



Province of the
EASTERN CAPE
EDUCATION

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GRADE / GRAAD 11

**NATIONAL/NASIONALE
SENIOR
CERTIFICATE/SERTIFIKAAT**

GRADE 11/GRAAD 11

NOVEMBER 2024

**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										
3										
4										
5										
6										
7										
8										
9										
10										
TOTAL TOTAAL										

This special answer book consists of 25 pages. /
Hierdie spesiale antwoordeboek bestaan uit 25 bladsye.



* I M A T 4 *

QUESTION/VRAAG 1

16	28	41	41	42	52	54
55	58	59	60	62	64	99

14

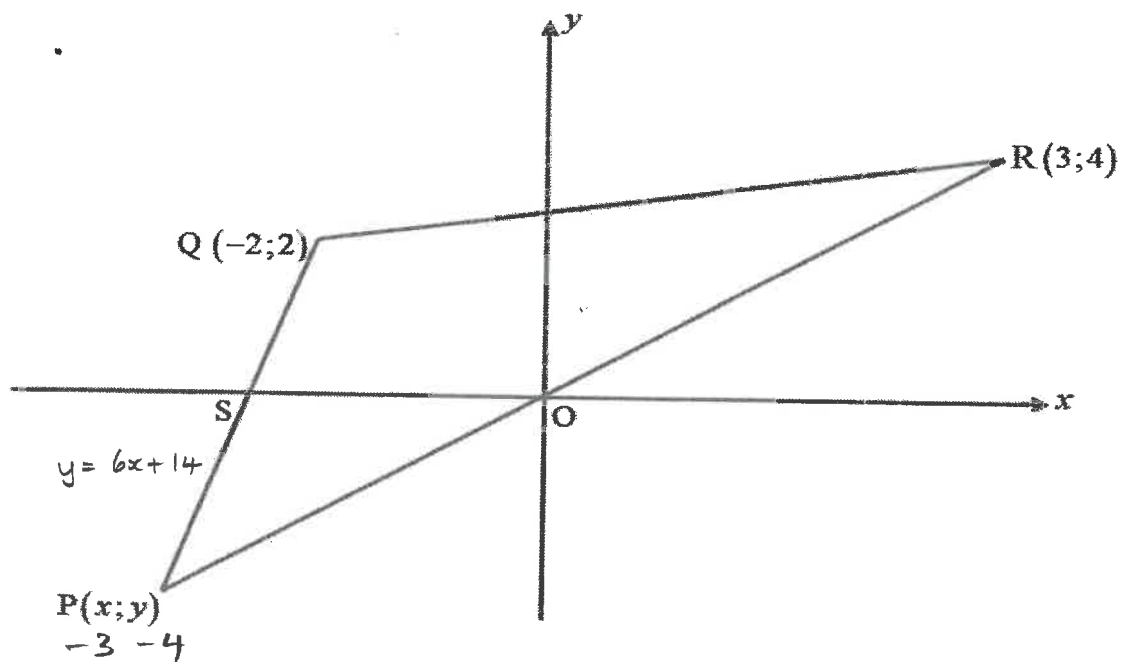
	Solution/Oplissing	Marks/ Punte
1.1	Mode = 41 ✓ →	1 (1)
1.2	LF = $41 - 1,5 \cdot 19 = 12,5$ 4F = $60 + 1,5 \cdot 19 = 88,5$ outlier = 99 ✓ →	1 (1)
1.3	M = 54,5 ✓✓ →	2 (2)
1.4	IQR = $60 - 41$ ✓ = 19 ✓ →	3 (3)
1.5	16 41 54,5 60 99 ✓ shape ✓ scale	2 (2)
1.6	$54,5 - 41 = 13,5$ $60 - 54,5 = 5,5$ $13,5 > 5,5$	1 (1)
	∴ data skewed to the left / negatively ✓	[10]

QUESTION/VRAAG 2

	Solution/Oplissing	Marks/ Punte																					
2.1	<table border="1"> <thead> <tr> <th>WEIGHT OF BOXERS GEWIG VAN BOKSERS</th><th>FREQUENCY FREKWENSIE</th><th>CUMULATIVE FREQUENCY KUMULATIEWE- FREKWENSIE</th></tr> </thead> <tbody> <tr> <td>$35 \leq x < 55$</td><td>1</td><td>1</td></tr> <tr> <td>$55 \leq x < 75$</td><td>3</td><td>4</td></tr> <tr> <td>$75 \leq x < 95$</td><td>9</td><td>13</td></tr> <tr> <td>$95 \leq x < 115$</td><td>6</td><td>19</td></tr> <tr> <td>$115 \leq x < 135$</td><td>3</td><td>22</td></tr> <tr> <td>$135 \leq x < 155$</td><td>1</td><td>23</td></tr> </tbody> </table>	WEIGHT OF BOXERS GEWIG VAN BOKSERS	FREQUENCY FREKWENSIE	CUMULATIVE FREQUENCY KUMULATIEWE- FREKWENSIE	$35 \leq x < 55$	1	1	$55 \leq x < 75$	3	4	$75 \leq x < 95$	9	13	$95 \leq x < 115$	6	19	$115 \leq x < 135$	3	22	$135 \leq x < 155$	1	23	2 (2)
WEIGHT OF BOXERS GEWIG VAN BOKSERS	FREQUENCY FREKWENSIE	CUMULATIVE FREQUENCY KUMULATIEWE- FREKWENSIE																					
$35 \leq x < 55$	1	1																					
$55 \leq x < 75$	3	4																					
$75 \leq x < 95$	9	13																					
$95 \leq x < 115$	6	19																					
$115 \leq x < 135$	3	22																					
$135 \leq x < 155$	1	23																					
2.2	$n = 23$ ✓	1 (1)																					
2.3	$\bar{x} = \frac{45 \times 1 + 65 \times 3 + 85 \times 9 + \dots + 145 \times 1}{23}$ $= 93,70$	3 (3)																					
2.4	Cumulative frequency graph (ogive) Kumulatiewefrekwensiegrafiek (ogief) ✓ upper end of int and cum freq. ✓ shape	3 (3)																					

2.5	$75 \rightarrow 4$	$100 \div 14,5$	2
	$n = 14,5 - 4 = 10,5 \therefore 11 \text{ boxers}$		
			[11]

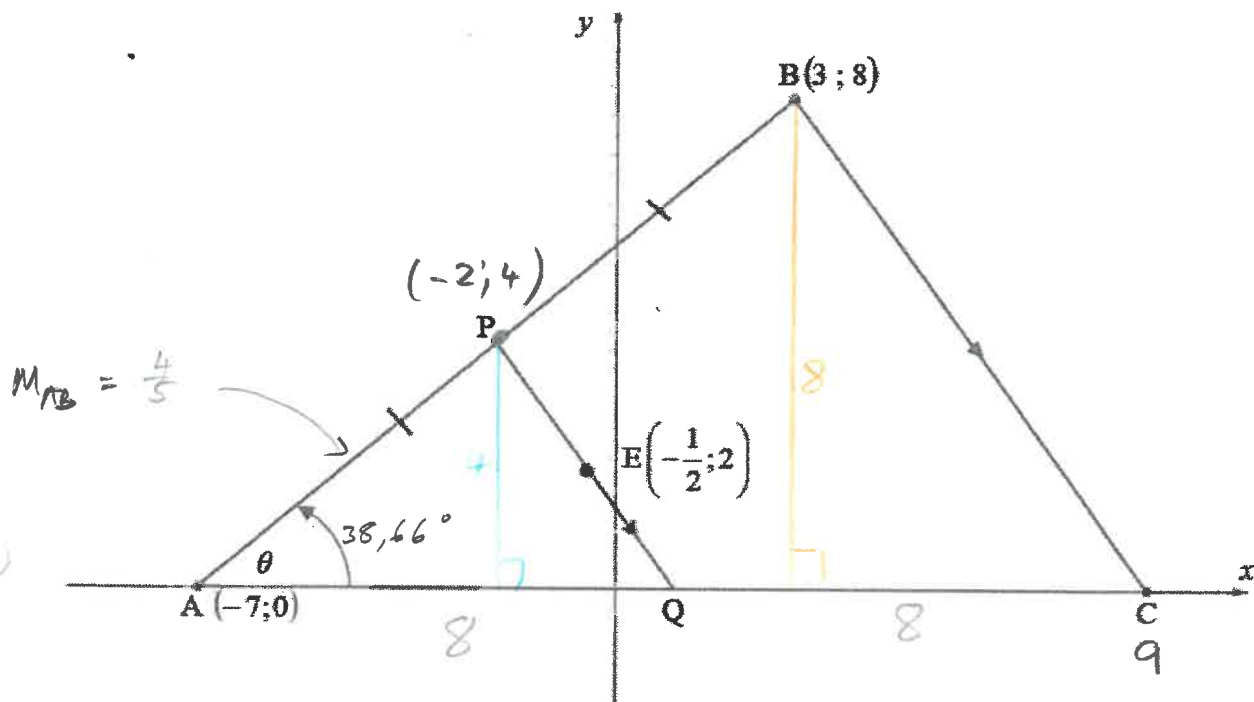
QUESTION/VRAAG 3



	Solution/Opllossing	Marks/ Punte
3.1	$m_{PR} = \frac{4 - 0}{3 - 0} \checkmark$ $= \frac{4}{3} \checkmark$	2
		(2)
3.2	$y = \frac{4}{3}x + c \checkmark$ Clearly, $c = 0 \checkmark$ $\therefore y = \frac{4}{3}x \checkmark$	3
		(3)

3.3	Point of $\cap$ $y = 6x + 14$ $y = \frac{4}{3}x$ $6x + 14 = \frac{4}{3}x$ $\frac{14}{3}x = -14$ $x = -3$ $y = 6(-3) + 14$ $= -4$ $\therefore P(-3; -4)$	4
3.4	Point: $0 = 6x + 14$ $-\frac{7}{3} = x$ $\therefore S(-\frac{7}{3}; 0)$	(4)
		(1)
		[10]

QUESTION/VRAAG 4



	Solution/Oplossing	Marks/ Punte
4.1.1	$x_P = \frac{-7 + 3}{2}$ $= -2$ $\therefore P(-2;4)$	2
	$y_P = \frac{0 + 8}{2}$ $= 4$	(2)
4.1.2	$M_{AB} = \frac{8 - 0}{3 - (-7)}$ $= \frac{4}{5}$	2
		(2)

4.1.3	$\tan \theta = \frac{4}{3}$ ✓ $\theta = 38,65...^\circ$ $\tan + \text{inv}$ $I: \theta = 38,66^\circ$ ✓	2 (2)
4.2	$m_{PE} = \frac{4-2}{-2-(-1/2)} = -\frac{4}{3}$ ✓ $P(-2;4)$ $E(-\frac{1}{2};2)$ $m_{BC} = -\frac{4}{3}$ ✓ $BC \parallel PQ$ $y = -\frac{4}{3}x + c$ sub $B(3;8)$ $8 = -\frac{4}{3}(3) + c$ ✓ $12 = c$ $\therefore y = -\frac{4}{3}x + 12$ ✓	5 (5)
4.3.1	x-int: $0 = -\frac{4}{3}x + 12$ ✓ $y=0$ $\frac{4}{3}x = 12$ $x = 9$ ✓ $C(9;0)$ $AC = 9 - (-7)$ $= 16$ ✓	3 (3)

4.3.2	$AQ = QC = 8$ ✓ <i>line thru midpt</i> <i> to 2nd side</i>	
	$\text{area } \triangle ABC = \frac{1}{2}(16)(8)$ ✓	
	$= 64$ ✓	
	$\text{area } \triangle APQ = \frac{1}{2}(8)(4)$ ✓	
	$= 16$ ✓	
	$\therefore \text{area trap. } PBCQ$	6
	$= 64 - 16$	
	$= 48$ ✓	
		
	(OR)	(6)
		[20]

$$AB = \sqrt{(8-0)^2 + (3-(-7))^2}$$

$$= \sqrt{164} \quad \checkmark$$

$$\text{area } \triangle ABC = \frac{1}{2} \sqrt{164} \cdot 16 \sin 38,66^\circ \quad \checkmark$$

$$= 64,00 \dots \quad \checkmark$$

$$\text{area } \triangle APQ = \frac{1}{2} \left(\frac{\sqrt{164}}{2} \right) \left(\frac{16}{2} \right) \sin 38,66^\circ \quad \checkmark$$

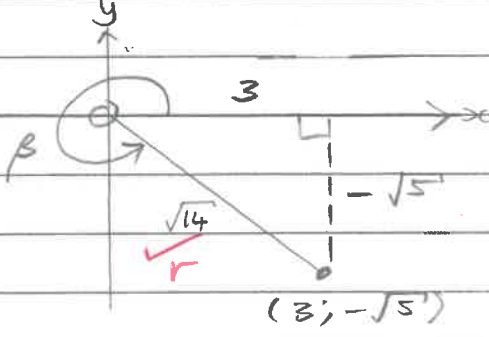
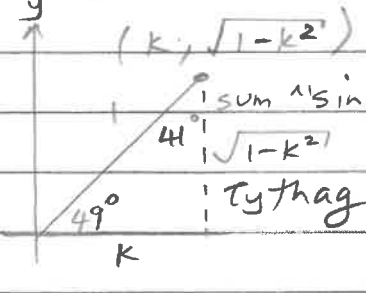
$$= 16,00 \dots \quad \checkmark$$

$$\therefore \text{area trap } PBCQ$$

$$= 64,00 \dots - 16,00 \dots$$

$$= 48 \quad \checkmark$$

QUESTION/VRAAG 5

	Solution/Oplissing	Marks/ Punte
5.1	$-3 \tan \beta - \sqrt{5} = 0 \quad \tan \beta = -\frac{\sqrt{5}}{3} \quad \text{II (IV)}$ $= \frac{y}{x} = \frac{-\sqrt{5}}{3}$ $\sin \beta < 0 \quad \text{III (IV)}$  3 - sqrt(5) x, y correct quad ✓ $(3)^2 + (-\sqrt{5})^2 = r^2 \quad \therefore r^2 = 14$ Pythag $r = \sqrt{14}$ $\sin^2 \beta - \cos^2 \beta = \left(\frac{y}{r}\right)^2 - \left(\frac{x}{r}\right)^2$ $= \left(\frac{-\sqrt{5}}{\sqrt{14}}\right)^2 - \left(\frac{3}{\sqrt{14}}\right)^2 \quad \text{✓ both}$ $= \frac{5}{14} - \frac{9}{14}$ $= -\frac{4}{14}$ $= -\frac{2}{7} \quad \text{✓ ans}$ D	5
5.2.1	$\cos 49^\circ = k = \frac{k}{1} \frac{x}{r}$  sum of sin Δ = 180° 41° sqrt(1-k^2) Pythag $\sin 131^\circ$ $= \sin (180^\circ - 49^\circ)$ $= \sin 49^\circ \quad \text{✓}$ $= \frac{\sqrt{1-k^2}}{1}$ $= \sqrt{1-k^2} \quad \text{✓}$	2

5.2.2	$1 - \cos^2 41^\circ = \sin^2 41^\circ \quad \checkmark$ $= \left(\frac{k}{h}\right)^2 \quad \frac{o}{h}$ $= k^2 \quad \checkmark$	2
		(2)
5.3	• $\tan(180^\circ - x) = -\tan x$ • $\cos(90^\circ - x) = +\sin x$ • $\cos(-x) = +\cos x$ • $\sin(180^\circ - x) = +\sin x$ • $\sin(360^\circ - x) = -\sin x$ show red "n" before $()^2$!!! $\therefore \frac{(-\tan x)(\cos x) + (-\sin x)^2 (\sin x)}{\sin x}$ $= \frac{-\left(\frac{\sin x}{\cos x}\right)(\cos x) + \sin^2 x \cdot \sin x}{\sin x}$ $= \frac{-\sin x + \sin^3 x}{\sin x} \quad \checkmark$ $= -1 + \sin^2 x$ $= -\cos^2 x \quad \checkmark$	7
		(7)
5.4	• $\sin(-15^\circ) = -\sin 15^\circ$ • $\cos 165^\circ$ • $\cos 75^\circ = \cos(90^\circ - 15^\circ) = \sin 15^\circ$ • $\cos 165^\circ = \cos(180^\circ - 15^\circ) = -\cos 15^\circ$ • $\tan 75^\circ \cdot \cos 75^\circ$ $= \frac{\sin 75^\circ}{\cos 75^\circ} \cdot \cos 75^\circ \quad \checkmark \quad t = \frac{s}{c}$ $= \sin 75^\circ$ $= \sin(90^\circ - 15^\circ)$ $= \cos 15^\circ$ $\therefore (-\sin 15^\circ)(\sin 15^\circ) + (\cos 15^\circ)(-\cos 15^\circ)$ $= -\sin^2 15^\circ - \cos^2 15^\circ$ $= -(\sin^2 15^\circ + \cos^2 15^\circ) \quad \checkmark$ $= -1 \quad \checkmark$	5
		(5)

5.5	$\begin{aligned} \text{LHS} &= \frac{3\cos x}{1+\sin x} + 3\tan x \\ &= \frac{3\cos x}{1+\sin x} + \frac{3\sin x}{\cos x} \checkmark \\ &= \frac{3\cos x \cdot \cos x + 3\sin x(1+\sin x)}{(1+\sin x)\cos x} \\ &= \frac{3\cos^2 x + 3\sin x + 3\sin^2 x}{(1+\sin x)\cos x} \checkmark \\ &= \frac{3(\cos^2 x + \sin x + \sin^2 x)}{(1+\sin x)\cos x} \checkmark \text{cf} \\ &= \frac{3(1+\sin x)}{(1+\sin x)\cos x} \quad c^2 + s^2 = 1 \checkmark \\ &= \frac{3}{\cos x} \\ &= \text{RHS} \rightarrow \end{aligned}$	4
5.6	$\begin{aligned} \sin^2 x - 3\cos^2 x &= 0 \\ \checkmark 1 - \cos^2 x - 3\cos^2 x &= 0 \\ 1 &= 4\cos^2 x \\ \cos^2 x &= \frac{1}{4} \checkmark \\ \cos x &= \pm \frac{1}{2} \checkmark \\ \alpha &= 60^\circ \\ \cos \pm \sin \\ \text{I: } x &= 60^\circ + k \cdot 360^\circ; k \in \mathbb{Z} \quad] \checkmark \\ \text{II: } x &= 120^\circ + k \cdot 360^\circ; k \in \mathbb{Z} \\ \text{III: } x &= 240^\circ + k \cdot 360^\circ; k \in \mathbb{Z} \quad] \checkmark \\ \text{IV: } x &= 300^\circ + k \cdot 360^\circ; k \in \mathbb{Z} \end{aligned}$	5
		(5)
		[30]

5.6.

OR

$$\sin^2 x - 3(1 - \sin^2 x) = 0$$

$$\sin^2 x - 3 + 3\sin^2 x = 0$$

$$4\sin^2 x = 3$$

$$\sin^2 x = \frac{3}{4}$$

$$\sin x = \pm \frac{\sqrt{3}}{2}$$

$$\text{ref}^\circ = 60^\circ$$

$$\sin \pm \text{in}$$

I: as before

etc.

5.6

OR

$$\frac{\sin^2 x}{\cos^2 x} = \frac{3\cos^2 x}{\cos^2 x}$$

$$\tan^2 x = 3$$

$$\tan x = \pm \sqrt{3}$$

$$\text{ref}^\circ = 60^\circ$$

$$\tan \pm \text{in}$$

$$\text{I: } x = 60^\circ + k \cdot 180^\circ; k \in \mathbb{Z}$$

$$\text{II: } x = 120^\circ + k \cdot 180^\circ; k \in \mathbb{Z}$$

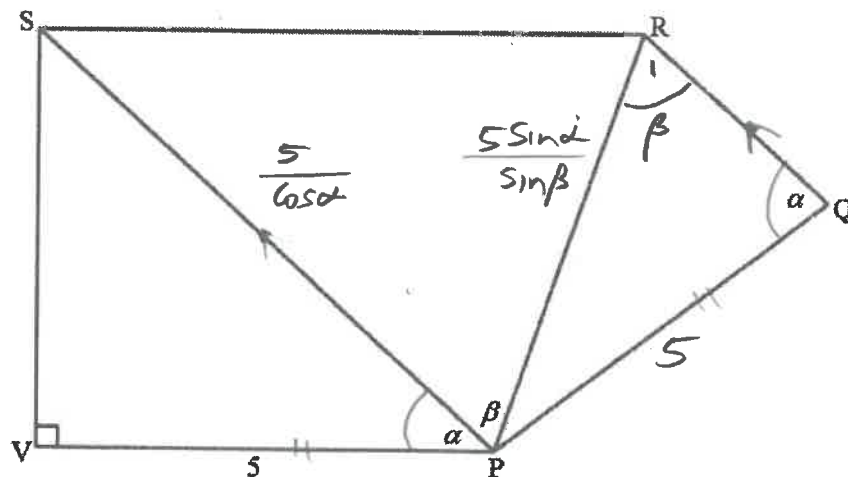
QUESTION/VRAAG 6

$$f: y = \cos(x + 30^\circ)$$

	Solution/Oplissing	Marks/Punte
6.1	360° ✓	1
6.2	$f: y \in [-1; 1]$ $h: y \in [0; 2]$	(1)
6.3	$h: y = \cos(x + 60^\circ + 30^\circ) + 1$ $= \cos(x + 90^\circ) + 1$ ✓ $= \cos(90^\circ + x) + 1$ $= -\sin x + 1$ ✓	2
6.4		(2)
6.5.1	$x = 150^\circ$ ✓ A	1
6.5.2	$h(x) \cdot f(x) \leq 0$ $y_h \cdot y_f \leq 0$ $x = -120^\circ$ or $x \in [60^\circ; 150^\circ]$	(1)
	$\checkmark A$ $\checkmark A$	2

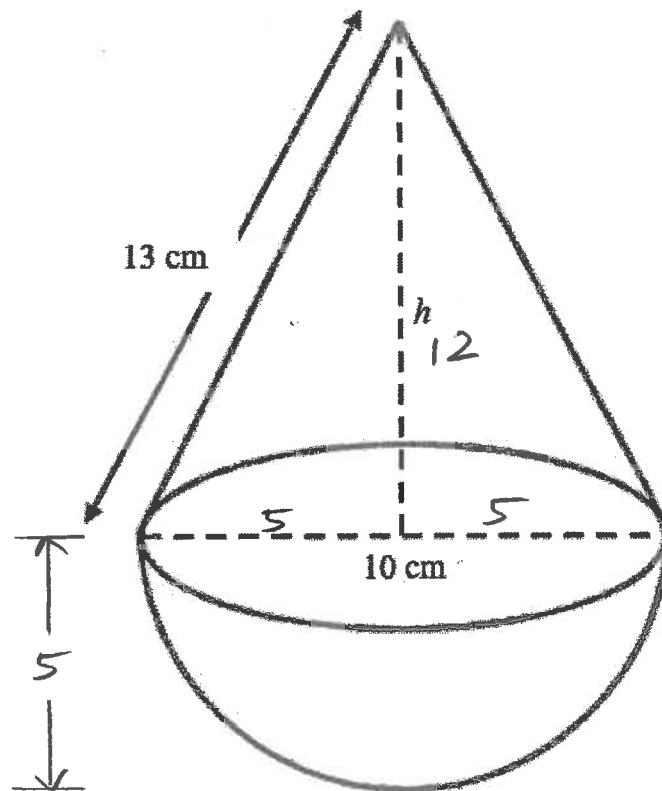
6.5.3	$f(x) = h(x)$	$y_f = y_h$	(1)
	$x = 30^\circ$		
			[12]

QUESTION/VRAAG 7



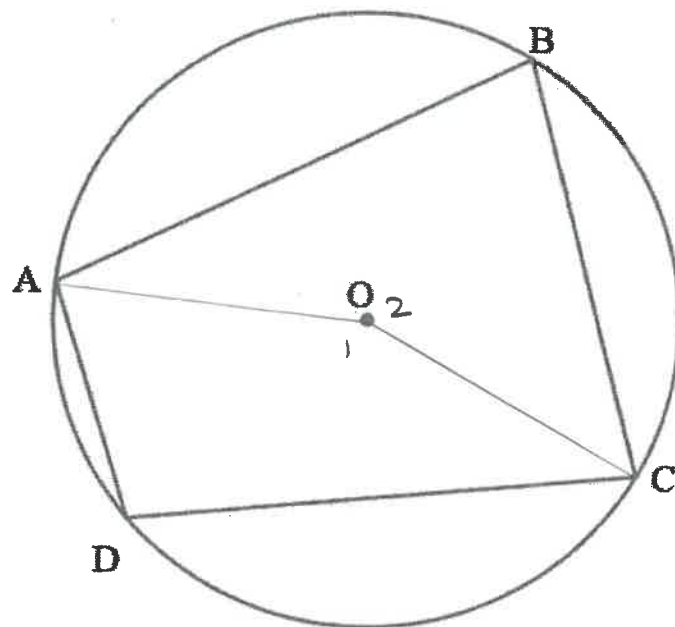
	Solution/Oplissing	Marks/Punte
7.1	$\frac{5}{PS} = \cos \alpha$ $5 = PS \cdot \cos \alpha$ $PS = \frac{5}{\cos \alpha}$	1
7.2	$\hat{R}_1 = \beta$ $\frac{RP}{\sin \alpha} = \frac{5}{\sin \beta}$ $RP = \frac{5 \sin \alpha}{\sin \beta}$	(1) 3
7.3	area $\triangle RPS$ $= \frac{1}{2} \left(\frac{5}{\cos \alpha} \right) \left(\frac{5 \sin \alpha}{\sin \beta} \right) \sin \beta$ $= \frac{1}{2} \cdot \frac{25 \sin \alpha}{\cos \alpha}$ $= \frac{25 \tan \alpha}{2}$	(3) 3
		(3)
		[7]

QUESTION/VRAAG 8

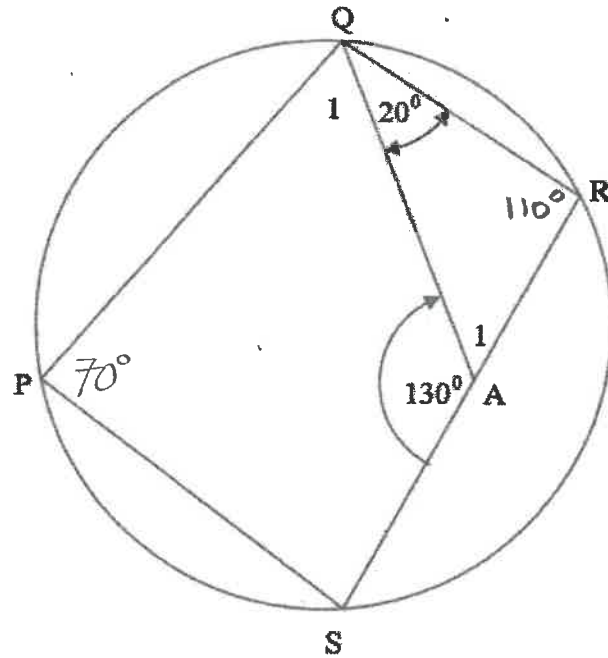


	Solution/Oplissing	Marks/ Punte
8.1	$h^2 + 5^2 = 13^2$ ✓ radii, Pythag $h^2 = 144$ ✓ $h = 12 \text{ cm}$ ✓ cm	3
		(3)
8.2	$12 + 5$ $= 17 \text{ cm}$ ✓	1
		(1)

QUESTION/VRAAG 9



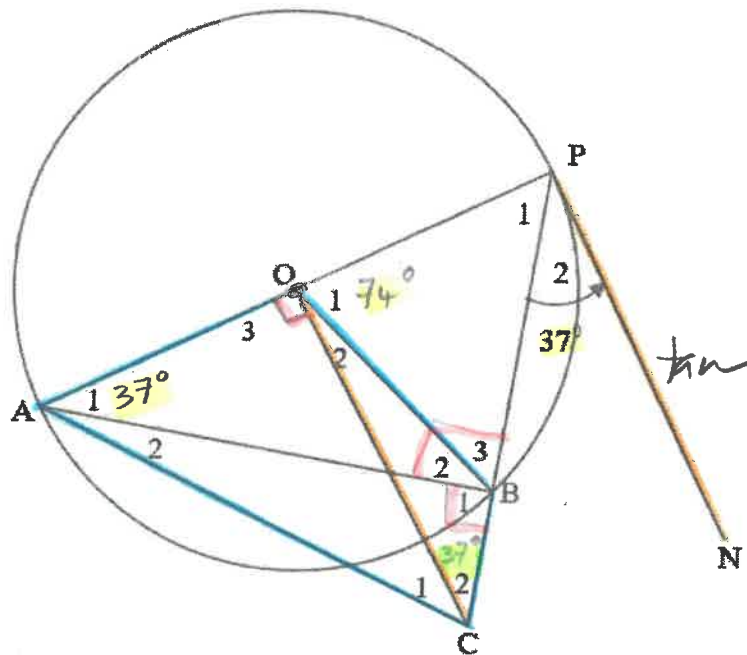
	Solution/Oplissing	Marks/ Punte
9.1	$\hat{O}_1 = 2 \cdot \hat{B}$ ✓SR $\wedge$ @ centre = $2 \times \wedge$ at circumf Similarly, $\hat{O}_2 = 2 \hat{D}$ ✓S $\hat{O}_1 + \hat{O}_2 = 360^\circ$ ✓SR $\wedge$ in a row = 360° $2\hat{B} + 2\hat{D} = 360^\circ$ $\div 2 :$ $\hat{B} + \hat{D} = 180^\circ$ ✓ No constv 0/5	5
		(5)



9.3	$\hat{R} = 110^\circ$	$\checkmark \checkmark$	ext Δ	4
	$\hat{P} = 70^\circ$	$\checkmark \checkmark$	opp Δ 's cyclic quad = 180°	
				(4)
				[15]

QUESTION/VRAAG 10

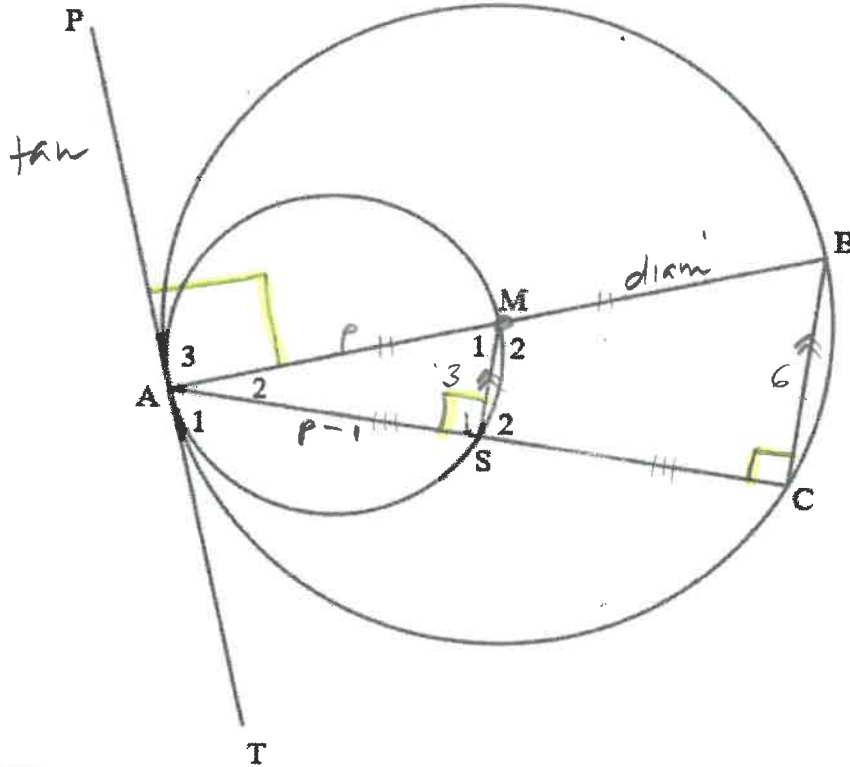
10.1



	Solution/Oplissing	Marks/Punte
10.1.1	$\hat{A}_1 = 37^\circ$ ✓S ✓R tan chord then $\hat{O}_1 = 74^\circ$ ✓S ✓R $\hat{\text{at centre}} = 2 \times \hat{\text{at circumf}}$	4
10.1.2 (a)	$\hat{B}_2 + \hat{B}_3 = 90^\circ$ ✓S ✓R $\hat{\text{in semi}} \hat{O} = 90^\circ$ $\hat{B}_1 = 90^\circ$ ✓SR $\hat{\text{on str line}} = 180^\circ$ $\hat{B}_1 = \hat{O}_3$ both = 90° $OACB$ is a ✓R cyclic quad $\hat{\text{in same segm}} =$	4

10.1.2 (b)	$\hat{C}_2 = 37^\circ$ ✓s ✓R	^'s in same $\odot$ segm =	3
	$\therefore \hat{C}_2 = \hat{P}_2$	both = 37°	
	$\therefore OC \parallel PN$ ✓R	alt ^'s =	
			(3)

10.2



	Solution/Oplossing	Marks/ Punte
10.2.1	$\hat{C} = 90^\circ$ ✓✓ $\wedge$ in semi $\odot = 90^\circ$ $\hat{A}_3 = 90^\circ$ ✓✓ $\tan \perp \text{rad}$ $\hat{S}_1 = 90^\circ$ ✓✓ $\tan \text{chord thm}$	6
10.2.2	$\hat{S}_1 = \hat{C}$ both $= 90^\circ$ $\therefore MS \parallel BC$ ✓✓ R conv $\wedge S =$	(6) 1
10.2.3	$AS : SC = 1 : 1$ ✓✓ R line thru midpt $\parallel$ to 2 nd side *	(1) 2
10.2.4	$MS = 3$ ✓✓ R midpt thm	(2) 2
10.2.5	$p^2 = (p-1)^2 + 3^2$ ✓✓ Pythag $p^2 = p^2 - 2p + 1 + 9$ ✓ $2p = 10$ $p = 5$ ✓	(3) 3
	* line from centre $\odot \perp$ to chord	[25]

TOTAL/TOTAAL: 150