Province of the
EASTERN CAPE
EDUCATION

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

NATIONAL/*NASIONALE* SENIOR CERTIFICATE/*SERTIFIKAAT*

GRADE/*GRAAD* 12

JUNE/*JUNIE* 2026

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

MARKS/*PUNTE*: 150

This marking guideline consists of 17 pages.
Hierdie nasienriglyn bestaan uit 17 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 be awarded if the statement is correct).
S/R	Award a mark if a statement and a reason are both correct.

NOTA

- *As 'n kandidaat 'n vraag TWEE keer beantwoord, merk slegs die EERSTE poging.*
- *As 'n kandidaat 'n poging van 'n vraag doodgetrek het en dit nie oorgedoen nie, merk die doodgetrekte poging.*
- *Volgehoue akkuraatheid word in ALLE aspekte van die nasienriglyn toegepas. Hou op nasien by die tweede berekeningsfout.*
- *Om antwoorde/waardes te aanvaar om 'n probleem op te los, word NIE aanvaar NIE.*

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

QUESTION/*VRAAG 1*

1.1	Median / *Mediaan* = 34	✓ answer / *antwoord*	(1)
1.2	$Q_3 = 60$ in both classes / *in albei klasse*	✓ answer / *antwoord*	(1)
1.3	$90 - 6 = 84$	✓ 84	(1)
1.4	**CLASS A** performed better than **CLASS B**. Range for **CLASS A** is less than range for **CLASS B**. ***KLAS A** het beter as **KLAS B** presteer. Omvang vir **KLAS A** is kleiner as die omvang van **KLAS B**.*	✓ **CLASS A / *KLAS A*** ✓ Reason / *Rede*	(2)
1.5	**CLASS B / *KLAS B***	✓ answer / *antwoord*	(1)
1.6	Positively skewed **OR** skewed to the right *Positief skeef **OF** Skeef na regs*	✓ answer / *antwoord*	(1)
1.7	$\frac{80}{100} \times 20 = 16$ $\therefore$ 4 learners qualified for awards 4 *leerders het vir toekennings gekwalifiseer* **OR/*OF*** $\frac{20}{100} \times 20 = 4$ $\therefore$ 4 learners qualified for the awards 4 *leerders het vir toekennings gekwalifiseer*	✓ method / *metode* ✓ answer / *antwoord* **OR/*OF*** ✓ method / *metode* ✓ answer / *antwoord*	(2)
			[9]

QUESTION/*VRAAG 2*

2.1

Ages in years *Ouderdom in jare*	**Frequency** *Frekwensie*	**Cummulative Frequency** *Kummulatiewe Frekwensie*
$10 < x \leq 19$	1	1
$20 < x \leq 29$	2	3
$30 < x \leq 39$	3	6
$40 < x \leq 49$	4	10
$50 < x \leq 59$	6	16
$60 < x \leq 69$	7	23
$70 < x \leq 79$	4	27
$80 < x \leq 89$	1	28

✓ first 3 correct *eerste 3 korrek* (2, 3, 4)

✓ second 3 correct *tweede 3 korrek* (6 ,7,4)

(2)

2.2 Mean / *Gemiddelde*

$$= \frac{14,5\times1+24,5\times2+34,5\times3+44,5\times4+54,5\times6+64,5\times7+74,5\times4+84,5\times1}{28}$$

$$= \frac{1506}{28}$$

$$= 53,79$$

✓ method / *metode*

✓ 1506

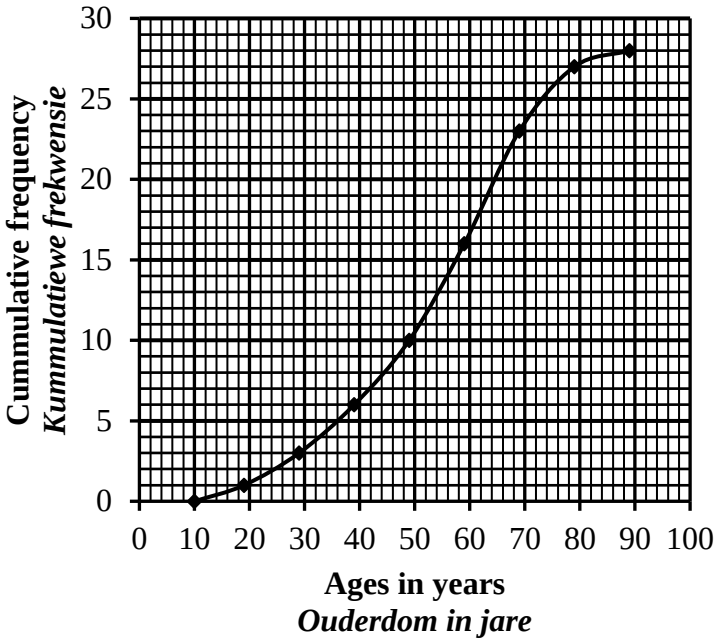
✓answer/*antwoord*

(3)

2.3 $60 < x \leq 69$ ✓answer/*antwoord* (1)

2.4

Cummulative Frequency graph/ Ogive
Kummulatiewefrekwesie-grafiek / Ogief



✓ grounding *anker*

✓ plot against the upper limit *afsteek teen boonste limiet*

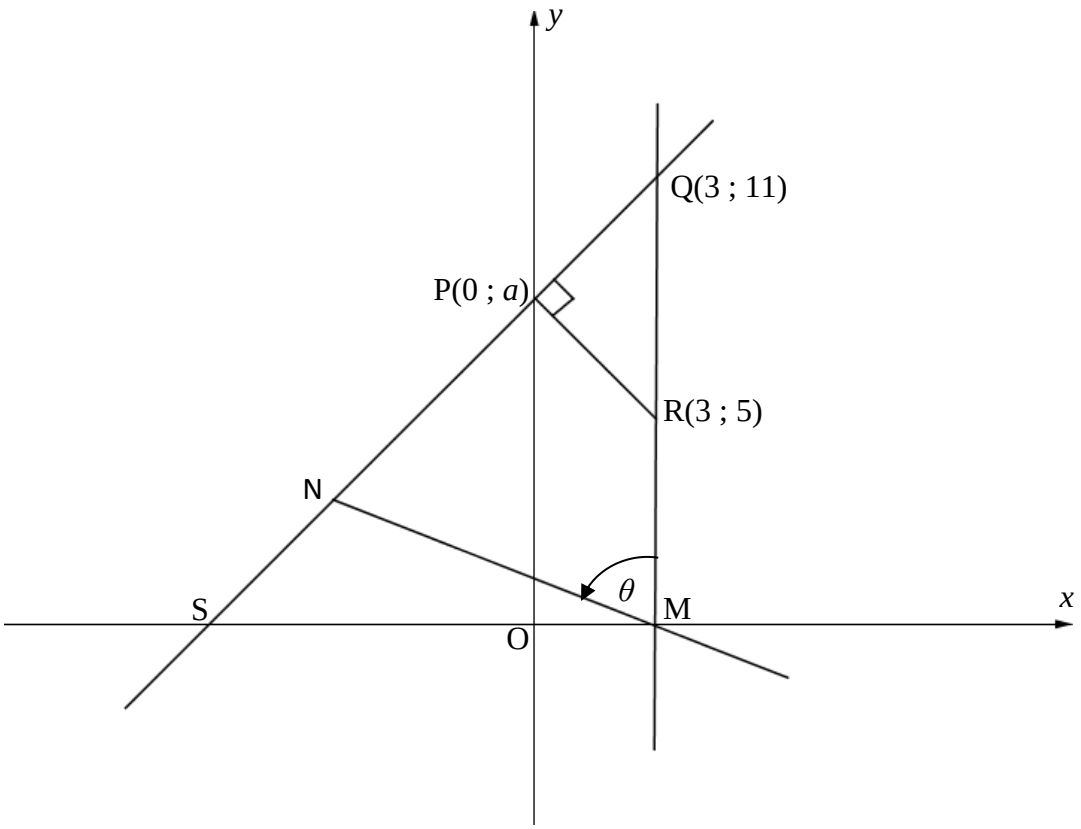
✓ shape / *vorm*

(3)

2.5 18 people / *persone* (1)

[10]

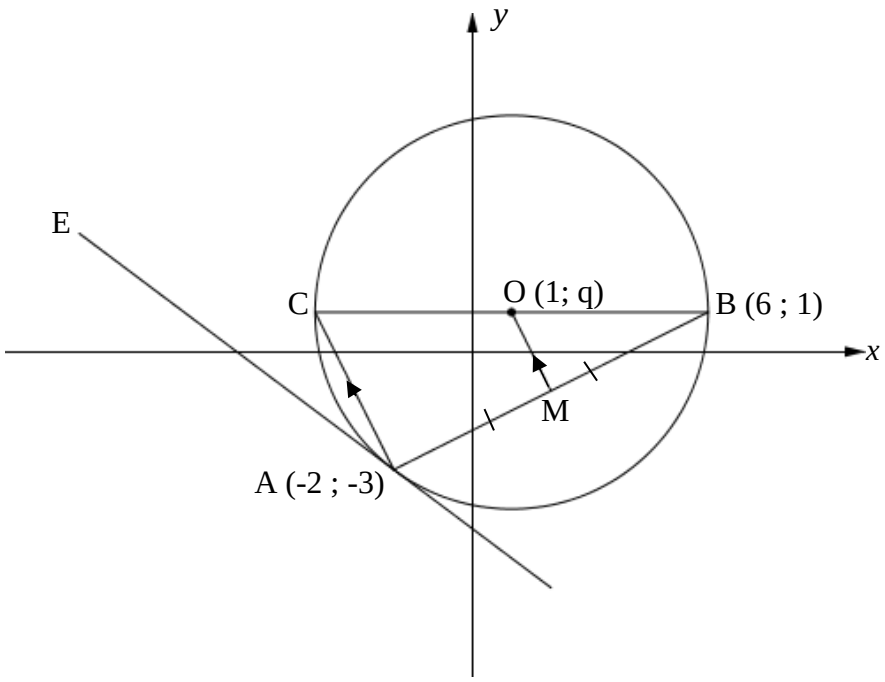
QUESTION/*VRAAG 3*



3.1	$M(3;0)$	✓ answer / *antwoord*	(1)
3.2	$QM = 11$ units / *eenhede*	✓ answer / *antwoord*	(1)
3.3	$m_{PQ} = \frac{11-a}{3-0} = \frac{11-a}{3}$	✓ correct substitution *korrekte vervanging* ✓ answer / *antwoord*	(2)
3.4	$m_{PQ} \times m_{PR} = -1$ [product of gradients of $\perp$ *lines*] [*produk van gradiënte van* $\perp$ *lyne*] $\frac{11-a}{3} \times \frac{5-a}{3} = -1$ $55 - 11a - 5a + a^2 = -9$ $a^2 - 16a + 64 = 0$ $(a-8)^2 = 0$ $\therefore a = 8$	✓ $m_{PQ} \times m_{PR} = -1$ ✓ correct substitution *korrekte vervanging* ✓ simplification / *vereenvoudiging* ✓ standard form / *standaardvorm* ✓ factors / *faktore*	(5)

3.5	$m_{SQ}=\frac{11-8}{3}=1$ $11=1(3)+c$ *or / of* $y-11=1(x-3)$ $8=c$ $y=x+8$ $y=x+8$	✓ m_{SQ} ✓ substituting m_{SQ} and P(0 ; 8) or Q(3; 11) *vervanging* m_{SQ} en P(0 ; 8) of Q(3 ; 11) ✓ answer / *antwoord*	(3)
3.6	$x+8=0$ $x=8$ $S(-8;\ 0)$ $SM=11$ units / *eenhede* $\therefore \Delta SMQ$ is isosceles $(SM=MQ)$ ΔSMQ *is gelykbenig* $(SM = MQ)$	✓ $y = 0$ ✓ correct *x*-value / *korrekte x-waarde* ✓ SM =11	(3)
3.7	$y=mx+1$ $0=m(3)+1$ $m=-\frac{1}{3}$ $\tan\alpha=-\frac{1}{3}$ $\alpha=161,57^0$ $\theta=161,57^0-90^0$ $[QM \parallel y-axis / as]$ $=71,57^0$	✓ substitute / *vervang* M(3;0) ✓ m_{MN} ✓ inclination of MN / *inklinasie van MN* ✓answer / *antwoord*	(4)
3.8	Area of $\Delta MQN=\frac{1}{2}\times MN\times MQ\times\sin\theta$ $45,38=\frac{1}{2}\times MN\times 11\times\sin 71,57^0$ $MN=8,70$	✓ correct formula of ΔMQN *korrekte formule van* ΔMQN ✓ correct substitution / *korrekte vervanging* ✓ answer / *antwoord*	(3)
			[22]

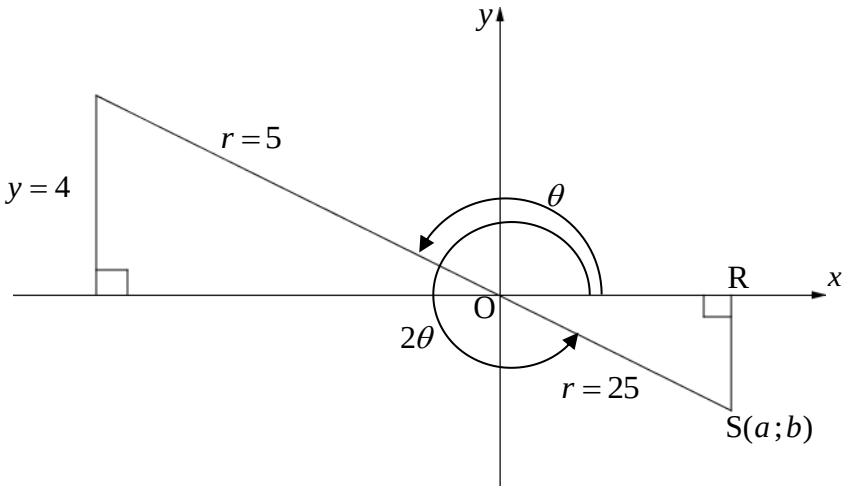
QUESTION/*VRAAG 4*



4.1	$AB = \sqrt{(-2-6)^2 + (-3-1)^2}$ $= \sqrt{80} = 4\sqrt{5}$	✓ correct substitution *korrekte vervanging* ✓ answer / *antwoord*	(2)
4.2	$OM = \sqrt{5}$ [Midpoint Thm / *Middelpunt Stelling*]	✓ answer / *antwoord*	(1)
4.3	$O\hat{M}B = 90^0$ [line from centre to the midpoint] [*lyn vanaf middelpunt*]	✓ answer / *antwoord*	(1)
4.4	$OB^2 = OM^2 + MB^2$ [*Pyth Thm / Pyth Stelling*] $(1-6)^2 + (q-1)^2 = (\sqrt{5})^2 + (2\sqrt{5})^2$ $25 + (q-1)^2 = 25$ $q - 1 = 0$ $q = 1$	✓ correct subst. into Pyth *korrekte verv. in Pyth* ✓ simplification *vereenvoudiging* ✓ answer / *antwoord*	(3)
4.5	$m_{AO} = \frac{1+3}{1+2}$ $= \frac{4}{3}$	✓ correct substitution *korrekte vervanging* ✓ answer / *antwoord*	(2)
4.6	$(x-1)^2 + (y-1)^2 = 25$	✓ LHS / *LK* ✓ RHS / *RK*	(2)

4.7	$m_{AE} = -\frac{3}{4}$ $\quad [\tan \perp \text{rad}]$ / [*raaklyn* $\perp$ *radius*] $y+3=-\frac{3}{4}(x+2)$ $y=-\frac{3}{4}x-\frac{9}{2}$	✓ m_{AE} ✓ substituting / *vervanging* m_{AE} and / *en* A(2 ; -3) ✓ answer / *antwoord*	(3)
4.8	$-\frac{9}{2}<t<8$	✓ correct c.v's. *korrekte k/w's* ✓ correct notation *korrekte notasie*	(2)
4.9	$\left(-\frac{22}{3};1\right)$ $r^2_{\text{new/}nuwe} = \left(-\frac{22}{3}-1\right)^2+(1-1)^2$ $r_{\text{new/}nuwe} = \frac{25}{3}$ $r_{\text{old/}oud} = 5$ $r_{\text{old/}oud} > r_{\text{new/}nuwe}$ $\therefore \left(-\frac{22}{3}-1\right)$ lies outside the circle / *lê buite die sirkel*	✓ $r_{\text{new/}nuwe}$ ✓ $r_{\text{old/}oud} > r_{\text{new/}nuwe}$ ✓ conclusion / *gevolgtrekking*	(3)
			[19]

QUESTION/*VRAAG 5*

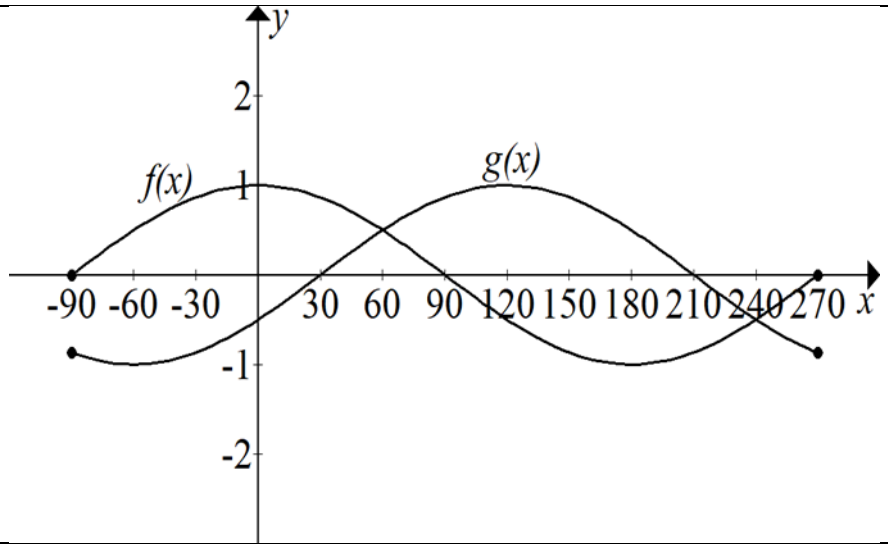


5.1	5.1.1	$x=-\sqrt{5^2-4^2}=-3$ $\cos\theta=-\frac{3}{5}$	✓ correct *x*-value *korrekte x-waarde* ✓ answer / *antwoord*	(2)
	5.1.2	$\cos(90^0-\theta)=\sin\theta$ $=\frac{4}{5}$	✓ $\sin\theta$ ✓answer / *antwoord*	(2)
	5.1.3	$\sin 2\theta=\frac{b}{25}$ $2\sin\theta\cos\theta=\frac{b}{25}$ $2\left(\frac{4}{5}\right)\left(-\frac{3}{5}\right)=\frac{b}{25}$ $b=-24$ $a=\sqrt{(25)^2-(-24)^2}=7$ $\therefore S(7;-24)$	✓ correct ratio *korrekte verhouding* ✓ identity / *identiteit* ✓ correct substitution *korrekte vervanging* ✓ value of *b* / *waarde van b* ✓ value of *a* / *waarde van a*	(5)
5.2	$\frac{\cos(\theta-360^0).\sin(180^0+\theta)}{\cos^2\theta+\sin\theta\cos(90^0+\theta)+\sin^2\theta}$ $=\frac{(\cos\theta)(-\sin\theta)}{1+\sin\theta(-\sin\theta)}$ $=-\frac{\sin\theta\cos\theta}{1-\sin^2\theta}$ $=-\frac{\sin\theta\cos\theta}{\cos^2\theta}$ $=-\tan\theta$	✓ $\cos\theta$ ✓ $-\sin\theta$ ✓ $\sin^2\theta+\cos^2\theta=1$ ✓ $-\sin\theta$ ✓ $\cos^2\theta$ ✓answer / *antwoord*	(6)
				[15]

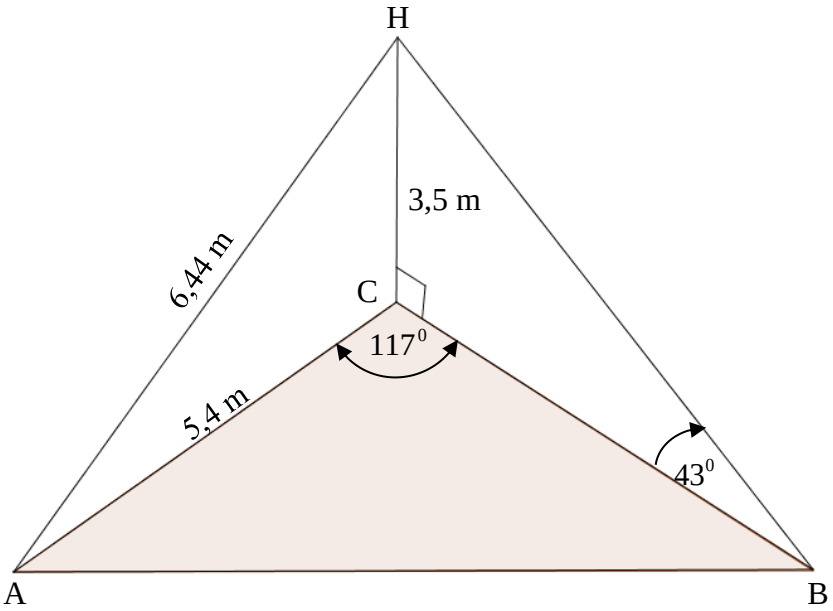
QUESTION/*VRAAG 6*

6.1.1	LHS/*LK* $= \dfrac{16\sin^2 A.\cos A}{2\sin^3 A - \sin 2A\cos A}$ $= \dfrac{8.2\sin A.\sin A.\cos A}{2\sin^3 A - 2\sin A.\cos A.\cos A}$ $= \dfrac{8\sin A.\sin 2A}{2\sin A\left(\sin^2 A - \cos^2 A\right)}$ $= \dfrac{4\sin 2A}{-\cos 2A}$ $= -4\tan 2A$	✓ $2\sin A\cos A$ ✓ $\sin 2A$ ✓ common factor *gemene faktor* ✓ $-\cos 2A$	(4)
6.1.2	$A \in \left[-90^\circ;90^\circ\right]$, but/*maar* $A \neq -45^\circ$ and/*en* $A \neq 45^\circ$	✓ $A \neq -45^\circ$ ✓ $A \neq 45^\circ$	(2)
6.2	$\sin\left(30^0 - 2x\right) = -\sin^2 x + \cos^2 x$ $\sin\left(30^0 - 2x\right) = \cos 2x$ $\sin 30^0\cos 2x - \sin 2x\cos 30^0 = \cos 2x$ $\dfrac{1}{2}\cos 2x - \dfrac{\sqrt{3}}{2}\sin 2x - \cos 2x = 0$ $-\dfrac{1}{2}\cos 2x - \dfrac{\sqrt{3}}{2}\sin 2x = 0$ $\dfrac{\sqrt{3}}{2}\sin 2x = -\dfrac{1}{2}\cos 2x$ $\tan 2x = -\dfrac{1}{\sqrt{3}}$ $2x = 150^0 + 180^0.k, \quad k \in Z$ $x = 75^0 + 90^0 k$	✓ $\cos 2x$ ✓ expansion / *uitbreiding* ✓ simplification *vereenvoudiging* ✓ equating / *gelykstel* ✓ $\tan 2x = -\dfrac{1}{\sqrt{3}}$ ✓ $2x = 150^0 + 180^0.k, \quad k \in Z$ ✓ $x = 75^0 + 90^0 k$	(7)
			[13]

QUESTION/*VRAAG 7*

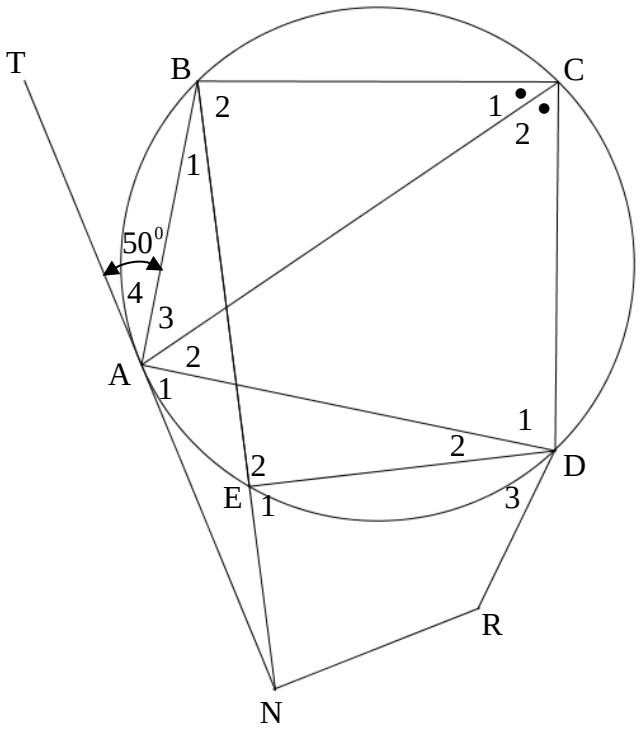
7.1	$-3 \le y \le -1$	✓ correct critical values *korrekte kritieke waardes* ✓ correct notation *korrekte notasie*	(2)
7.2		✓ intercepts with the axes *afsnitte met die asse* ✓ turning points *draaipunte* ✓ shape / *vorm*	(3)
7.3.1	$x = -60^0$ and/*en* $x = 0^0$	✓✓ each x-value *elke x-waarde*	(2)
7.3.2	$2 - 4\cos^2 \frac{1}{2}x = \sqrt{3}\sin x - \cos x$ $-2\left(2\cos^2 \frac{1}{2}x - 1\right) = \sqrt{3}\sin x - \cos x$ $\cos x = -\frac{\sqrt{3}}{2}\sin x + \frac{1}{2}\cos x$ $\frac{\sqrt{3}}{2}\sin x = \frac{1}{2}\cos x - \cos x$ $\frac{\sqrt{3}}{2}\sin x = -\frac{1}{2}\cos x$ $\tan x = \frac{-1}{\sqrt{3}}$ $x = 150° + 180°.k$, $k \in \mathbb{Z}$ or / *of* $x = 330° + 180°.k$	✓ common factor *gemene faktor* ✓ identity/ $\cos x$ *identiteit / cos x* ✓ $\tan x = \frac{-1}{\sqrt{3}}$ ✓ answers / *antwoorde*	(4)
7.3.3	$-10^0 < x < 170^0$	✓✓ answer / *antwoord*	(2)
			[13]

QUESTION/*VRAAG 8*



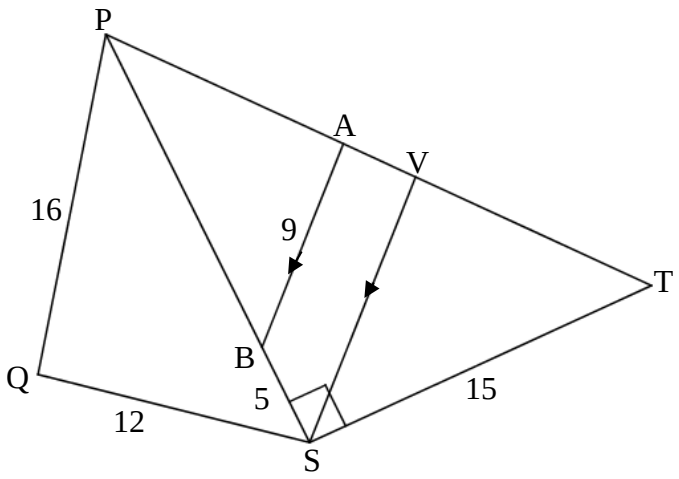
8.1	$\tan 43^0 = \frac{3,5}{BC}$ $BC = 3,75$	✓ correct substitution *korrekte vervanging* ✓ BC	(2)
8.2	$HB = \sqrt{(3,75)^2 + (3,5)^2}$ [*PythThm / Stelling*] $= 5,13$ $HB^2 = AH^2 + AB^2 - 2.AH.AB.\cos H\hat{A}B$ $(5,13)^2 = (6,44)^2 + (7,85)^2 - 2(6,44)(7,85)\cos A$ $\cos A = 0,7593780908$ $H\hat{A}B = 40,59^0$	✓ HB ✓ correct application of cosine rule *korrekte toepassing van kosinusreël* ✓ correct substitution *korrekte vervanging* ✓ correct ratio of cos A *korrekte verhouding van* cos A ✓ answer / *antwoord*	(5)
8.3	$\text{Area } \Delta HAB = \frac{1}{2} \times AH \times AB \times \sin 40,59^0$ $= \frac{1}{2} \times 6,44 \times 7,85 \times \sin(40,59^0)$ $= 16,45\ cm^2$	✓ correct application in area rule in ΔHAB *korrekte toepassing van oppervlakte-reël* ✓ correct substitution *korrekte vervanging* ✓ answer / *antwoord*	(3)
			[10]

QUESTION/*VRAAG 9*



9.1	$\hat{C}_1 = \hat{A}_4 = 50^0$ [tan chord theo] / [*raaklyn – koord stelling*] $\hat{C}_2 = \hat{C}_1 = 50^0$ [given] / [*gegee*] $\hat{A}_1 = \hat{C}_2 = 50^0$ [tan chord theo] / [*raaklyn – koord stelling*]	✓ S ✓ R ✓ S ✓ S/R	(4)
9.2	$\hat{E}_1 = \hat{C} = 100^0$ [ext ∠ of a cyclic quad]/[*buite ∠ van koordevh*] $\hat{C}_1 = \hat{C}_2$ [given] / [*gegee*] $\therefore \hat{E}_1 = 2\hat{C}_2 = 100^0$ $\therefore \hat{E}_1 = 2\hat{A}_1 = 100^0$ $\therefore$ E is the centre of the *circle* passing through A, N, R and D [converse ∠ at centre = 2∠ at circumf] *E is die middelpunt van die sirkel wat deur A, N, R en D gaan.* [*omgekeerde middelpunts ∠ = 2× omtreks ∠*]	✓ S ✓ R ✓ $\hat{E}_1 = 2\hat{A}_1 = 100^0$ ✓ R	(4)
9.3	$\hat{R} = 130^0$ [opp ∠s of a cyclic quad] / [*teenoorst. ∠e van koordevh*]	✓ S R ✓	(2)
9.4	Chords subt. = ∠s / *Koorde onderspan = ∠e*	✓ R	(1)
			[11]

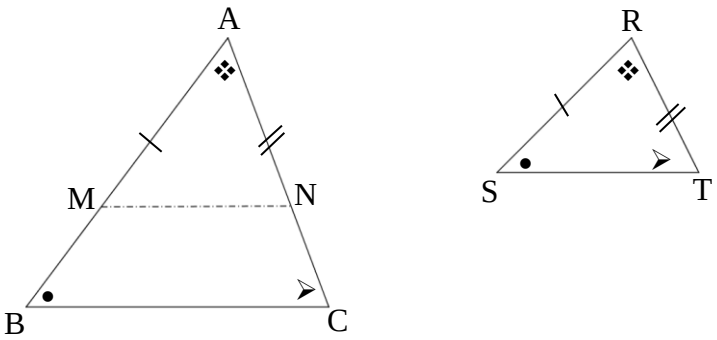
QUESTION/*VRAAG 10*

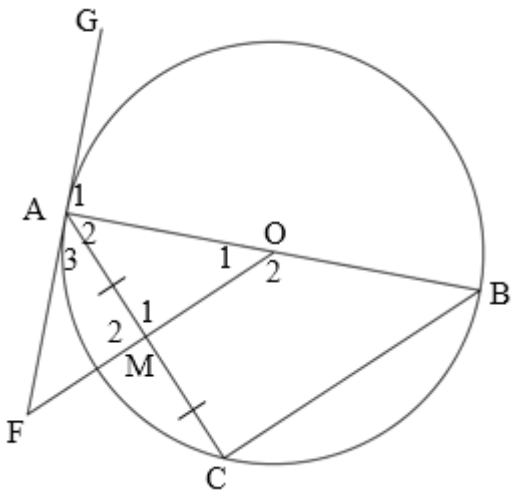


10.1	$\frac{PB}{BS}=\frac{PA}{AV}$ $[line\|\|to\ one\ side\ of\ a\ \Delta]/[lyn\|\|aan\ een\ sy\ van\ \Delta]$ $\frac{PB}{5}=\frac{3}{1}$ $PB=15$ **OR/*OF*** $\frac{PS}{BS}=\frac{PV}{AV}$ $[line\|\|to\ one\ side\ of\ a\ \Delta]/[lyn\|\|aan\ een\ sy\ van\ \Delta]$ $\frac{PS}{5}=\frac{4}{1}$ $PS=20$ $\therefore PB=15$ **OR/*OF*** $\frac{PB}{PS}=\frac{PA}{PV}$ $[\text{line}\|\|\text{to one side of a}\ \Delta]/[lyn\|\|aan\ een\ sy\ van\ \Delta]$ $\frac{PB}{PB+5}=\frac{3}{4}$ $4PB=3PB+15$ $PB=15$	✓ S ✓ R ✓ PB **OR/*OF*** ✓ S ✓ R ✓ PB **OR/*OF*** ✓ S ✓ R ✓ PB	(3)

10.2	$\Delta PAB \text{ ||| } \Delta PVS$ $\frac{PB}{PS}=\frac{AB}{VS}$ $[\text{ ||| } \Delta s/e]$ $\frac{15}{20}=\frac{9}{VS}$ $VS=12$ In ΔPQS *and* ΔSVT / In ΔPQS *en* ΔSVT $\frac{PQ}{SV}=\frac{16}{12}=\frac{4}{3}$ $\frac{QS}{VT}=\frac{12}{9}=\frac{4}{3}$ $\frac{PS}{ST}=\frac{20}{15}=\frac{4}{3}$ $\therefore \Delta PQS \text{ ||| } \Delta SVT$ $[\text{corresp sides have} = \text{ratios}]$ $[\textit{ooreenk. sye het} = \textit{verhoudings}]$	✓ S ✓ R ✓ substitution / *vervanging* ✓ VS ✓ all 3 equal ratios *al 3 gelyke verhoudings* ✓ R	(6)
			[9]

QUESTION/*VRAAG 11*

11.1	 Constructions. Put point M on AB and N on AC such that AM = RS and AN = RT Proof: In ΔAMN & Δ RST 1. AM = RS [constructions] 2. AN = RT [constructions] 3. $B\hat{A}C = S\hat{R}T$ [given] $\therefore \Delta AMN \equiv \Delta RST$ [S∠S] $\therefore A\hat{M}N = R\hat{S}T$ [≡ Δs] $\therefore A\hat{M}N = \hat{B}$ $\therefore MN \parallel BC$ [corresp.∠s=] $\therefore \frac{AB}{AM} = \frac{AC}{AN}$ [line ‖ to one side of a Δ] $\frac{AB}{RS} = \frac{AC}{RT}$	✓ complete constructions ✓ all 3 statements ✓ R for congruency ✓ R for MN‖ BC ✓ S ✓ R	
	Konstruksies. Plaas punt M op AB en N op AC sodat AM = RS en AN = RT *Bewys: In Δ AMN & Δ RST* *1. AM = RS [konstruksie]* *2. AN = RT [konstruksie]* *3.* $B\hat{A}C = S\hat{R}T$ [gegee] $\therefore \Delta AMN \equiv \Delta RST$ [S∠S] $\therefore A\hat{M}N = R\hat{S}T$ [≡ Δ*e*] $\therefore A\hat{M}N = \hat{B}$ $\therefore MN \parallel BC$ [*ooreenk..*∠s=] $\therefore \frac{AB}{AM} = \frac{AC}{AN}$ [*lyn ‖ aan een sy van ń* Δ] $\frac{AB}{RS} = \frac{AC}{RT}$	✓ *volledige konstruksies* ✓ *al 3 stellings* ✓ R *vir kongruensie* ✓R vir MN ‖ BC ✓ S ✓ R	(6)

11.2			
11.2.1	$\hat{C} = 90^0$ $[\angle \text{in semi} - \text{circle}]/[\angle \textit{in semi} - \textit{sirkel}]$ $\hat{M}_1 = 90^0$ [line from centre to midpoint] [*lyn vanaf die middelpunt van sirkel*] FO||CB [corresp.∠s=]/[*ooreenk.∠e=*]	✓ S ✓ R S / R ✓ ✓ R	(4)
11.2.2	$\hat{M}_2 = \hat{M}_1$ $[\angle \text{s on a straight line}]/[\angle e\, op\, 'n\, reguitlyn]$ $\hat{M}_2 = \hat{C}$ [both / *beide* $= 90^0$] $\hat{A}_3 = \hat{B}$ [tan chord theo]/[*raaklyn – koord – st*] $\hat{F} = \hat{A}_2$ [3rd / 3*de* ∠] ΔMAF ||| ΔCBA [∠∠∠] **OR/*OF*** $\hat{M}_2 = \hat{M}_1$ $[\angle \text{s on a straight line}]/[\angle e\, op\, 'n\, reguitlyn]$ $\hat{M}_2 = \hat{C}$ [both / *beide* $= 90^0$] $\hat{A}_3 = \hat{B}$ [tan chord theo]/[*raaklyn – koord – st*] $\hat{F} = \hat{A}_2$ [3rd / 3*de* ∠] ΔMAF ||| ΔCBA [∠∠∠]	✓ S ✓ S ✓ R ✓ R **OR/*OF*** ✓ S ✓ S ✓ R ✓S for/*vir* 3rd/*de* ∠	(4)
11.2.3	$\frac{MA}{CB} = \frac{MF}{AC}$ [||| Δs] $MA \times AC = MF \times BC$ $MA = \frac{1}{2}AC$ [given / *gegee*] $\therefore AC \times \frac{1}{2}AC = MF \times BC$ $AC^2 = 2BC \times MF$ $AC^2 = AB^2 - BC^2$ [Pyth Thm / *Stelling*] $AB^2 - BC^2 = 2BC \times MF$	✓ S ✓ R ✓ $MA = \frac{1}{2}AC$ ✓ $AC^2 = 2BC \times MF$ ✓ Pyth theo / stel	(5)
			[19]
	'n	**TOTAL/*TOTAAL*:**	**150**