	$\cos(90^\circ - 2\theta) = \sin 2\theta$ $= 2 \sin \theta \cos \theta$ $= 2 \left(\frac{y}{r} \right) \left(\frac{x}{r} \right)$ $= 2 \left(\frac{5}{\sqrt{41}} \right) \left(-\frac{4}{\sqrt{41}} \right)$ $= -\frac{40}{41}$	4 (4)

5.2	$\begin{aligned} \text{LHS} &= \frac{3\cos 2x + 3\cos^2 x + 9\sin^2 x}{4 - 4\sin^2 x} \\ &= \frac{3(\cos^2 x - \sin^2 x) + 3\cos^2 x + 9\sin^2 x}{4(1 - \sin^2 x)} \\ &= \frac{3\cos^2 x - 3\sin^2 x + 3\cos^2 x + 9\sin^2 x}{4\cos^2 x} \\ &= \frac{6\cos^2 x + 6\sin^2 x}{4\cos^2 x} \quad \text{3 ID's} \\ &= \frac{6(\cos^2 x + \sin^2 x)}{4\cos^2 x} \\ &= \frac{6 \cdot 1}{4\cos^2 x} \quad \checkmark \\ &= \frac{3}{2\cos^2 x} \\ &= \text{RHS} \quad \rightarrow \end{aligned}$	4
5.3	$\begin{aligned} &\frac{\cos x \cos(90^\circ - x) \sin(48^\circ - x) + \sin^2 x \cos(48^\circ - x)}{\sin(-x) \cos 24^\circ \cos 66^\circ} \\ &= \frac{\cos x (\sin x) \sin(48^\circ - x) + \sin^2 x \cos(48^\circ - x)}{(-\sin x) \cos 24^\circ \cos(90^\circ - 24^\circ)} \\ &= \frac{\sin x (\cos x \sin(48^\circ - x) + \sin x \cos(48^\circ - x))}{-\sin x \cos 24^\circ \sin 24^\circ} \quad \checkmark \text{ cf } \checkmark \\ &= \frac{\sin x \cos(48^\circ - x) + \cos x \sin(48^\circ - x)}{-\sin 24^\circ \cos 24^\circ} \\ &= \frac{\sin(x + 48^\circ - x)}{-\sin 24^\circ \cos 24^\circ} \\ &= -\frac{\sin 48^\circ}{\sin 24^\circ \cos 24^\circ} \quad \checkmark \\ &= -\frac{2 \sin 24^\circ \cos 24^\circ}{\sin 24^\circ \cos 24^\circ} \quad \checkmark \\ &= -2 \quad \checkmark \rightarrow \end{aligned}$	7

5.4.1	✓ $[\cos(60^\circ - x) + \cos(60^\circ + x)]^2$ ✓ $= [\cos 60^\circ \cos x + \sin 60^\circ \sin x + \cos 60^\circ \cos x - \sin 60^\circ \sin x]^2$ ✓ $= [2 \cos 60^\circ \cos x]^2$ ✓ $= [2 \left(\frac{1}{2}\right) \cos x]^2$ $= \cos^2 x$ →	3
5.4.2	$\cos^2 x = \frac{3}{4}$ ✓ $\cos x = \pm \frac{\sqrt{3}}{2}$ ✓ $\text{ref}^\circ = 30^\circ$$\cos \neq \text{in}$ I : $x = 30^\circ + k \cdot 360^\circ; k \in \mathbb{Z}$ II : $x = 150^\circ + k \cdot 360^\circ; k \in \mathbb{Z}$ III : $x = 210^\circ + k \cdot 360^\circ; k \in \mathbb{Z}$ IV : $x = 330^\circ + k \cdot 360^\circ; k \in \mathbb{Z}$ → ✓ ✓	4

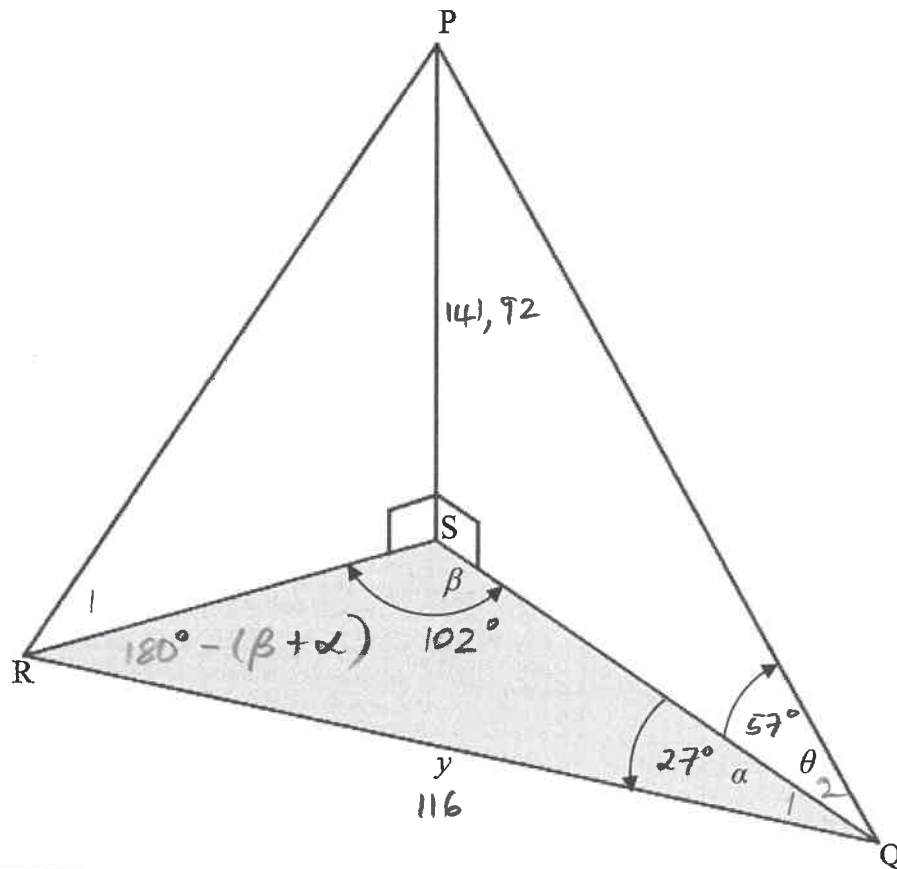
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QUESTION/VRAAG 6

$$f: y = \cos x - \frac{1}{2} \quad g: y = \sin(x + 30^\circ)$$

	Solution/Oplossing	Marks/ Punte
6.1	$f: y \in [-\frac{3}{2}; \frac{1}{2}]$ $f+1: y \in [-\frac{1}{2}; \frac{3}{2}]$	2
6.2		3
6.3	$g_{\min} \text{ @ } x = -120^\circ \text{ or } 240^\circ$	2
6.4	$f'(x) < 0 \quad x \in (0^\circ; 180^\circ)$ decreasing	2
6.5	$\text{Amp}_f = 1$	1
6.6	$f: y = \cos x - \frac{1}{2} \rightarrow h: y = -\cos x$ $\checkmark$ f translated $\frac{1}{2}$ unit vertically up $\checkmark$ then, reflect in x-axis.	2
		[12]

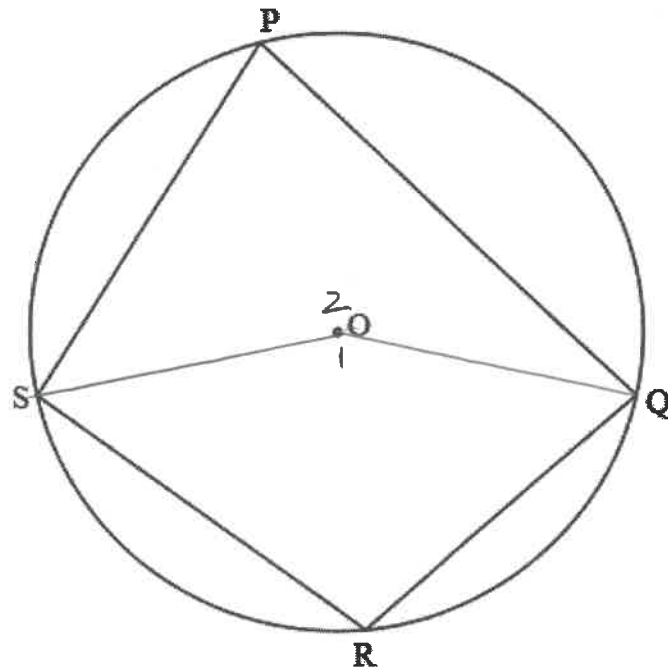
QUESTION/VRAAG 7



	Solution/Oplossing	Marks/ Punte
7.1	$\hat{S}RQ = 180^\circ - (\beta + \alpha)$ ✓ $\sum \text{angles in } \Delta = 180^\circ$	1
7.2	$\Delta SRQ \quad \frac{QS}{\sin(180^\circ - (\beta + \alpha))} = \frac{y}{\sin \beta}$ $\frac{QS}{\sin(\beta + \alpha)} = \frac{y}{\sin \beta}$ ✓ $QS = \frac{y \sin(\beta + \alpha)}{\sin \beta}$ $\Delta PSQ \quad \tan \theta = \frac{PS}{QS}$ ✓ $PS = QS \cdot \tan \theta$ $= \frac{y \sin(\beta + \alpha)}{\sin \beta} \cdot \tan \theta$ $= \frac{y \tan \theta \sin(\beta + \alpha)}{\sin \beta}$	3

7.3	$PS = \frac{116 \tan 57^\circ \sin(102^\circ + 27^\circ)}{\sin 102^\circ} \checkmark$ $= 141,92 \text{ m} \checkmark$	2 (2)
7.4	$\Delta SRQ \quad \frac{RS}{\sin 27^\circ} = \frac{116}{\sin 102^\circ} \checkmark$ $RS = \frac{116}{\sin 102^\circ} \cdot \sin 27^\circ \checkmark$ $= 53,83... \checkmark$ $\Delta PSR \quad \tan \hat{R}_1 = \frac{141,92}{53,83...} \checkmark$ $= 2,63...$ $\text{ref}^\circ = 69,22...^\circ$ $\tan + \text{in}$ $\therefore \hat{R}_1 = 69,23^\circ \checkmark$ accept $69,22^\circ$	
		[10]

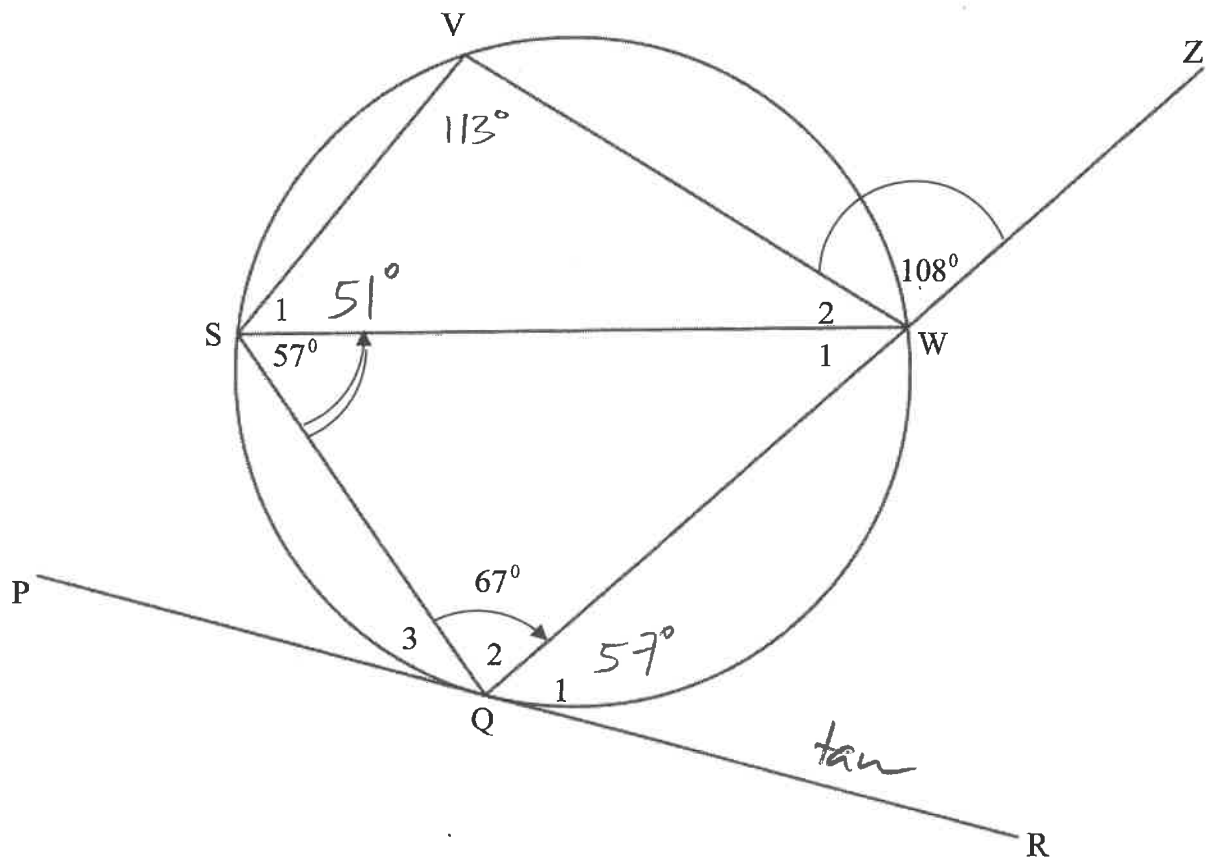
QUESTION/VRAAG 8



no constr
b/d 0/5

✓ constr

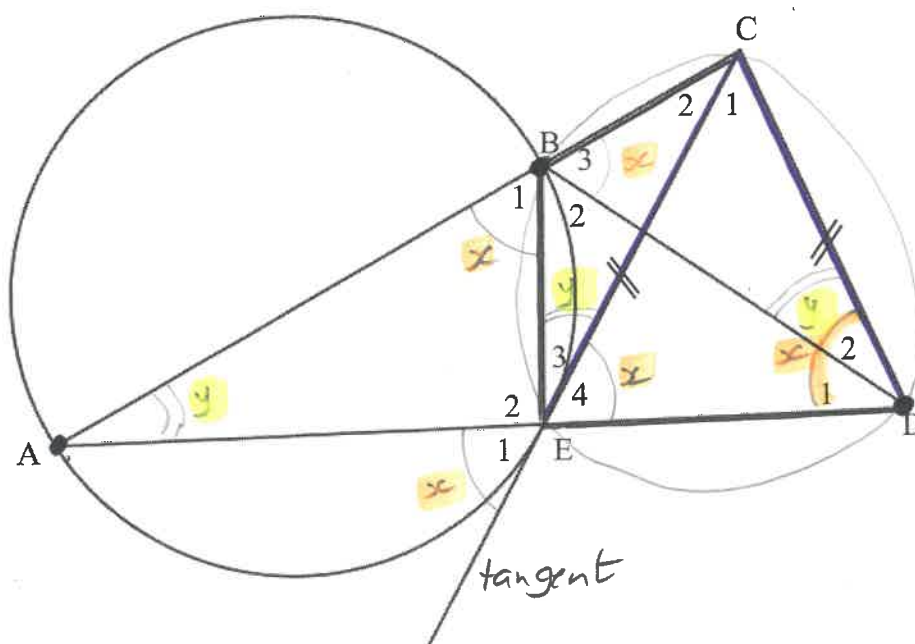
	Solution/Oplissing	Marks/ Punte
8.1	$\hat{O}_1 = 2 \cdot \hat{P}$ ✓ SP $\hat{\text{@}} \text{ centre} = 2 \times \hat{\text{@}} \text{ circum}$	5
	$\hat{O}_2 = 2 \cdot \hat{R}$ ✓ S $\hat{\text{@}} \text{ centre} = 2 \times \hat{\text{@}} \text{ circum}$	
	$\hat{O}_1 + \hat{O}_2 = 360^\circ$ ✓ SP $\text{all in a row} = 360^\circ$	
	$2\hat{P} + 2\hat{R} = 360^\circ$ ✓ S	
	$2(\hat{P} + \hat{R}) = 360^\circ$	
	$\hat{P} + \hat{R} = 180^\circ$	
		(5)



	Solution/Oprossing	Marks/ Punte
8.2.1	$\hat{V} = 113^\circ \rightarrow$ ✓ S ✓ R opp ^'s cyclic quad = 180°	2 (2)
8.2.2	$\hat{S}_1 + 57^\circ = 108^\circ$ ✓ S ✓ R ext ^ cyclic quad $\hat{S}_1 = 51^\circ \rightarrow$	2 (2)
8.2.3	$\widehat{WQR}$ $= \hat{Q}_1$ $= 57^\circ \rightarrow$ ✓ S ✓ R tan chord thm	2 (2)

[11]

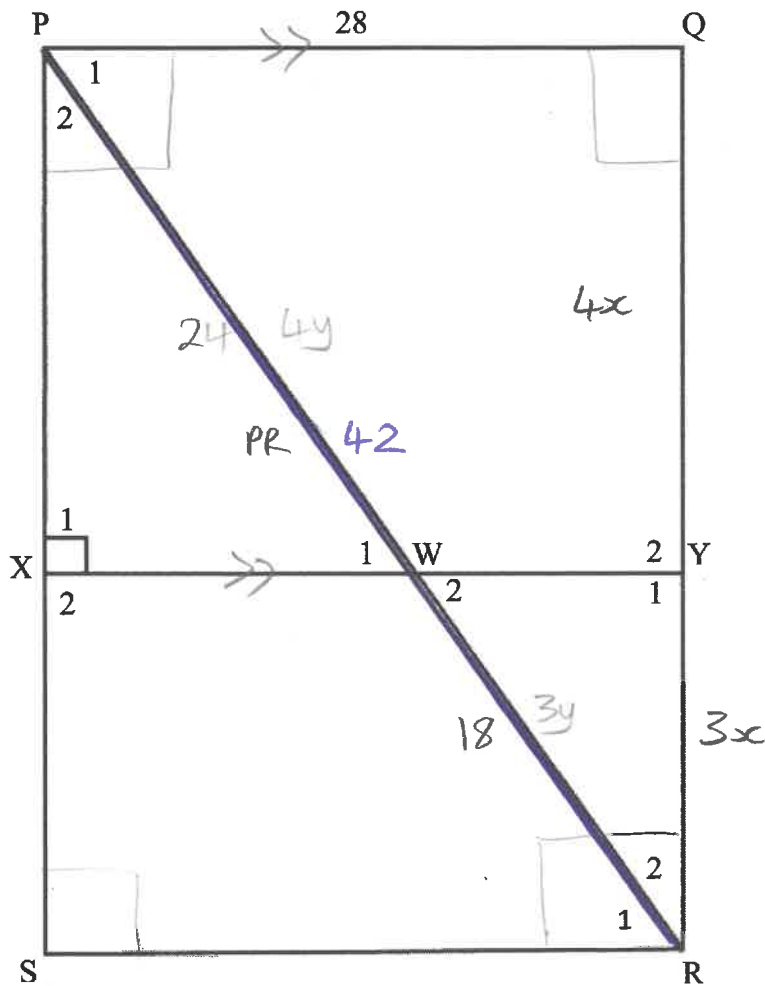
QUESTION/VRAAG 9



	Solution/Oplossing	Marks/Punte
9.1	Let $\hat{D}_4 = x$ $\therefore \hat{D}_1 + \hat{D}_2 = x$ $\checkmark SR$ $\wedge$'s opp = sides $\hat{E}_1 = x$ $\checkmark SR$ vert opp $\wedge$'s = $B_1 = x$ $\checkmark S \checkmark R$ tan chord then $\therefore \hat{B}_1 = \hat{D}_1 + \hat{D}_2$ both = x $\therefore BCDE$ is a cyclic quad $\checkmark R$ $\Rightarrow$ corner ext $\wedge$ cyclic quad	5
9.2	In Δ's $C_2E_3B_{2+3}$, $C_2A E_{2+3}$ 1. $\hat{C}_2 = \hat{C}_2$ $\checkmark SR$ common 2. $\hat{E}_3 = \hat{A} = y$ $\checkmark SR$ tan chord then 3. $\hat{B}_2 + \hat{B}_3 = \hat{E}_2 + \hat{E}_3$ sum $\wedge$'s in $\Delta = 180^\circ$ $\therefore \triangle CEB \parallel \triangle CAE$ $\checkmark R$	3

9.3	$\frac{CE}{CA} = \frac{EB}{AE} = \frac{BC}{EC}$ $\frac{CD}{CA} = \frac{EB}{AE}$ $\therefore CD = \frac{EB \cdot AC}{AE}$ D	2 (2)
9.4	$\hat{D}_2 = \hat{y}$ $\therefore \hat{D}_2 = A$ CD is a tan $\checkmark R$ cons tan chord then to $\odot ABD$ D	3 (3)
9.5	$\frac{EB}{EA} = \frac{CE}{CA}$ 9.3. $\frac{CE}{CA} = \frac{EB}{AE} = \frac{BC}{EC}$ $\Delta CEB \parallel \Delta CAE$ $\frac{EB^2}{AE^2}$ $= \frac{EB}{AE} \cdot \frac{EB}{AE}$ $= \frac{CE}{CA} \cdot \frac{BC}{EC}$ $= \frac{BC}{AC}$ D	6 (6)
		[19]

QUESTION/VRAAG 10



$$\frac{QY}{YR} = \frac{4}{3}$$

$$QY = 4x$$

$$YR = 3x$$

	Solution/Oplissing	Marks/Punte
10.1	$\hat{P}_1 + \hat{P}_2 = 90^\circ$ ✓ SR $\wedge$ rect = 90°	2 (2)
	$\therefore \hat{P}_1 + \hat{P}_2 + \hat{X}_1 = 90^\circ + 90^\circ$	
	$= 180^\circ$	
	$\therefore XY \parallel PQ$ ✓ R $\wedge$ $\text{oint}^\wedge$ s = 180°	

10.2	$\frac{RW}{WP} = \frac{RY}{YQ} \quad \checkmark S \checkmark R \text{ line } \parallel \text{ side of } \Delta$ $= \frac{3x}{4x}$ $= \frac{3}{4} \quad \left. \begin{array}{l} RW = 3y \\ WP = 4y \end{array} \right\} \checkmark$ $3y + 4y = 42$ $7y = 42$ $y = 6$ $\therefore WR = 3(6) = 18 \quad \checkmark$	4 (4)
10.3	$XW \parallel PQ \quad (10.1)$ $PQ \parallel RS \quad \text{opp sides rect } \parallel$ $\text{In } \Delta's \text{ } PXW, PSR,$ $1. \hat{P}_2 = \hat{P}_2 \quad \text{Common}$ $2. \hat{X}_1 = \hat{S} \quad \text{both} = 90^\circ$ $3. \hat{W}_1 = \hat{R}_1 \quad \text{Cor } \hat{s} =, XW \parallel SR$ $\therefore \Delta PXW \parallel \Delta PSR \quad \checkmark S \quad A A A$ $\frac{XW}{28} = \frac{WP}{42-18} \quad \checkmark S \quad \Delta PXW \parallel \Delta PSR$ $\frac{XW}{28} = \frac{24}{42} \quad \checkmark R \quad \text{opp sides rect} =$ $XW = 16 \quad \checkmark$	5 (5)
		[11]

TOTAL/TOTAAL: 150