Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE
NASIONALE SENIORSERTIFIKAAT

GRADE/*GRAAD* 12

SEPTEMBER 2023

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

MARKS/*PUNTE*: 150

This marking guideline consists of 18 pages.
Hierdie nasienriglyn bestaan uit 18 bladsye.

QUESTION 1/*VRAAG 1*

Data Set / *Datastel*: 29 27 24 31 22 19 30			
1.1.1(a)	Mean / *Gemiddelde* = $\frac{182}{7} = 26$	✓✓ mean / *gemiddelde*	(2)
1.1.1(b)	Standard deviation / *standaardafwyking* = 4,14	✓ SD / *standaardafwyking*	(1)
1.1.2	{26 – 4,14; 26 + 4,14} = {21, 86; 30, 14} 5 players / *spelers*	✓✓ calculations *berekeninge* ✓ answer / *antwoord*	(3)
1.1.3	Rugby team has the same average number of push-ups. The rugby team results were clustered around the mean because of the smaller standard deviation. *Rugbyspan het dieselfde gemiddelde aantal opstote. Die rugbyspan se uitslae was rondom die gemiddelde gegroepeer agv die kleiner standaardafwyking.*	✓✓ for any two valid comments using SD and the mean *Vir enige twee geldige opmerkings in gebruik van standaardafwyking en die gemiddelde*	(2)
1.2.1	50%	✓ answer / *antwoord*	(1)
1.2.2	Mean / *Gemiddelde* Distribution skewed to the right. (positively skewed) *Verspreiding is skeef na regs* (*positief skeef*)	✓ answer / *antwoord* ✓ reason / *rede*	(2)
			[11]

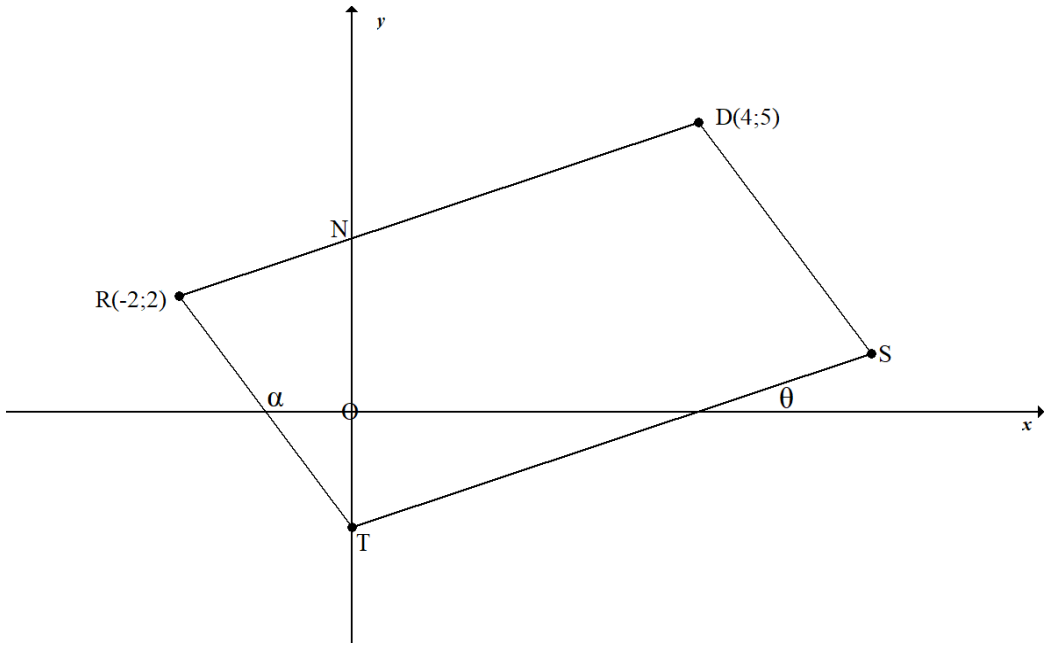
QUESTION 2/*VRAAG 2*

Third Term % *Derde Kw.* %	71	80	59	38	41	98	80	88	91	94	64	94	70	42	64
Final Term % *Finale Kw.* %	74	77	58	41	42	98	78	92	85	92	68	96	73	52	71

2.1	a = 9, 035 b = 0, 895 $\hat{y} = 9{,}035 + 0{,}895x$	✓ for a / *vir a* ✓ for b / *vir b* ✓ for equation / *vir vergelyking*	(3)
2.2	r = 0, 98	✓ answer / *antwoord*	(1)
2.3.1	$y = 9{,}035 + 0{,}895(48)$ $y \approx 52$	✓ substitution / *vervanging* ✓ answer / *antwoord*	(2)
2.3.2	correlation is very strong **OR** 48 is within domain of regression line. *korrelasie is baie sterk **OF** 48 is binne die gebied van die regressie-lyn.*	✓ answer / *antwoord*	(1)
2.4.1	50% is outside the domain of the line (data set) **OR** (50 ; 80) is an outlier. 50% *is buite die gebied van die lyn* (*datastel*) ***OF*** (50 ; 80) *is 'n uitskieter*	✓ answer / *antwoord*	(1)

	OR/OF Alternative reason: $9{,}035 + 0{,}895(50) = 54$ *and not* 80		
2.4.2	Increase the gradient / *Vermeerder die gradiënt*	✓ answer / *antwoord*	(1)
			[9]

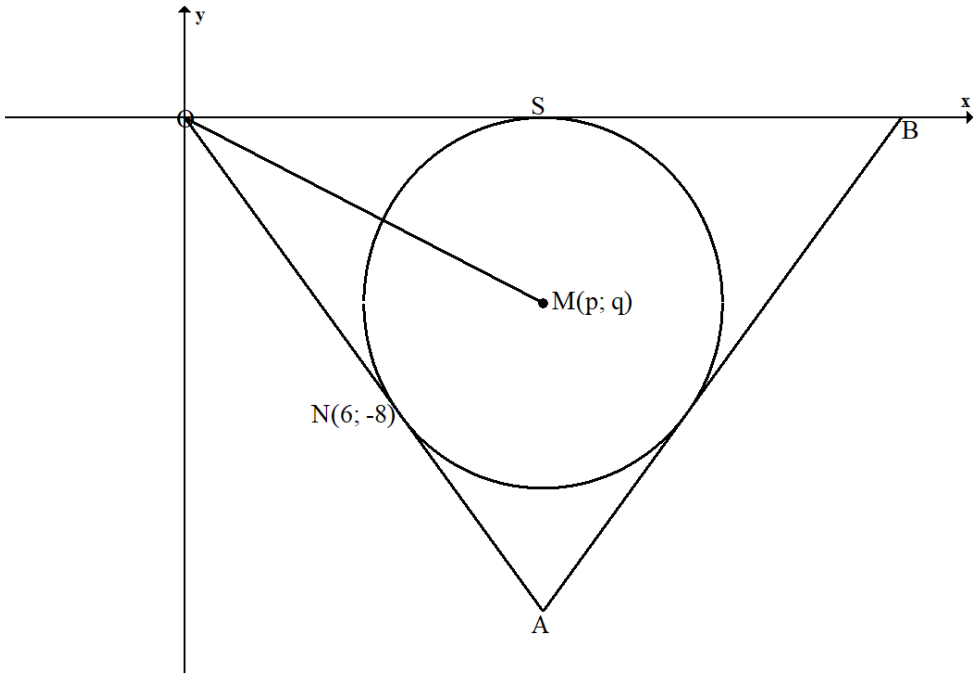
QUESTION 3 / *VRAAG 3*



3.1	T(0; -2)	✓ answer / *antwoord*	(1)
3.2.1	$m_{RT} = \frac{2-(-2)}{-2-0} = -\frac{4}{2} = -2$	✓ substitution / *vervanging* ✓ answer / *antwoord*	(2)
3.2.2	$\tan\theta = \frac{1}{2}$ $\therefore \theta = 26{,}57°$ $\tan\alpha = -2$ $\therefore \alpha = 116{,}57°$ $\therefore R\hat{T}S = 116{,}57° - 26{,}57° = 90°$ **OR / *OF*** $m_{TS} = \frac{1}{2}$ $m_{RT} = -2$ $m_{TS} \times m_{RT} = -1$ $R\hat{T}S = 90^{\circ}$	✓ for / *vir* $\tan\theta = \frac{1}{2}$ ✓ for / *vir* $\theta = 26{,}57°$ ✓ for / *vir* $\tan\alpha = -2$ ✓ for / *vir* $\alpha = 116{,}57°$ ✓ $R\hat{T}S = 90°$ **OR / *OF*** ✓ $m_{TS} = \frac{1}{2}$ ✓ $m_{RT} = -2$ ✓✓ product of gradients *produk van gradiënte* ✓ $R\hat{T}S = 90°$	(5)
3.3	$y = \frac{1}{2}x + c$ $2 = \frac{1}{2}(-2) + c$ $c = 3$ $\therefore y = \frac{1}{2}x + 3$	✓ gradient / *gradiënt* ✓ substitution of point R or D *vervanging van punt* R *of* D ✓ answer / *antwoord*	(3)

3.4	RDST is a parallelogram (opposite sides parallel) RDST *is 'n parallelogram* (*teenoorst. sye ewewydig*) Midpoint of DT / *Middelpunt van* DT: $\left(\frac{4+0}{2}; \frac{5-2}{2}\right) = \left(2; \frac{3}{2}\right)$ Midpoint of RS is the same as midpoint of DT (diagonals bisect each other.) *Middelpunt van* RS *is dieselfde as die middelpunt van* DT (*hoeklyne halveer mekaar*) Midpoint of RS / *Middelpunt van* RS: $\left(2; \frac{3}{2}\right)$ **OR / *OF*** $S(6\,;1)$ Midpoint of RS / *Middelpunt van* RS: $\left(\frac{6-2}{2}\,;\frac{1+2}{2}\right) = \left(2;\frac{3}{2}\right)$	✓ substitution in the MP formula *vervanging in die* MP *formule* ✓ S/R ✓ answer / *antwoord* **OR / *OF*** ✓✓ $S(6\,;1)$ ✓ answer / *antwoord*	(3)
3.5	N(0; 3) RN $= \sqrt{2^2+1^2} = \sqrt{5}$ RT $= \sqrt{2^2+4^2} = \sqrt{20}$ Area /*Oppervlakte* $= \frac{1}{2} \times \sqrt{20} \times \sqrt{5}$ $= 5$ square units / *eenhede*^{2} **OR / *OF*** TN $= 5$ units / *eenhede* Height / *Hoogte* = 2 units / *eenhede* Area /*Oppervlakte* $= \frac{1}{2} \times 5 \times 2$ Area /*Oppervlakte* $= 5$ square units / eenhede^2	✓ coordinates of N *koördinate van* N ✓ for / *vir* RN ✓ for / *vir* RT ✓ for the answer / *vir die antwoord* **OR / *OF*** ✓ TN $= 5$ units / *eenhede* ✓ Height/*hoogte* = 2 units / *eenhede* ✓ sub. into formula *vervanging in formule* ✓ answer / *antwoord*	(4)
			[18]

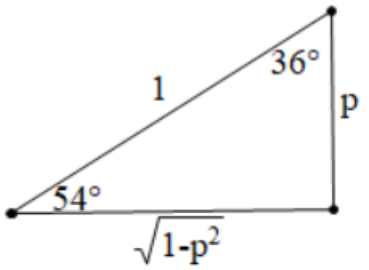
QUESTION 4 / *VRAAG 4*



4.1.1	$ON = \sqrt{(6-0)^2 + (-8)^2}$ $= \sqrt{100} = 10$ units / *eenhede*	✓ substitution in correct formula *vervanging in korrekte formule* ✓ answer / *antwoord*	(2)
4.1.2	ON = OS (tangents from the same point) (*raaklyne vanaf dieselfde punt*) $\therefore p = 10$ units / *eenhede* Answer only = full marks	✓ S and/*en* R ✓ answer / *antwoord*	(2)
4.1.3	ON ⊥ NM (tan – radius) / (*raaklyn – radius*) $m_{ON} = \frac{-8}{6} = \frac{-4}{3}$ $m_{NM} = \frac{3}{4}$ No penalty for omitting first line.	✓ S and/*en* R ✓ gradient of ON / *gradiënt van* ON ✓ gradient of NM *gradiënt van* NM	(3)
4.1.4	$m_{NM} = \frac{q+8}{10-6} = \frac{3}{4}$ $\frac{q+8}{4} = \frac{3}{4}$ $q = -5$	✓ for subs and equating *vir vervanging en gelyk stel* ✓ answer / *antwoord*	(2)
4.2	MS = r = 5 units / *eenhede* $(x-10)^2 + (y+5)^2 = 25$ CA marking applies (p and q values)	✓ radius / *radius* ✓ centre sub/ *vervang middelpunt* ✓ answer / *antwoord*	(3)
4.3	$k = 5$ **OR/*OF*** $k = 15$	✓ *k = 5* **OR/*OF*** ✓*k = 15*	(2)

4.4	Coordinates of the point directly opposite N is C. *Koördinate van die punt regoor* N *is* C. $C\left(\frac{x+6}{2}=10\,;\,\frac{y-8}{2}=-5\right)$ $C(14;\,-2)$ Equation of the tangent at C: *Vergelyking van die raaklyn by* C: $y+2=-\frac{4}{3}(x-14)$ $y=-\frac{4}{3}x+\frac{50}{3}$ $\therefore 0<t<\frac{50}{3}$	✓ formula and sub / *formule en vervanging* ✓ for *x*-coordinate *vir x-koördinaat* ✓ for *y*-coordinate *vir y-koördinaat* ✓ substitution / vervanging ✓ for the answer / *vir die antwoord* ✓ for the value of t. *vir die waarde van t*	(6)
4.5	They will not touch. The new circle is the old circle shifted up by 11. *Hulle sal nie raak nie.* *Die nuwe sirkel is die ou sirkel* 11 *eenhede opwaarts geskuif.*	✓ answer / *antwoord* ✓ any valid reason / *enige geldige antwoord*	(2)
			[22]

QUESTION 5/*VRAAG 5*

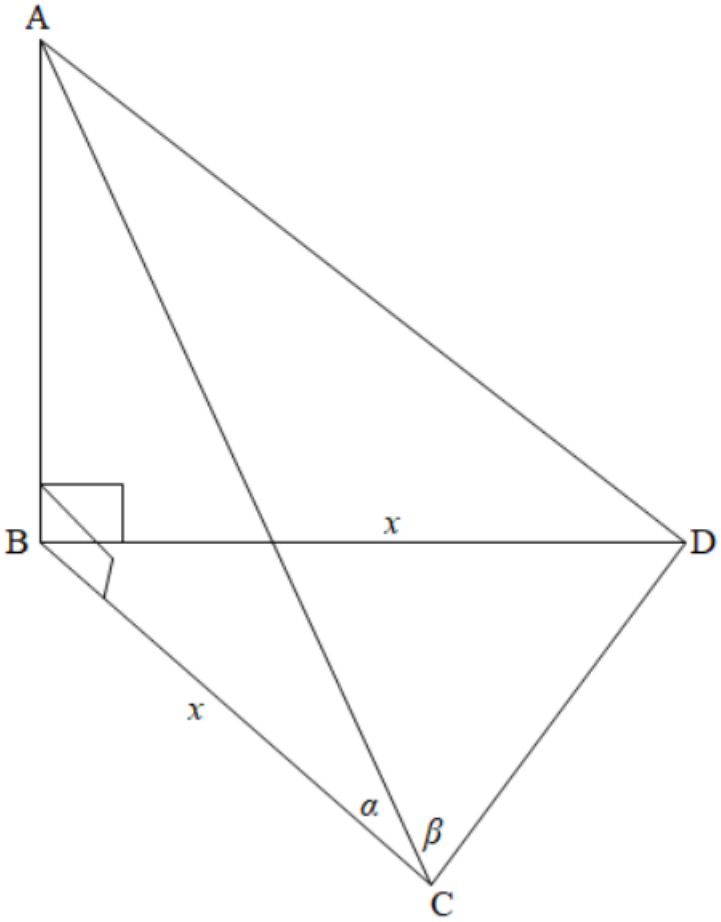


5.1.1	$\sin 594°$ $= \sin 234°$ $= -\sin 54°$ $= -p$	✓ $-\sin 54°$ ✓ $-$ p	(2)
5.1.2	$\cos 36^0$ $= p$	✓✓ answer / *antwoord*	(2)
5.1.3	$\cos 18°$ $= \sin 72°$ $= \sin 2(36°)$ $= 2\sin 36° \cos 36°$ $= 2\left(\frac{\sqrt{1-p^2}}{1}\right)\left(\frac{p}{1}\right)$ $= 2p\left(\sqrt{1-p^2}\right)$	✓ for / *vir* $\sin 72°$ ✓ for / *vir* $\sin 2(36°)$ ✓ for / *vir* $2\sin 36° \cos 36°$ ✓ for / *vir* $2p\left(\sqrt{1-p^2}\right)$	
	$\cos 18$ $\cos 36 = \cos 2(18)$ $p = 2\,cos^2 18 - 1$ $2\,cos^2 18 = p + 1$ $cos^2 18 = \frac{p+1}{2}$ $\cos 18 = \sqrt{\frac{p+1}{2}}$ **OR/OF** $\cos 18 = \cos(54 - 36)$ $\cos 18 = \cos 54 \cos 36 + \sin 54 \sin 36$ $\cos 18 = \sqrt{1-p^2}\,.p + p.\sqrt{1-p^2}$ $\cos 18 = 2p\sqrt{1-p^2}$	✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ (4)	(4)

5.2	$\dfrac{\cos 140° - \sin(90° - \theta)}{\sin 410° + \cos(-\theta)}$ $= \dfrac{\cos(90° + 50°) - \cos\theta}{\sin 50° + \cos\theta}$ $= \dfrac{-\sin 50° - \cos\theta}{\sin 50° + \cos\theta}$ $= \dfrac{-(\sin 50° + \cos\theta)}{(\sin 50° + \cos\theta)}$ $= -1$ Please take note that: $\sin 50$ and $-\sin 50$ can be changed to $\cos 40$ and $-\cos 40$	✓ $-\sin 50°$ ✓ $\cos\theta$ ✓ $\sin 50°$ ✓ $\cos\theta$ ✓ for the common factor *vir die gemene faktor* ✓ for the answer *vir die antwoord*	(6)
5.3	$\cos(x + 65°).\cos(x + 20°) - \sin(x + 245°).\sin(x + 20°)$ $= \cos(x + 65°).\cos(x + 20°) + \sin(x + 65°).\sin(x + 20°)$ $= \cos[(x + 65°) - (x + 20°)]$ $= \cos 45°$ $= \dfrac{1}{\sqrt{2}}$	✓ reduction / *reduksie* ✓ compound angle *saamgestelde hoek* ✓ $\cos 45°$ ✓ answer / *antwoord*	(4)
5.4	$cos^2x - sin^2x = \dfrac{1}{2}$ $\cos 2x = \dfrac{1}{2}$ $2x = 60° + 360°.k$ or/*of* $2x = 300° + 360°.k$ $x = 30° + 180.k$ or/*of* $x = 150° + 180.k$ $k\epsilon Z$ **OR / OF** $2\,cos^2x - 2\,sin^2x = 1$ $2\,cos^2x - 2\,sin^2x = sin^2x + cos^2x$ $3\,sin^2x = cos^2x$ $tan^2x = \dfrac{1}{3}$ $tan\,x = \dfrac{1}{\sqrt{3}}$ $x = 30^\circ$ (reference angle / *verwysingshoek*) $x = 30^\circ + 180^\circ.k$, $k \in Z$	✓ $\cos 2x = \dfrac{1}{2}$ ✓ for / *vir* $2x$ in both quadrants / *in beide kwadrante* ✓ $x = 30° + 180.k$ ✓ $x = 150° + 180.k$ **OR / OF** ✓ multiplying by 2 and using identity / *vermenigvuldig met 2 en gebruik van identiteit* ✓ $3\,sin^2x = cos^2x$ ✓ $tan\,x = \frac{1}{\sqrt{3}}$ ✓ answer / *antwoord*	(4)

5.5.1	LHS $= \frac{\sin 2\theta \,.\tan\theta}{\cos 2\theta+1}$ $= \frac{2\sin\theta\cos\theta\,.\,\frac{\sin\theta}{\cos\theta}}{2\cos^2\theta-1+1}$ $= \frac{2\sin^2\theta}{2\cos^2\theta}$ $= \tan^2\theta$	✓ $2\sin\theta\cos\theta$ ✓ $\frac{\sin\theta}{\cos\theta}$ ✓ $2\cos^2\theta-1$ ✓ $\frac{2\sin^2\theta}{2\cos^2\theta}$	(4)
5.5.2	$\cos 2\theta + 1 = 0$ $\cos 2\theta = -1$ $2\theta = 180°$ $\theta = 90°$	✓ $\cos 2\theta + 1 = 0$ ✓ $\cos 2\theta = -1$ ✓ $2\theta = 180°$ ✓ $\theta = 90°$	(4)
			[30]

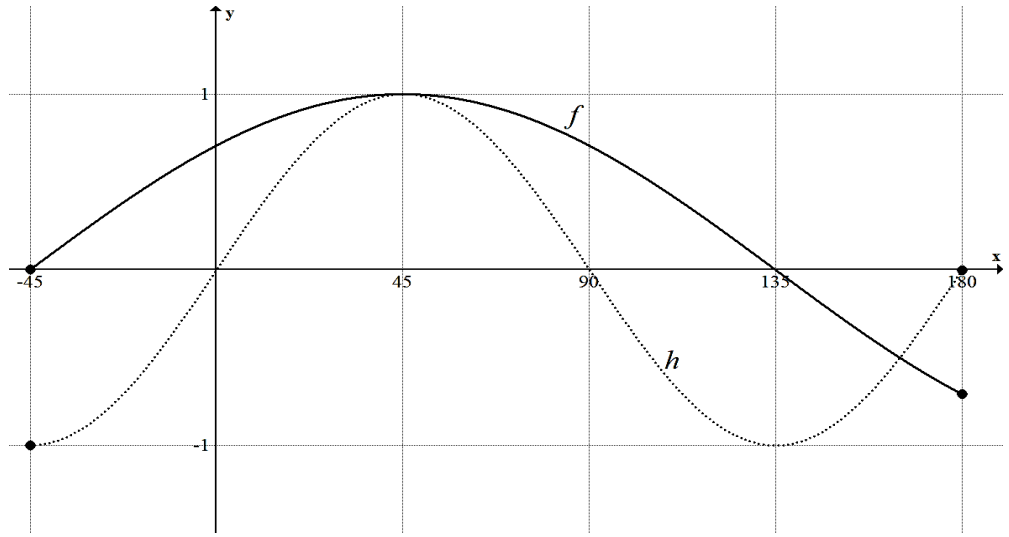
QUESTION 6 / *VRAAG 6*



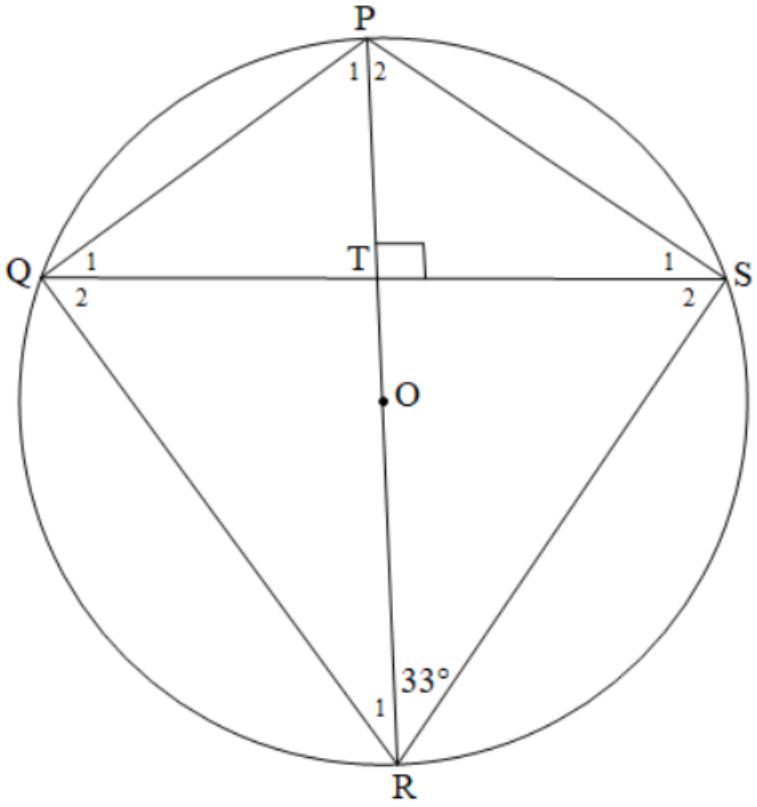
6.1	$\Delta ABC \equiv \Delta ABD$ (SAS) / (*SHS*)	✓ S and/*en* R	(1)
6.2	$\cos\alpha = \frac{x}{AC}$ $AC = \frac{x}{\cos\alpha}$	✓ S ✓ answer / *antwoord*	(2)
6.3	$CD^2 = \left(\frac{x}{\cos\alpha}\right)^2 + \left(\frac{x}{\cos\alpha}\right)^2 - 2\left(\frac{x}{\cos\alpha}\right)\left(\frac{x}{\cos\alpha}\right)\cos(180° - 2\beta)$ $CD^2 = \frac{x^2}{cos^2\alpha} + \frac{x^2}{cos^2\alpha} + 2\left(\frac{x^2}{cos^2\alpha}\right)\cos 2\beta$ $CD^2 = \frac{2x^2}{cos^2\alpha}(1 + \cos 2\beta)$ $CD^2 = \frac{2x^2}{cos^2\alpha}\left(1 + (1 - 2sin^2\beta)\right)$ $CD^2 = \frac{2x^2}{cos^2\alpha} \times 2cos^2\beta$ $CD^2 = \frac{4x^2cos^2\beta}{cos^2\alpha}$ $\therefore CD = \frac{2x\cos\beta}{\cos\alpha}$ **OR / *OF***	✓ cos rule / *cos-reël* ✓ simplification *vereenvoudiging* ✓ double angles expansion *dubbelhoeke uitbreiding* ✓ simplification *vereenvoudiging* **OR / *OF***	

	$A\hat{D}B = \beta$ $C\hat{A}D = 180^0 - 2\beta$ $\frac{CD}{\sin(180^0 - 2\beta)} = \frac{AC}{\sin\beta}$ $CD = \frac{AC \sin 2\beta}{\sin\beta}$ $CD = \frac{x.2\sin\beta\cos\beta}{\cos\alpha \sin\beta}$ $CD = \frac{2\,x\cos\beta}{\cos\alpha}$	✓ for /*vir* $A\hat{D}B = \beta$ and/*en* $C\hat{A}D = 180^0 - 2\beta$ ✓ use of sin rule *gebruik van sinus-reël* ✓ substitution of AC *vervanging van* AC ✓ simplification / *vereenvoudiging*	(4)
6.4	$CD = \frac{2x\cos\beta}{\cos\alpha}$ $CD = \frac{2(25)\cos 65{,}62°}{\cos 30°}$ $CD = 23{,}83$ cm	✓ substitution / *vereenvoudiging* ✓ answer / *antwoord*	(2)
			[9]

QUESTION 7 / *VRAAG 7*

7.1	$f(180°) = -0{,}71$ ∴ Range: $Terrein: Waardeversameling: \ -0{,}71 \leq y \leq 1$ **OR / *OF*** $[-0{,}71;\ 1]$	✓ $f(180°)$ ✓ answer / *antwoord*	(2)
7.2	 ✓ intercepts / *afsnitte* ✓shape / *vorm* ✓ turning points / *draaipunte*		(3)
7.3	Period / *Periode* = 180°	✓ answer / *antwoord*	(1)
7.4	$-45° < x < 45°$ Accept: $-45 \leq x \leq 45$	✓✓ answer / *antwoord*	(2)
7.5	$x = -45°$ or / *of* $x = 135°$	✓ $x = -45°$ ✓ $x = 135°$	(2)
7.6	$g(x) = \cos(x + 15°)$	✓ answer / *antwoord*	(1)
			[11]

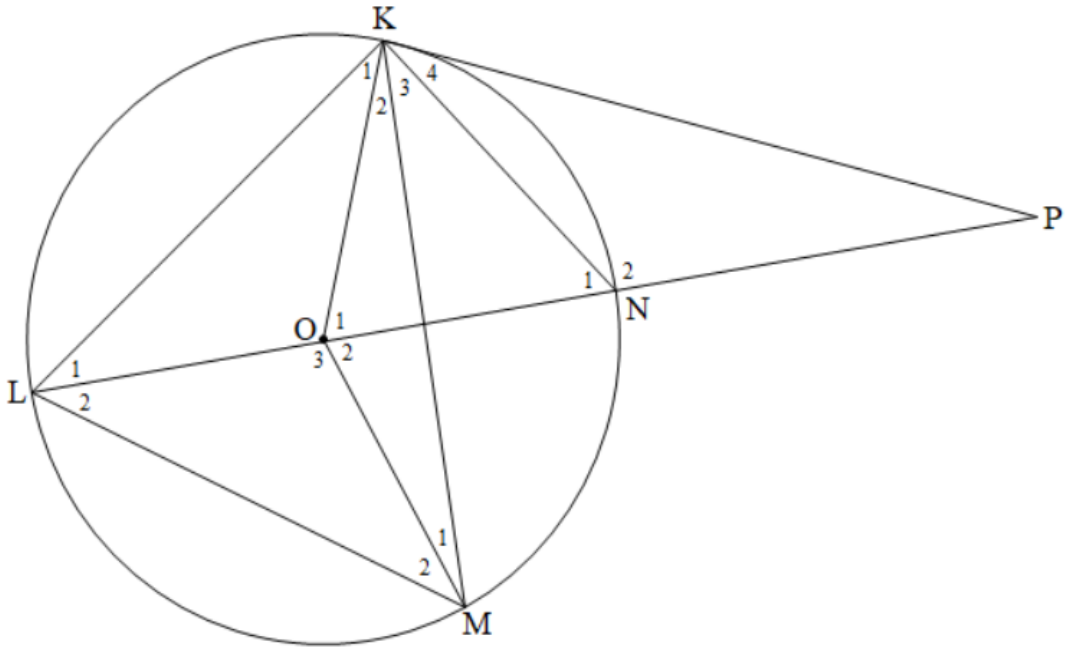
QUESTION 8 / *VRAAG 8*



8.1.1	$\hat{Q}_1 = 33°$ (∠s in the same segment) (∠*e in dieselfde segment*) $\hat{P}_1 = 57°$ (∠s of a triangle) / (∠*e van 'n driehoek*)	✓ S ✓ R ✓S and/*en* R	(3)
8.1.2	$\hat{Q} = 90°$ (∠ subtended by the diameter) (∠ *onderspan deur middellyn*) $\hat{Q}_2 = 57°$ (complementary ∠s / ∠s of a triangle) (*komplementêre* ∠e / ∠e *van 'n driehoek*)	✓ S and/*en* R ✓ S and/*en* R	(2)
8.2	$QT = TS = 8\ cm$ (line from centre perp to chord) (*lyn vanaf middelpunt loodreg op koord*) $OQ = OS = 10\ cm$ (radii) / (*radiusse*) $OQ^2 = TO^2 + QT^2$ (Pythagoras) / (*Pythagoras*) $10^2 = OT^2 + 8^2$ $TO = \sqrt{100 - 64} = 6$ cm	✓ S and/*en* R ✓ S and/*en* R ✓ S and/*en* R ✓ answer / *antwoord*	

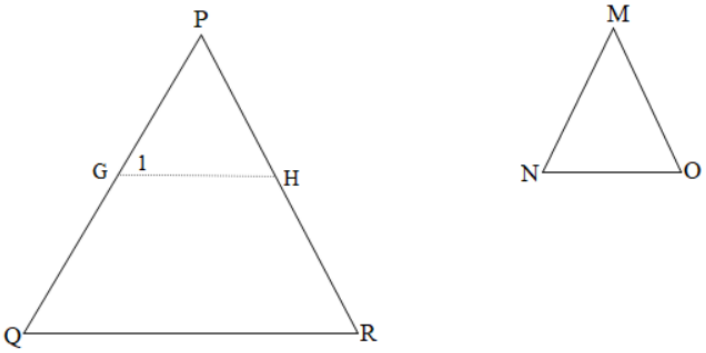
	Using Trigonometry $QT = TS = 8$ Line from centre perp to chord $\boldsymbol{In\ \Delta PTS}$ $\tan 33 = \frac{PT}{8}$ *or* $\tan 57 = \frac{8}{PT}$ $PT = 5{,}195$ $\therefore OT = 4{,}81$ $\boldsymbol{In\ \Delta TRS}$ $\tan 33 = \frac{8}{RT}$ *or* $\tan 57 = \frac{RT}{8}$ $RT = 12{,}31$ $\therefore OT = 2{,}31$ $\boldsymbol{In\ \Delta\ PSR}$ $\sin 33 = \frac{PS}{20}$ $PS = 20 \sin 33$ $PS = 10{,}89$ Using Pythagoras in Triangle PTS $PT = \sqrt{10{,}89^2 - 8^2}$ $PT = 7{,}39$ $OT = 10 - 7{,}39$ $OT = 2{,}61$ **OR/*OF*** $\sin 57 = \frac{SR}{20}$ $SR = 20 \sin 57$ $SR = 16{,}77$ Using Pythagoras in triangle TRS $TR = \sqrt{16{,}77^2 - 8^2}$ $TR = 14{,}74$ $OT = 14{,}74 - 10$ $OT = 4{,}74$	✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓	(4)
			[9]

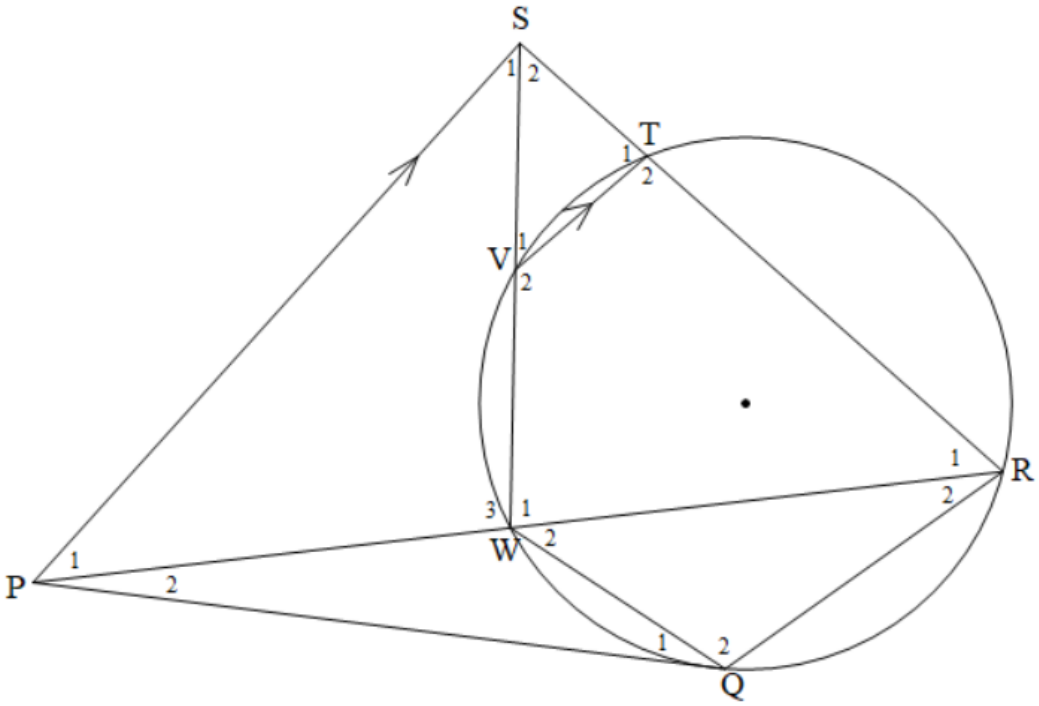
QUESTION 9 / *VRAAG 9*



9.1	$L\hat{K}N = 90°$ $O\hat{K}P = 90°$	✓ answer / *antwoord* ✓ answer / *antwoord*	(2)
9.2.1	$\hat{L}_1 = x$ (tan – chord theorem) / (*raaklyn-koord stelling*)	✓ S ✓ R	(2)
9.2.2	$\hat{K}_1 = x$ (∠s opp. = sides) / (∠e *teenoor = sye*)	✓ S ✓ R	(2)
9.2.3	In ΔLKP; $L\hat{K}P = 90° + x$ and/*en* $\hat{L}_1 = x$ $\therefore \hat{P} = 90° - 2x$ (∠s of a triangle) (∠*e van 'n driehoek*) **OR / *OF*** $\hat{N}_2 = 90^0 + x$ ($ext \angle of\ \Delta$) / (*buite ∠ van* Δ) $\therefore \hat{P} = 90° - 2x$ (∠s of a triangle) (∠*e van 'n driehoek*)	✓ S ✓ R **OR / *OF*** ✓ S/R ✓ S/R	(2)
9.3	$O\hat{M}P = 90°$ (tan⊥ rad) / (*raaklyn ⊥ radius*) $O\hat{K}P = 90°$ (proven) / (*bewys*) ∴ KOMP is a c.q. (opp. ∠s suppl.) KOMP is 'n kv (*teenoorst. ∠e supplementêr*)	✓ S & R ✓ S ✓ R	(3)
			[11]

QUESTION 10 / *VRAAG 10*

10.1	 On PQ, mark PG = MN and on PR, mark off PH = MO Join GH In ΔPGH and ΔMNO (1) PG = MN (construction) (2) $\hat{P} = \hat{M}$ (given) (3) PH = MO (construction) $\therefore \Delta PGH \equiv \Delta MNO$ (SAS) $\therefore \hat{G}_1 = \hat{N}$ (Congruency) But $\hat{Q} = \hat{N}$ (given) $\therefore \hat{G}_1 = \hat{Q}$ $\therefore GH \parallel QR$ (corresponding angles formed =) $\therefore \frac{PG}{PQ} = \frac{PH}{PR}$ (prop.int; $GH \parallel QR$) But PG = MN and PH = MO $\therefore \frac{MN}{PQ} = \frac{MO}{PR}$	✓ construction ✓ congruency proof ✓ S ✓ R ✓ S and/*en* R ✓ S	
	Afrikaans *Op* PQ, *merk af* PG = MN *en op* PR, *merk af* PH = MO *Verbind* GH In ΔPGH *en* ΔMNO (1) PG = MN (*konstruksie*) (2) $\hat{P} = \hat{M}$ (*gegee*) (3) PH = MO (*konstruksie*) $\therefore \Delta PGH \equiv \Delta MNO$ (SHS) $\therefore \hat{G}_1 = \hat{N}$ (*Kongruensie*) *Maar*, $\hat{Q} = \hat{N}$ (*gegee*) $\therefore \hat{G}_1 = \hat{Q}$ $\therefore GH \parallel QR$ (*ooreenkomstige hoeke gevorm* =) $\therefore \frac{PG}{PQ} = \frac{PH}{PR}$ (*eweredigheid*; $GH \parallel QR$) *Maar*, PG = MN *en* PH = MO $\therefore \frac{MN}{PQ} = \frac{MO}{PR}$	✓ *konstruksie* ✓ *kongruensie bewys* ✓ S ✓ R ✓ S and/*en* R ✓ S	(6)



10.2.1	$\hat{S}_1 = \hat{V}_1$ (alt ∠s; PS∥VT) / (*verw.* ∠*e* ; PS ∥ VT) $\hat{V}_1 = \hat{R}_1$ (ext.∠ of cq RTVW) / (*buite* ∠ *van kv* RTVW) $\therefore \hat{S}_1 = \hat{R}_1$	✓ S and/*en* R ✓ S ✓ R	(3)
10.2.2	In ΔPWS and/*en* ΔPSR (1) $\hat{P}_1$ is common / *is gemeen* (2) $\hat{S}_1 = \hat{R}_1$ (proven) / (*bewys*) (3) 3rd angle of a triangle / (3de *hoek van driehoek*) ΔPWS ||| ΔPSR (AAA) / (HHH) / (∠∠∠) Second mark should be for statement.	✓ S ✓ R ✓ S and/*en* R	(3)
10.2.3	In ΔPQW and/*en* ΔPRQ (1) $\hat{Q}_1 = \hat{R}_2$ (tan – chord theorem) /(*raaklyn – koord stelling*) (2) $\hat{P}_2$ is common / *is gemeen* (3) 3rd angle of a triangle / 3de *hoek van driehoek* ΔPQW ||| ΔPRQ (AAA) $\therefore \frac{PQ}{PR} = \frac{PW}{PQ}$ (similarity) / (*gelykvormig*) $\therefore PQ^2 = PW.PR$	✓ S and/*en* R ✓ S ✓ S and/*en* R ✓ S ✓ S	(5)

10.2.4	From / *Vanaf* 10.2.1 $\frac{PW}{PS}=\frac{PS}{SR}$ $(\Delta PWS \|\|\| \Delta PSR)$ $\therefore PS^2 = PW.PR$ From / *Vanaf* 10.2.2 $PQ^2 = PW.PR$ $\therefore PQ = PS$ First line: $\frac{PW}{PS}=\frac{PS}{PR}$	✓ S ✓ S ✓	(3)
			[20]

TOTAL / *TOTAAL*: 150

