



Province of the
EASTERN CAPE
EDUCATION

Isihloko leMfundo Kapa: Isihloko leMfundo
Provincia van die Oos Kaap: Departement van Onderwys
Peratsoho: Ya Kapa: Isihloko leMfundo: Isihloko leMfundo

LEARNER'S NAME:
LEERDER SE NAAM:

Soln s

GRADE/GRAAD 12

SUT

**NATIONAL/NASIONALE
SENIOR
CERTIFICATE/SERTIFIKAAT**

GRADE 12/GRAAD 12

JUNE/JUNIE 2025

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

Marker/Merker			Moderator's Initials / Moderator se paraaf									
Question Vraag	Marks Punte	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												

*SM = School Moderator
*SM = Skool Moderator

*DM = District Moderator
*DM = Distrik Moderator

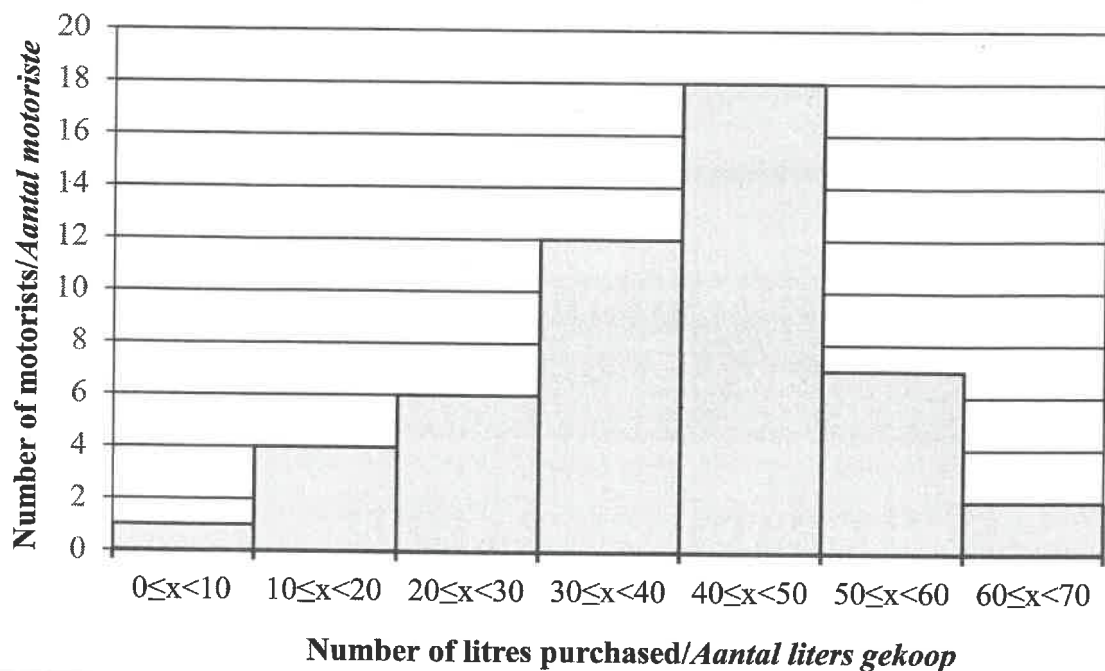
*PM = Provincial Moderator
*PM = Provinsiale Moderator

*NM = National Moderator
*NM = Nasionale Moderator

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

QUESTION/VRAAG 1

HISTOGRAM



Solution/Oplissing

Marks/
Punte

1.1

$$n = 50 \checkmark$$

(1)

1.2

Modal class is $40 \leq x < 50 \checkmark$

(1)

1.3

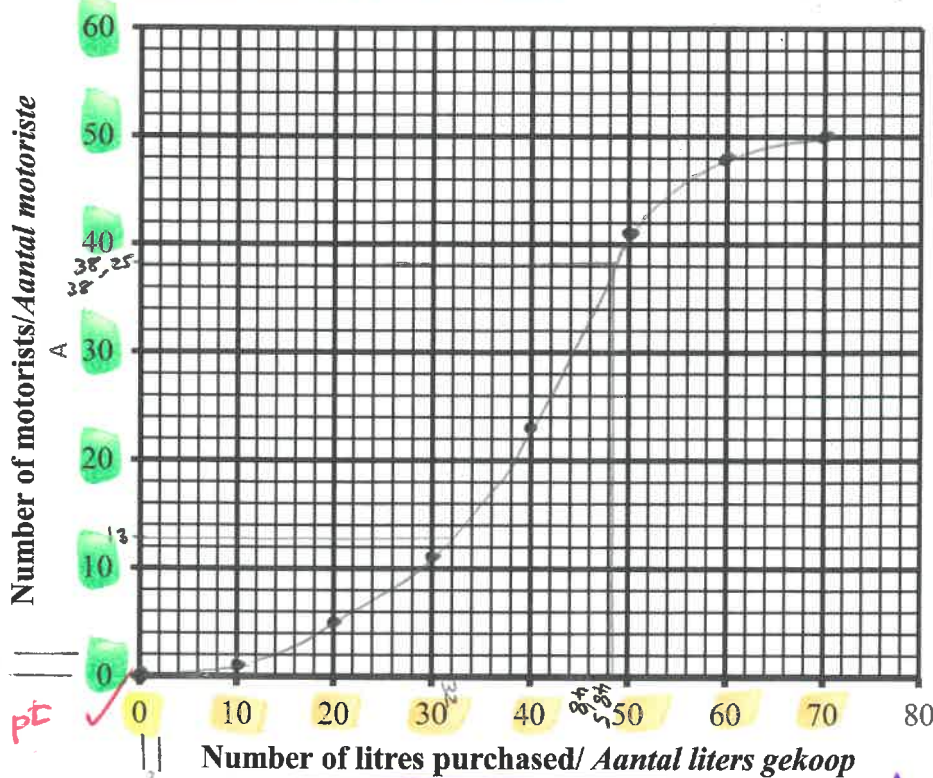
No. of litres purchased Aantal liters gekoop	Frequency/ Frekwensie	Cumulative Frequency/ Kumulatiewe Frekwensie
$0 \leq x < 10$	1	1
$10 \leq x < 20$	4	5
$20 \leq x < 30$	6	11
$30 \leq x < 40$	12	23
$40 \leq x < 50$	18	41
$50 \leq x < 60$	7	48
$60 \leq x < 70$	2	50

$$\checkmark f$$

(3)

1.4

CUMULATIVE FREQUENCY GRAPH/ OGIVE
KUMULATIEWE FREKWENSIE GRAFIEK / OGIEF



★ $T_1, \dots, T_{50} \quad M = T_{25,5} \quad T_1, \dots, T_{25} \quad T_{26}, \dots, T_{50}$

(3)

1.5

$Q_1 = T_{13} = 32$ ✓

1

(1)

1.6

$\bar{x} = \frac{5 \times 1 + 15 \times 4 + 25 \times 6 + 35 \times 12 + 45 \times 18 + 55 \times 7 + 65 \times 2}{50}$ ✓
 $= \frac{1960}{50}$ ✓ midpt x freq
 $= 39,2$ ✓ ans only 3/3

3

(3)

1.7

$P_{75} = T_{\frac{75}{100}(1+50)} = T_{38,25} = 48,5$ ✓

2

(2)

1.8

$Q_3 = T_{38} = 48$ ✓ $IQR = 48 - 32 = 16$ ✓

2

(2)

1.9

$38,25 \rightarrow 50 = 50 - 38,25 + 1 = 12,75 \approx 13$ ✓
 $\therefore \text{Rewards} = 13 \times 0,40 \times 60$
 $= R \ 312$ ✓

2

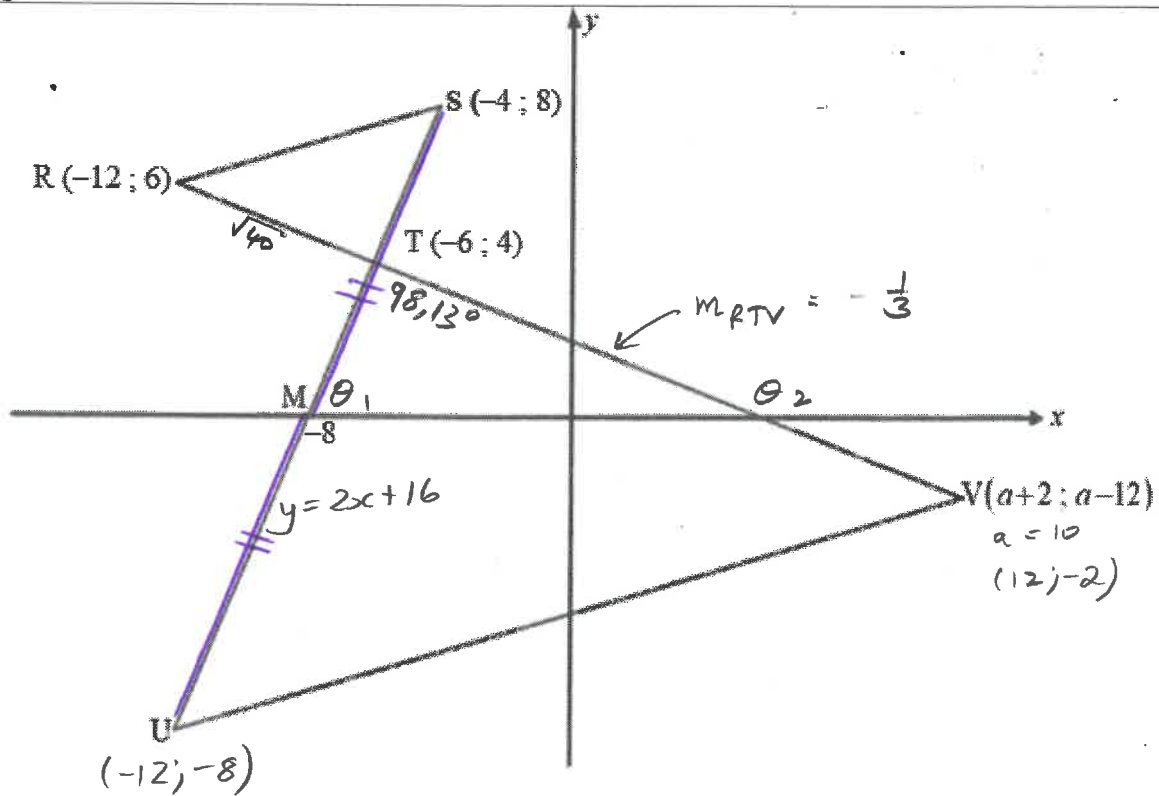
(2)

[18]

★ NB $Q_1 = T_{\frac{1}{2}(1+25)} = T_{13}$
 $Q_3 = T_{\frac{1}{2}(26+50)} = T_{38}$

$M = T_{\frac{1}{2}(1+50)} = T_{25,5}$

QUESTION/VRAAG 2



Solution/Oplossing

Marks/
Punte

2.1

$$\begin{aligned}
 m_{RV} &= m_{RT} & R(-12; 6) \quad T(-6; 4) \\
 &= \frac{4-6}{-6-(-12)} \quad \checkmark \\
 &= -\frac{1}{3} \quad \checkmark
 \end{aligned}$$

2

(2)

2.2

$$\begin{aligned}
 RT &= \sqrt{(4-6)^2 + (-6-(-12))^2} \quad \checkmark \\
 &= \sqrt{40} \quad 2\sqrt{10} \quad \checkmark \\
 &= 6,32
 \end{aligned}$$

2

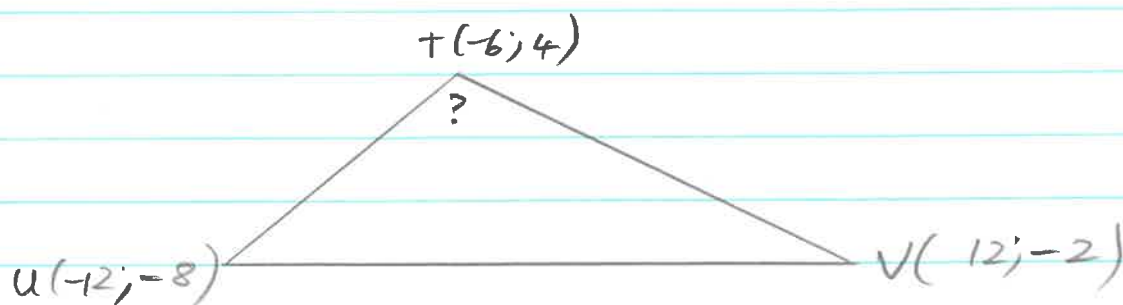
(2)

2.3	$m_{rtv} = -\frac{1}{3} \quad T(-6; 4) \quad V(a+2; a-12)$ $\frac{a-12-4}{a+2-(-6)} =$ $\frac{a-16}{a+8} = -\frac{1}{3} \quad \checkmark$ $3(a-16) = -1(a+8) \quad \therefore 3a-48 = -a-8 \quad \checkmark$ $4a = 40$ $a = 10 \quad \checkmark$	3 (3)
2.4	$\frac{x_u + (-4)}{2} = -8 \quad \checkmark \quad \frac{y_u + 8}{2} = 0 \quad S(-4; 8) \quad U(-8; 0) \quad U$ $x_u - 4 = -16 \quad y_u + 8 = 0$ $x_u = -12 \quad y_u = -8$ $\therefore U(-12; -8) \quad \checkmark$	2 (2)
2.5	$m_{su} = \frac{4-8}{-6-(-4)} \quad S(-4; 8) \quad T(-6; 4)$ $= 2 \quad \checkmark$ $\therefore y = 2x + c$ $\text{sub } S(-4; 8) \quad 8 = 2(-4) + c \quad \checkmark$ $16 = c$ $\therefore y = 2x + 16 \quad \checkmark$	3 (3)

$$TV = 3. FT \quad \frac{1}{2} (3\sqrt{40})(\sqrt{180}) \sin 98,13^\circ$$

$$= 126$$

2.6.



$$UT = \sqrt{(4 - (-8))^2 + (-6 - (-12))^2} = \sqrt{180} = 6\sqrt{5}$$

$$TV = \sqrt{(-2 - 4)^2 + (12 - (-6))^2} = \sqrt{360} = 6\sqrt{10}$$

$$UV = \sqrt{(-8 - (-2))^2 + (-12 - 12)^2} = \sqrt{612} = 6\sqrt{17}$$

$$UV^2 = UT^2 + TV^2 - 2 \cdot UT \cdot TV \cdot \cos \hat{T}$$

$$612 = 180 + 360 - 2 \sqrt{180} \sqrt{360} \cos T$$

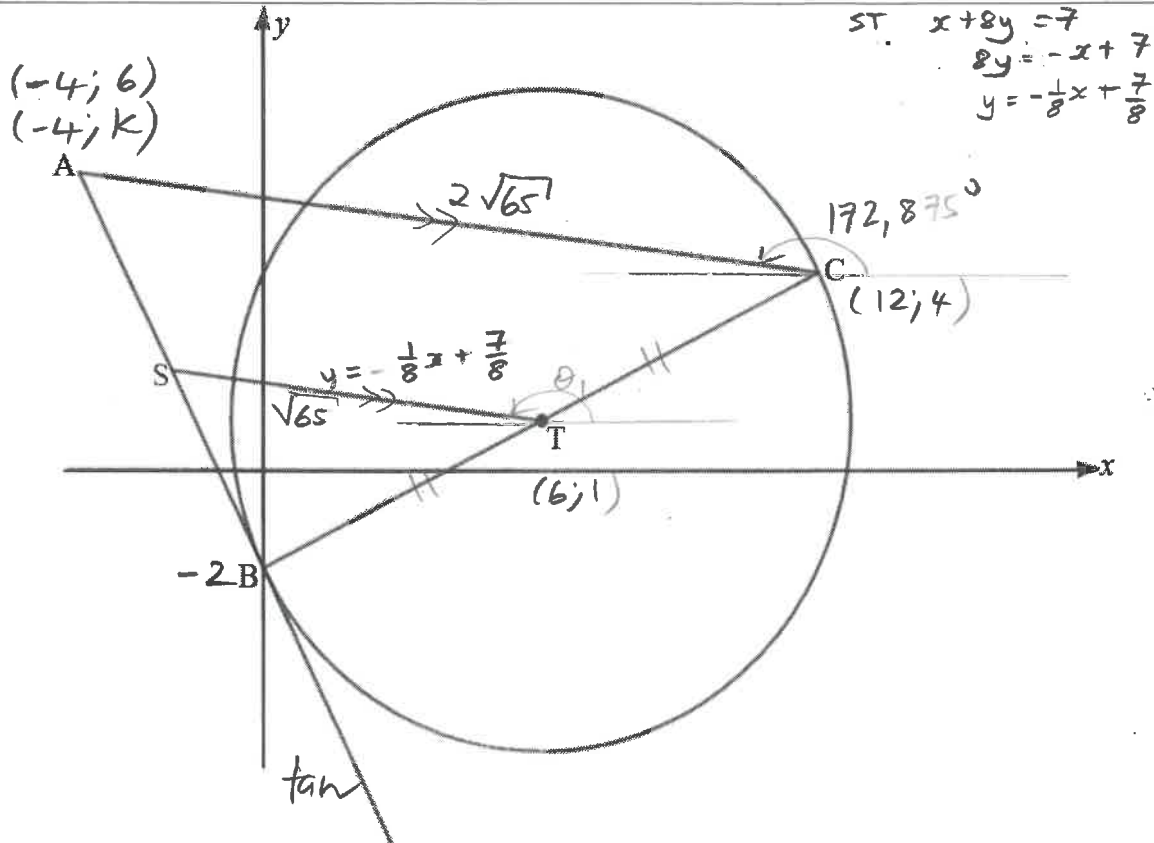
$$-0,14 \dots = \cos T$$

$$\arccos = 81,86 \dots^\circ$$

cos - in

$$\hat{T} : T = 98,13^\circ$$

QUESTION/VRAAG 3



Solution/Oplissing

Marks/
Punte

3.1

$$x^2 - 12x + (-6)^2 + y^2 - 2y + (-1)^2 = 8 + 36 + 1$$

$$(x - 6)^2 + (y - 1)^2 = 45$$

✓
LHS
and RHS

$$\therefore T(6; 1)$$

3

(3)

3.2

$$y \text{ int: } 0^2 - 12(0) + y^2 - 2y - 8 = 0 \quad \checkmark x=0$$

$$(x=0) \quad y^2 - 2y - 8 = 0 \quad \checkmark \text{std form}$$

$$(y - 4)(y + 2) = 0$$

$$\therefore y = 4 \text{ or } -2$$

reject

$$\therefore B(0; -2) \quad \checkmark$$

3

(3)

OR

$$(0 - 6)^2 + (y - 1)^2 = 45$$

$$(y - 1)^2 = 9$$

$$y - 1 = \pm 3$$

$$y = 1 \pm 3$$

$$= -2 \text{ or } 4$$

reject

3.3

$$ST: y = -\frac{1}{8}x + \frac{7}{8} \quad \checkmark$$

$$\tan \theta_1 = -\frac{1}{8} \quad \checkmark$$

$$\text{ref}^\circ = 7,12 \dots^\circ$$

$$\tan - \text{inv}$$

$$\text{II: } \hat{\theta}_1 = 172,875^\circ \quad \checkmark$$

$$\therefore \theta_{AC} = \theta_1$$

$$\therefore AC \parallel ST \quad \text{corr}^\circ \text{ s} =$$

$$\text{OR} \quad \tan \theta_{AC} = -0,125 \quad (-\frac{1}{8}) \quad \checkmark$$

3

3.4 1.

$$BT = TC \quad \text{radius}$$

$$BS = SA \quad \text{line through midpt } \parallel \text{ to } 2^{\text{nd}} \text{ side}$$

$$\therefore AC = 2\sqrt{65} \quad \checkmark \text{ midpt then}$$

$$= 16,12$$

(3)

2

(2)

3.4.2

$$\frac{x_c + 0}{2} = 6$$

$$\frac{y_c + (-2)}{2} = 1$$

$$B(0, -2) \parallel T(6, 1) \parallel C$$

$$x_c = 12$$

$$y_c - 2 = 2$$

$$y_c = 4$$

$$\therefore C(12, 4) \quad \checkmark \checkmark$$

2

(2)

3.4.3

$$AC = \sqrt{(k-4)^2 + (-4-12)^2}$$

$$A(-4; k) \quad C(12; 4)$$

$$(2\sqrt{65})^2 = (\sqrt{(k-4)^2 + 256})^2 \quad \checkmark$$

$$4 \cdot 65 = (k-4)^2 + 256$$

$$4 = (k-4)^2 \quad \checkmark$$

$$k^2 - 8k + 12 = 0$$

$$\pm 2 = k - 4$$

$$(k-6)(k-2) = 0$$

$$4 \pm 2 = k$$

$$6 \text{ or } 2$$

$$(k > 4)$$

3

(3)

$\checkmark \rightarrow$ reject

3.4.3

$$m_{\text{rad}} = \frac{1 - (-2)}{6 - 0}$$
$$= \frac{1}{2}$$

A(0; -2) C(6; 1)

$$\therefore m_{\text{tan}} = -2$$

tan $\perp$ rad

$$y = -2x + c$$

clearly $c = -2$

$$y = -2x - 2$$

Sub A(-4; k)

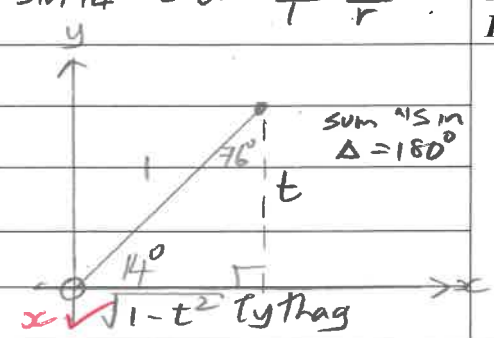
$$k = -2(-4) - 2$$
$$= 6 \rightarrow$$

3.4.4	$\hat{A}Bc = 90^\circ \stackrel{AB}{=} \checkmark 5$	
	$\therefore AC$ is diam	$\tan \perp$ rad
	of $\odot ABC$	conv $\wedge$ in Semi $\odot = 90^\circ$
	$r = \frac{1}{2}(2\sqrt{65}) = \sqrt{65}$	
	$x = \frac{-4 \pm 12}{2}$	$y = \frac{6 \pm 4}{2}$
	$= 4$	$= 5$
	$\therefore (x-4)^2 + (y-5)^2 = (\sqrt{65})^2$	
	$(x-4)^2 + (y-5)^2 = 65$	(4)
	$\checkmark$ LHS	$\checkmark$ RHS

4

(4)

[20]

QUESTION/VRAAG 4		Marks/ Punte
	Solution/Oplissing	
4.1.1	$\cos 14^\circ$ $= \frac{x}{r}$ $= \frac{\sqrt{1-t^2}}{1}$ $= \sqrt{1-t^2}$	$\sin 14^\circ = t = \frac{t}{1} \cdot \frac{y}{r}$  (2)
4.1.2	$38^\circ < 76^\circ$ $\cos 2x = 1 - 2 \sin^2 x$ $\cos 76^\circ = 1 - 2 \sin^2 38^\circ$ $\frac{a}{h} \quad \checkmark \frac{t}{1} = 1 - 2 \sin^2 38^\circ$ $\checkmark \frac{t-1}{-2} = \sin^2 38^\circ$ $\pm \sqrt{-\frac{1}{2}t + \frac{1}{2}} = \sin 38^\circ$ $\text{reject -} \quad \therefore \sin 38^\circ = \sqrt{-\frac{1}{2}t + \frac{1}{2}}$	(3)
4.1.3	$\sin 59^\circ$ $= \sin (45^\circ + 14^\circ)$ $= \sin 45^\circ \cos 14^\circ + \cos 45^\circ \sin 14^\circ$ $= \left(\frac{1}{\sqrt{2}}\right) (\sqrt{1-t^2}) + \left(\frac{1}{\sqrt{2}}\right) (t)$ $= \frac{\sqrt{1-t^2} + t}{\sqrt{2}}$	(4)

4.2

$$\begin{aligned} & \sin A \cdot \tan\left(\frac{1}{2}A - 360^\circ\right) + 1 \\ &= \sin A \cdot \tan\left(\frac{1}{2}A + 360^\circ\right) + 1 \\ &= 2 \sin \frac{1}{2}A \cos \frac{1}{2}A \cdot \frac{\sin \frac{1}{2}A}{\cos \frac{1}{2}A} + 1 \\ &= 2 \sin^2 \frac{1}{2}A + 1 \end{aligned}$$

OR $x = \frac{1}{2}A \therefore 2x = A$

$$\begin{aligned} & \sin 2x \cdot \tan(x - 360^\circ) + 1 \\ &= \sin 2x \cdot \tan x + 1 \\ &= 2 \sin x \cos x \cdot \frac{\sin x}{\cos x} + 1 \\ &= 2 \sin^2 x + 1 \\ &= 2 \sin^2 \frac{1}{2}A + 1 \end{aligned}$$

4

4.3.1

$$\begin{aligned} f(x) &= \frac{2 \cos x \cos(90^\circ - x)}{\cos^2 x + \sin(180^\circ + x) \cdot \cos(-x) \tan x} \\ &= \frac{2 \cos x (\sin x)}{\cos^2 x + (-\sin x)(\cos x) \left(\frac{\sin x}{\cos x}\right)} \\ &= \frac{2 \sin x \cos x}{\cos^2 x - \sin^2 x} \\ &= \frac{\sin 2x}{\cos 2x} \\ &= \tan 2x \end{aligned}$$

(6) 4

6

(6)

4.3.2	$A = 2x$ $\cos A = 0$ $A = 90^\circ + k \cdot 180^\circ$ $2x = 90^\circ + k \cdot 180^\circ$	$x = 45^\circ + k \cdot 90^\circ; k \in \mathbb{Z}$ $\therefore x = \pm 45^\circ \checkmark \checkmark$ $x \in [-90^\circ; 90^\circ] \text{ (CA)}$ (2)
4.4.1	$\cos(\theta + 30^\circ) = \frac{1}{2} \sin \theta$ $\checkmark_{LHS} \cos \theta \cos 30^\circ - \sin \theta \sin 30^\circ = \frac{1}{2} \sin \theta$ $\frac{\sqrt{3}}{2} \cos \theta - \frac{1}{2} \sin \theta = \frac{1}{2} \sin \theta$ $\frac{\sqrt{3}}{2} \cos \theta = \sin \theta \checkmark$ $\div \cos \theta : \frac{\sqrt{3}}{2} = \tan \theta \checkmark$ $\theta = 40,89^\circ$ $\tan + \text{in}$ $I: \theta = 40,89^\circ + k \cdot 180^\circ; k \in \mathbb{Z}$	(4)
4.4.2	$x = -139,11^\circ; 40,89^\circ; x$ $x \in [-270^\circ; 180^\circ] \text{ (CA)}$	(2)

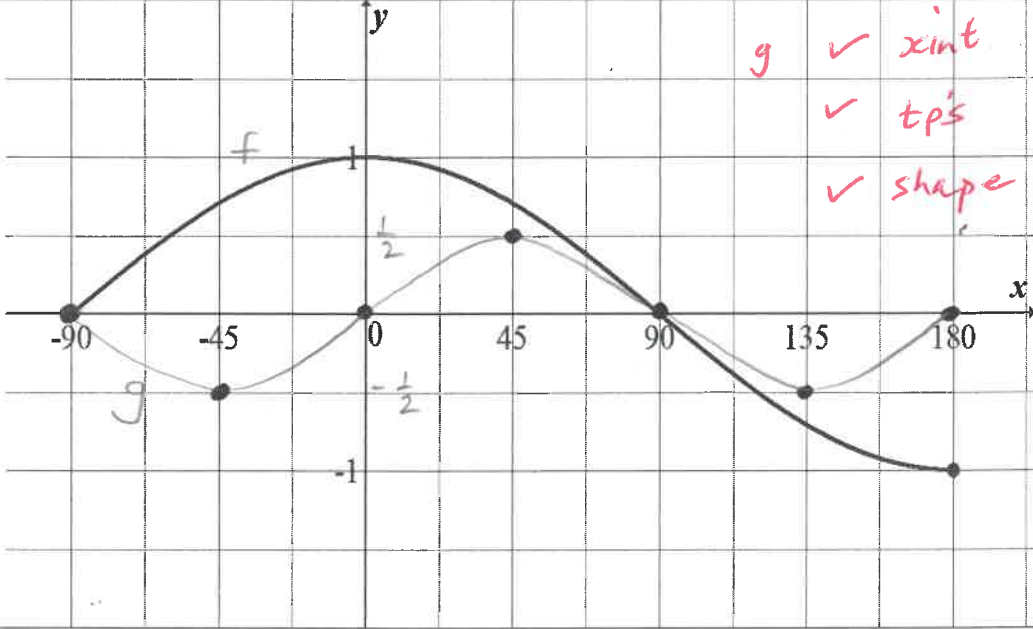
(2)
[29]
27

27 → 29

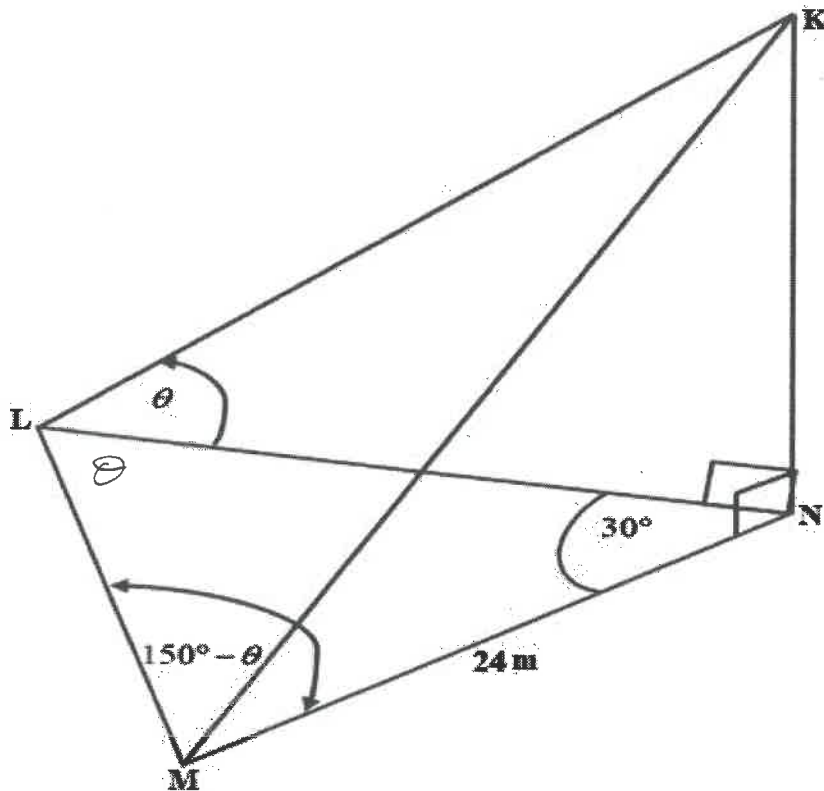
using pg 12.1.

Q 4 conversion

<u>27</u>	<u>29</u>
1	1
2	2
3	3
4	4
5	5
6	6
7	8
8	9
9	10
10	11
11	12
12	13
13	14
14	15
15	16
16	17
17	18
18	19
19	20
20	21
21	23
22	24
23	25
24	26
25	27
26	28
27	29

QUESTION/VRAAG 5	Solution/Oplissing	Marks/Punte
5.1	$\text{New Period} = \frac{360^\circ}{\frac{1}{2}} = 720^\circ$	1 (1)
5.2	$f(x) : y \in [-1; 1]$ $f\left(\frac{x}{2}\right) : y \in [-1; 1]$ $f\left(\frac{x}{2}\right) - 1 : y \in [-2; 0]$	2 (2)
5.3	 $g: y = \frac{1}{2} \sin 2x$	3 (3)
5.4	$g \text{ and } g' \rightarrow \text{same min}$ $y_{\min} = -\frac{1}{2}$	1 (1)
5.5	$\sin x \cos x - \cos x = 0$ $\frac{1}{2} (2 \sin x \cos x) - \cos x = 0$ $\frac{1}{2} \sin 2x = \cos x$ $\therefore x = -90^\circ \text{ or } 90^\circ$	3 (3)
	$\therefore x = -90^\circ \text{ or } 90^\circ$	[10]

QUESTION/VRAAG 6



Solution/Oplissing

Marks/
Punte

6.1 $\hat{MLN} + 150^\circ - \theta + 30^\circ = 180^\circ$ $\text{Sum } \Delta \text{ sin } \Delta = 180^\circ$

$\hat{MLN} = \theta$ ✓

6.2 $\frac{LN}{\sin(150^\circ - \theta)} = \frac{24}{\sin \theta}$ ✓ ΔLMN

$LN = \frac{24 \sin(150^\circ - \theta)}{\sin \theta}$

$= \frac{24 (\sin 150^\circ \cos \theta - \cos 150^\circ \sin \theta)}{\sin \theta}$ ✓ exp

$= \frac{24 \left(\frac{1}{2} \cos \theta - \left(-\frac{\sqrt{3}}{2}\right) \sin \theta \right)}{\sin \theta}$ ✓ $\frac{1}{2} - \frac{\sqrt{3}}{2}$

$= \frac{12 \frac{\cos \theta}{\sin \theta} + 12\sqrt{3}}{\sin \theta}$ ✓

can be left as $\frac{12 \cos \theta + 12\sqrt{3} \sin \theta}{\sin \theta}$

• woc not stated

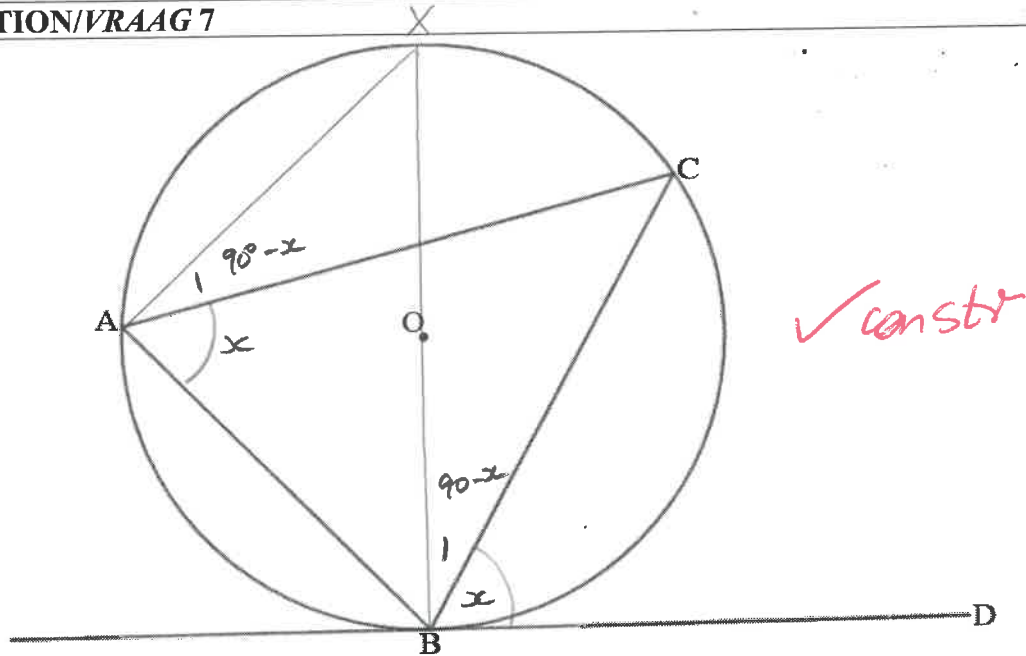
1
(1)

4

(4)

6.3	$\frac{KN}{LN} = \tan \theta$ ✓ $\triangle KLM$	
	$\therefore KN = LN \cdot \tan \theta$ ✓ <i>sub</i>	
	$= (12 \frac{\cos \theta}{\sin \theta} + 12\sqrt{3}) \tan \theta$	
	$= 12 \frac{\cos \theta}{\sin \theta} \cdot \frac{\sin \theta}{\cos \theta} + 12\sqrt{3} \tan \theta$ ✓	
	$= 12 + 12\sqrt{3} \tan \theta$ ✓	3
		(3)
6.4	$KN = 12 + 12\sqrt{3} \tan \theta$	
	$46 = 12 + 12\sqrt{3} \tan \theta$ ✓	
$\frac{17\sqrt{3}}{18}$	$\frac{17}{6\sqrt{3}}$ $1,63 \dots = \tan \theta$ ✓	3
	$\text{ref}^\circ = 58,56 \dots^\circ$	
	$\tan + \text{in}$	(3)
	$I: \theta = 58,56^\circ$ ✓	[11]

QUESTION/VRAAG 7



Solution/Oplissing

Marks/
Punte

7.1

$$\text{Let } \widehat{CBD} = x$$

$$\widehat{B} = 90^\circ - x$$

$$\widehat{A} = 90^\circ - x$$

$$\widehat{BAC} = x$$

✓ SR

tan + rad

✓ SR

^ in same @ segm =

✓ S ✓ R

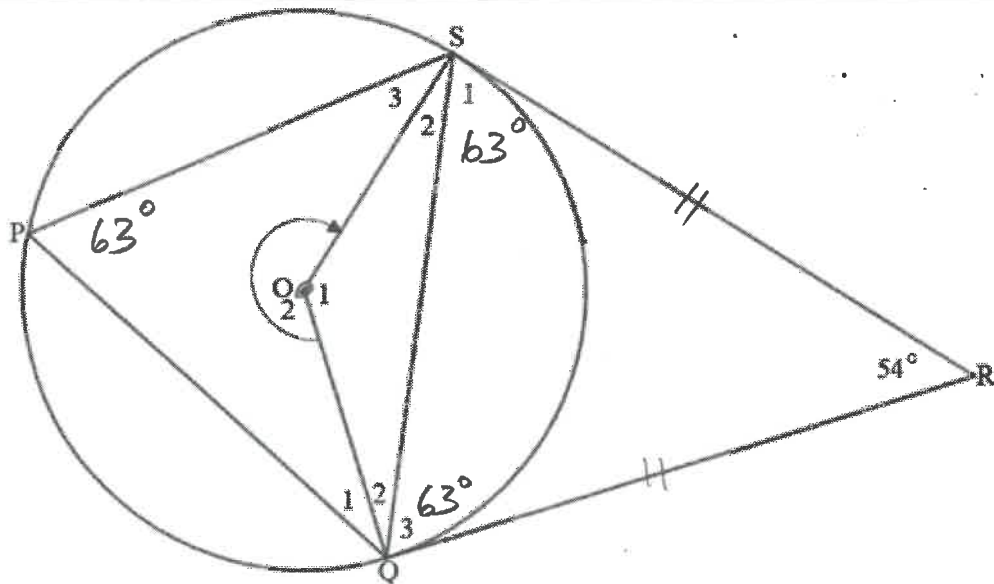
^ in semi @ = 90°

$$\therefore \widehat{CBD} = \widehat{BAC}$$

$$\text{both} = x$$

NB No construction bd 0/5

(5)



7.2.1

$$SR = QR$$

✓SR

tan's from ext common

$$\therefore \hat{S}_1 = \hat{Q}_3$$

✓S ✓R

pt =

∠'s opp = sides

$$\therefore \hat{Q}_3 = \frac{180^\circ - 54^\circ}{2}$$

sum ∠'s in Δ = 180°

$$= 63^\circ$$

✓SR

4

(4)

7.2.2

$$\hat{P} = 63^\circ$$

✓S

✓R

tan chord thm

2

(2)

7.2.3

$$\hat{O}_1 = 126^\circ$$

✓S

✓R

∠@ centre = 2x ∠@

circumf

2

(2)

[13]

8.3	$\frac{GD}{OG} = \frac{3}{2} \therefore \text{let } GD = 3x \text{ and } OG = 2x$ $\frac{FE}{ED} = \frac{OG}{GD} \quad \text{line } \parallel \text{ side of } \Delta$ $= \frac{2}{3} \quad \checkmark \text{SR} \quad FE = 2y \quad ED = 3y$ $FO \parallel AB \quad \text{both } \parallel \text{ to } EC$ $FA = DF \quad \checkmark \text{S} \quad \text{line through midpt } \parallel \text{ to second side}$ $= 5y$ $\therefore \frac{EF}{FA} = \frac{2y}{5y}$ $\therefore EF : FA = 2 : 5 \quad \checkmark \text{S}$	3 (3)
8.4	$\hat{F}_2 + \hat{F}_3 = 90^\circ \quad \wedge \text{ in semi } \odot = 90^\circ$ $BE^2 + 2^2 = 20^2 \quad \checkmark \text{SR Pythag}$ $BE = \sqrt{396} \quad \checkmark \text{S}$ $\therefore BC = \sqrt{396} \quad \checkmark \text{S} \quad \text{6.11} \quad BE = BC \quad 8.2$ $= 19.90$ LEAVE OUT	X (3) [14] 11

11 → 14

using pg 19.2.

8.3

(OR)

$$BG = OB = 5x$$

radius

$$\begin{aligned}\frac{EH}{HB} &= \frac{GO}{OB} \\ &= \frac{2x}{5x} \\ &= \frac{2}{5}\end{aligned}$$

✓ line $\parallel$ 1 side of Δ

$$EH = 2z \quad HB = 5z$$

$$\begin{aligned}\frac{EF}{FA} &= \frac{EH}{HB} \\ &= \frac{2z}{5z} \\ &= \frac{2}{5}\end{aligned}$$

line $\parallel$ 1 side of Δ

(3)

$$\therefore \underline{EF : FA = 2 : 5} \quad \triangleright$$

Q 8 conversion

T_1	T_4
1	1
2	3
3	4
4	5
5	6
6	8
7	9
8	10
9	12
10	13
11	14

9.3	$\frac{AD}{CB} = \frac{DF}{BF}$ ✓ ✓ $\triangle ADF \parallel \triangle CBF$	2
	$\therefore AD = \frac{DF \cdot CB}{BF}$	
9.4	$\frac{AC}{AD} = \frac{FC}{FE}$ ✓s ✓R line $\parallel$ side of $\triangle$	(4) 2
	$\therefore AC \cdot FE = AD \cdot CF$	
	$\frac{AC \cdot FE}{CF} = AD$ ✓	
		3
	$\therefore \frac{AC \cdot FE}{CF} = \frac{DF \cdot CD}{BF}$ both = AD	
	$\xrightarrow{\quad \quad \quad} D$	(3)
		(15) 13
TOTAL/TOTAAL:		150

13 → 15
using pg 21.2.

Planning:

$$\frac{AC \cdot FE}{CF} = \frac{DF \cdot CB}{BF}$$

$$= AD$$

$$\textcircled{AC} \cdot FE = AD \cdot CF$$

$$\frac{AC}{CF} = \frac{AD}{FE} \quad \textcircled{1}$$

$$\frac{CA}{CF} = \frac{AD}{FE}$$

$\triangle$'s CAD, CFE X



$$\frac{\textcircled{AC}}{AD} = \frac{CF}{FE}$$

$$\frac{AC}{AD} = \frac{FC}{FE} \quad \textcircled{2}$$



92.

OR

$$\begin{aligned} 2. \quad \hat{A} &= \hat{D}_4 \\ \hat{D}_4 &= \hat{C}_1 \\ \therefore \hat{A} &= \hat{C}_1 \end{aligned}$$

✓SR

✓SR

Conv $\wedge$ is =, $AB \parallel DE$
tan chord, then
both = $\hat{D}_4$

Q9 conversion

<u>13</u>	<u>15</u>
1	1
2	2
3	4
4	5
5	6
6	7
7	8
8	9
9	10
10	12
11	13
12	14
13	15