GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

PREPARATORY EXAMINATION
VOORBEREIDENDE EKSAMEN

2023

MARKING GUIDELINES/*NASIENRIGLYNE*

MATHEMATICS/*WISKUNDE* (PAPER/*VRAESTEL* 2) (10612)

19 pages/*bladsye*

Stanmorephysics.com

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 the question, mark the crossed-out version.**
- **Consistent accuracy applies in ALL aspects of the marking guidelines. Stop marking at the second calculation error.**
- **Assuming answers/values to solve a problem is NOT acceptable.**

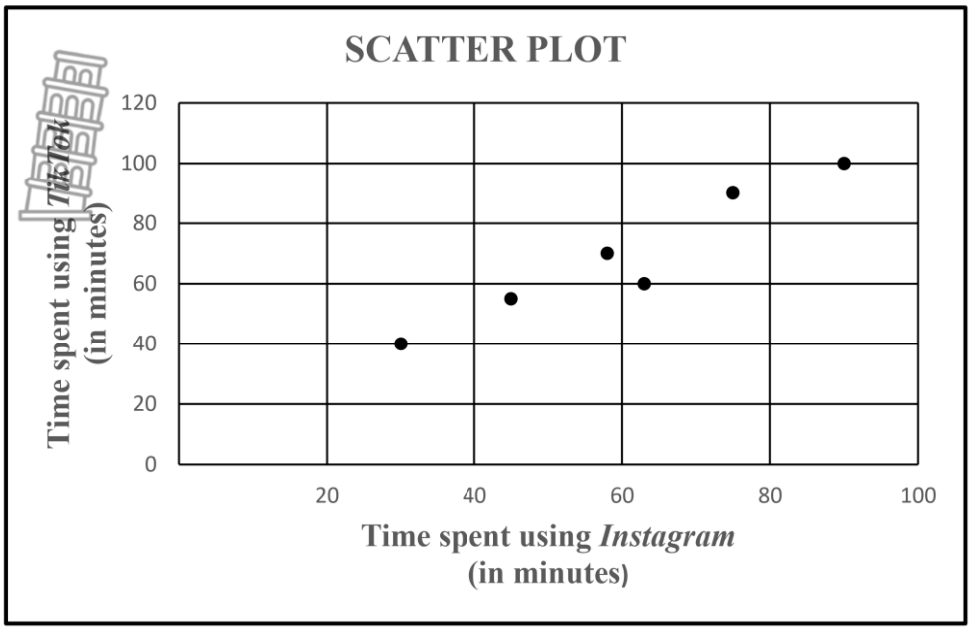
LET WEL:

- ***As 'n kandidaat 'n vraag TWEE KEER beantwoord, sien slegs die EERSTE poging na.***
- ***As 'n kandidaat 'n antwoord van 'n vraag doodtrek en nie oordoen nie, sien die doodgetrekte poging na.***
- ***Volgehoue akkuraatheid word in ALLE aspekte van die nasienriglyne toegepas. Hou op nasien by die tweede berekeningsfout.***
- ***Aannames van antwoorde/waardes om 'n probleem op te los, word NIE toegelaat nie.***

GEOMETRY/*MEETKUNDE*	
S	A mark for a correct statement (A statement mark is independent of a reason.)
	'n Punt vir 'n korrekte bewering *('n Punt vir 'n bewering is onafhanklik van die rede.)*
R	A mark for a correct reason (A reason mark may only be awarded if the statement is correct.)
	'n Punt vir 'n korrekte rede *('n Punt word slegs vir die rede toegeken as die bewering korrek is.)*
S/R	Award a mark if the statement AND reason are both correct.
	(Ken 'n punt toe as beide die bewering EN rede korrek is.)

QUESTION/*VRAAG* 1

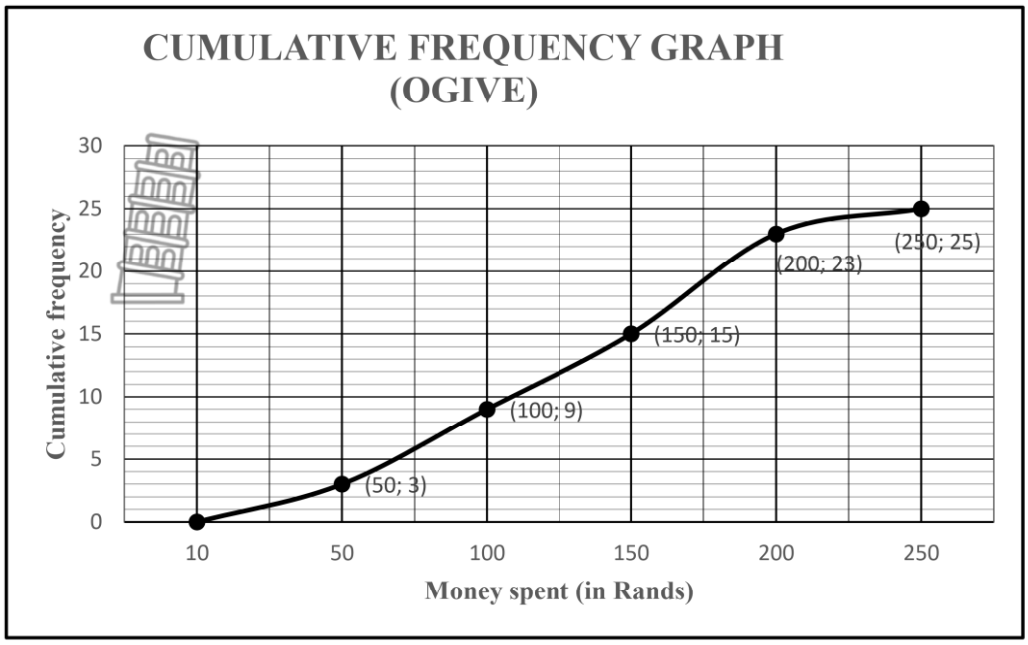
TIME USED ON *INSTAGRAM* (in minutes)	30	45	58	63	75	90
TIME USED ON *TIKTOK* (in minutes)	40	55	70	60	90	100



1.1	$r = 0{,}96$	✓ answer/*antwoord* (1)
1.2	Very strong /*Baie sterk*	✓ answer/*antwoord* **Accept: Strong** *Aanvaar: Sterk* (1)
1.3	$a = 8{,}12$ $b = 1{,}01$ $\hat{y} = 8{,}12 + 1{,}01x$ **NOTE: If equation only with the values with *a* and *b*, swopped: award 1 mark.** *Indien slegs die vergelyking gegee word met a en b se waardes omgeruil: 1 punt*	✓ $a = 8{,}12$ ✓ $b = 1{,}01$ ✓ $\hat{y} = 8{,}12 + 1{,}01x$ **Answer only: Full marks** ***Slegs antwoord: Volpunte*** (3)
1.4	$\hat{y} = 8{,}12 + 1{,}01(115)$ $= 124{,}27 \approx 124$ minutes/*minute* **OR** $\hat{y} = 124{,}80 \approx 125$ minutes / *minute* (calculator)	✓substitute/*vervang* 115 ✓ answer/*antwoord* **OR** ✓✓answer/*antwoord* (2)

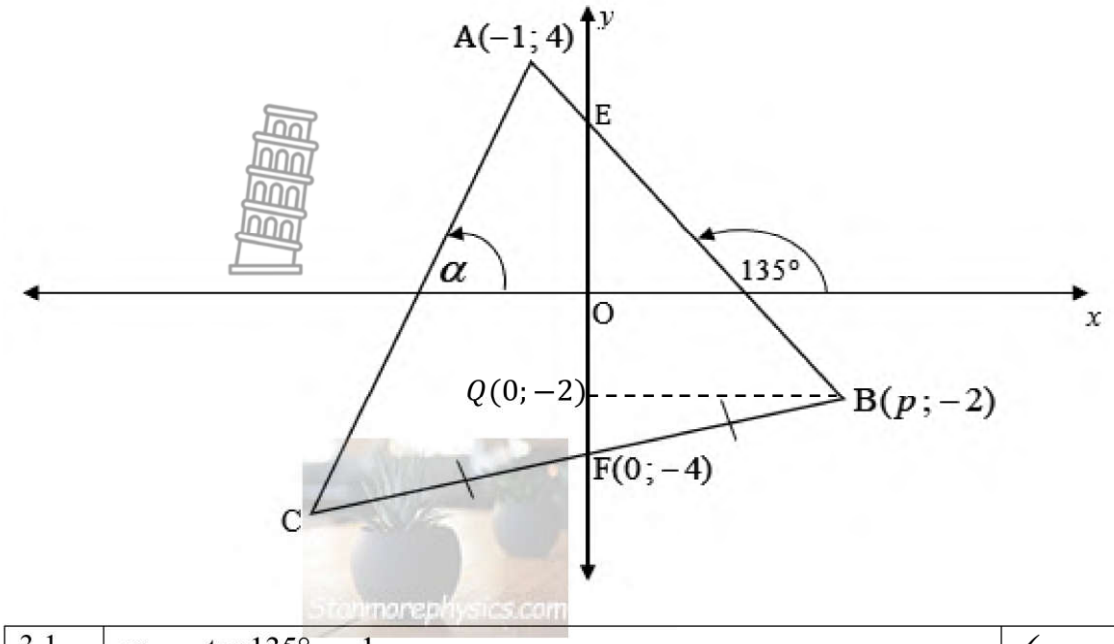
1.5	$73{,}4 = \frac{\sum x}{10}$ **OR/*OF*** $73{,}4 = \frac{\sum x}{20}$ Total/*Totaal* = 734 minutes/*minute* Total for Instagram and TikTok = 1 468 minutes *Totaal vir Instagram en TikTok = 1 468 minute* $\frac{1\ 468}{60} = 24{,}47$ ∴ Yes I agree. More than a day was spent./ ∴ *Ja, ek stem saam. Meer as ' n dag is spandeer.*	✓ 1 468 minutes/*minute* ✓ $\frac{1468}{60} = 24{,}47$ hours/*ure* ✓conclusion/*gevolgtrekking* (3)
		[10]

QUESTION/*VRAAG* 2



2.1.1	25 learners/*leerders*	✓ answer/*Antwoord* (1)
2.1.2	$a = 3$ $b = 6$	✓$a = 3$ ✓$b = 6$ (2)
2.1.3	25 – 19 = 6 learners/*leerders* $\frac{6}{25} \times 100 = 24\%$ $\therefore$ 24% of the learners spent more than R175/ *van die leerders het meer as R175 gespandeer*	✓ 6 ✓ 24% (2)
2.2	$\bar{x} - 2\sigma = 4,8$ $13,20 - 2\sigma = 4,8$ $-2\sigma = -8,4$ $\sigma = 4,2$ **OR** $\bar{x} + 2\sigma = 9,2$ $13,20 + 2\sigma = 9,2$ $2\sigma = -4$ **OR** The interval is incorrect/meaningless because 13,20 < 9,2 which is mean < upperlimit, therefore no further calculations can be done. / *Die gegewe interval is verkeerd / betekenisloos, want 13,20 < 9,2, dit is die gemiddeld < boonste limiet. Dus kan geen verdere berekenings gemaak word nie.*	✓ ✓ equation/ *vergelyking* ✓✓ $\sigma = 4,2$ **OR** ✓ ✓ equation/ *vergelyking* ✓✓ $2\sigma = -4$ **OR** ✓ ✓ ✓ ✓ explanation/*verduideliking* (4)
		[9]

QUESTION/*VRAAG* 3

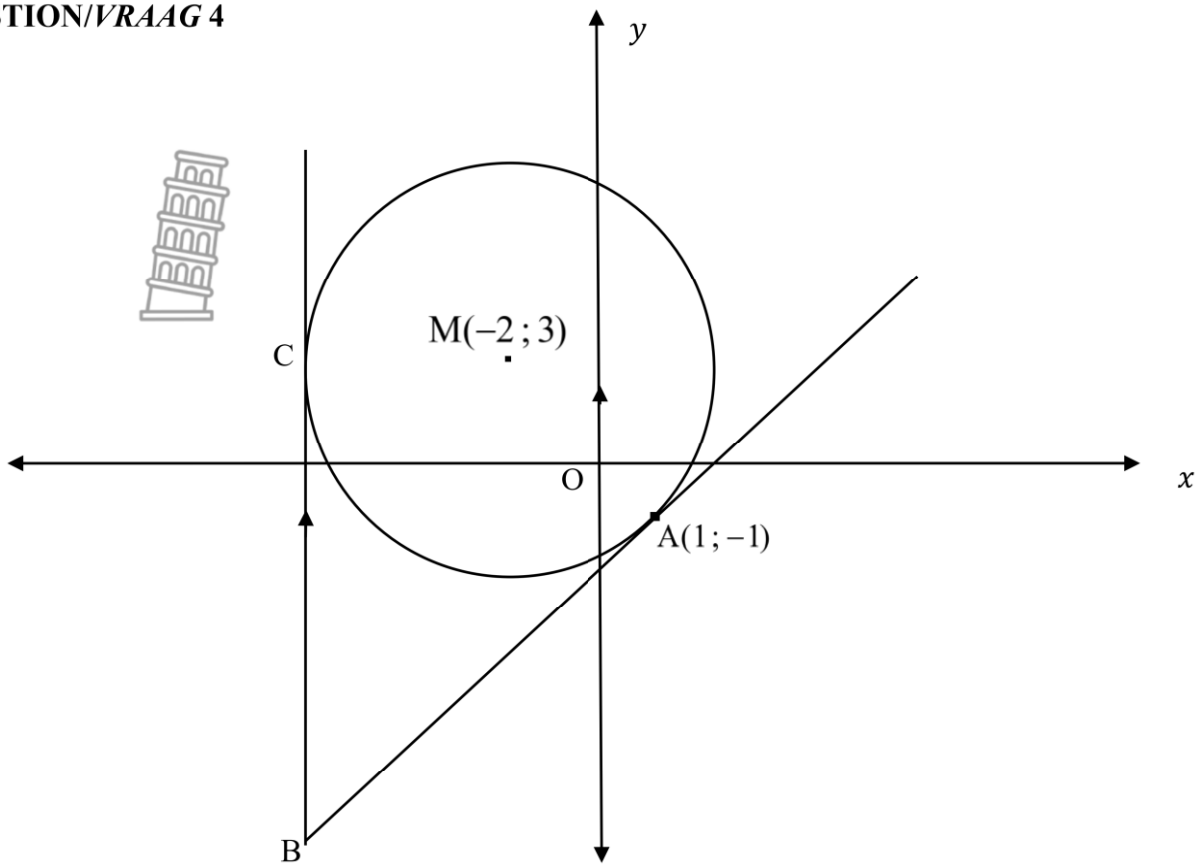


3.1	$m_{AB} = \tan 135° = -1$	✓ $m_{AB} = \tan 135°$ ✓ answer (2)
3.2	$m_{AB} = \dfrac{-2-4}{p-(-1)}$ $-1 = \dfrac{-6}{p+1}$ $p+1 = 6$ $p = 5$	✓ correct substitution of A and B into gradient formula/*korrekte substitusie van A en B in die gradiënt formule* ✓ equate to/*gelykstel aan* -1 (2)
3.3	$\dfrac{5+x_c}{2} = 0$ and/*en* $\dfrac{-2+y_c}{2} = -4$ $x_c = -5$ and/*en* $y_c = -8+2$ $C(-5;-6)$ $y_c = -6$ **NOTE: Does not have to be in coordinate form** *Let op: Dit is nie nodig om in koördinaatvorm te skryf nie.*	✓ $x_C = -5$ ✓ $y_C = -6$ (2)

3.4	$m_{AC} = \frac{4-(-6)}{-1-(-5)} = \frac{10}{4} = \frac{5}{2}$ Substitute/*Vervang* A(–1 ; 4) $y-4=\frac{5}{2}(x+(-1))$ **OR/*OF*** $4=\frac{5}{2}(-1)+c$ $y=\frac{5}{2}x+\frac{5}{2}+4$ $4=\frac{-5}{2}+c$ $y=\frac{5}{2}x+\frac{13}{2}$ $c=6\frac{1}{2}$ $y=\frac{5}{2}x+6,5$ $y=\frac{5}{2}x+6\frac{1}{2}$	✓ correct substitution of A and C into gradient formula/*korrekte substitusie van A en C in die gradiënt formule* ✓ $m_{AC}=\frac{5}{2}$ ✓subs of *m* and point A or C/*vervang m en punt A of C* ✓equation/*vergelyking* (4)
3.5	$\tan\alpha=\frac{5}{2}$ $\alpha = 68,20°$ $C\hat{A}B = 135° - 68,20°$ (Ext $\angle$ of Δ) $= 66,8°$	✓ $\tan\alpha=\frac{5}{2}$ ✓ $\alpha = 68,20°$ ✓answer/*antwoord* (3)
3.6	Subst./*Vervang* A (–1 ; 4) OF/*OF* Subst/*Vervang* B(5; –2) E : $4 = -1(-1) + c$ **OR/*OF*** $y + 2 = -1(x - 5)$ $3 = c$ $y + 2 = -x + 5$ $y = -x + 3$ E(0 ; 3) F(0 ; –4) Area/*Opp* $\Delta BEF = \frac{1}{2} \times EF \times \perp h$ $= \frac{1}{2} \times 7 \times 5$ $= 17,5$ square units/*vierkante eenhede* **OR/OF** E : $4 = -1(-1) + c$ $3 = c$ E(0 ; 3) $F\hat{E}B = 45°$ $BE^2 = (5-0)^2 + (-2-3)^2$ $BE = \sqrt{50}$ Area/*Opp* $\Delta BEF = \frac{1}{2} \times EF \times BE \times \sin F\hat{E}B$ $= \frac{1}{2} \times 7 \times \sqrt{50} \times \sin 45°$ $= 17,5$ square units / *vierkante eenhede*	✓ value of c/*waarde van c* ✓ $\perp$height/*hoogte* = 5 ✓answer/*antwoord* (3) **OR/OF** ✓ value of c/*waarde van c* ✓ $BE = \sqrt{50}$ ✓answer/*antwoord* (3)

	OR/OF E : $4 = -1(-1) + c$ $3 = c$ E(0 ; 3) $Area / Opp\ \Delta EQB = \frac{1}{2} \times 2 \times 5 = 5$ $Area / Opp\ \Delta EQB = \frac{1}{2} \times 5 \times 5 = 12,5$ $Area / Opp\ \Delta EFB = 5 + 12,5$ $= 17,5$ *square units / vierkante eenhede*	**OR/OF** ✓ value of c/*waarde van c* ✓ ⊥ height/*hoogte* = 5 ✓answer/*antwoord* (3)
3.7	$AK = 5\sqrt{5}$ $\sqrt{(t+1)^2 + (t-4)^2} = (5\sqrt{5})$ $t^2 + 2t + 1 + t^2 - 8t + 16 = 125$ $t^2 - 3t - 54 = 0$ $(t-9)(t+6) = 0$ $t = 9$ (*n.a*) or/*of* $t = -6$ K(–6 ; –6) **NOTE: Must be in coordinate form**. *Let op: Moet in koördinaatvorm wees.*	✓ substitute A and K into distance formula/ *vervang A en K in die afstandformule* ✓ equating/*gelykstelling* ✓ standard form/ *standaardvorm* ✓ factors/*faktore* ✓ K(–6 ; – 6) (5)
		[21]

QUESTION/*VRAAG* 4

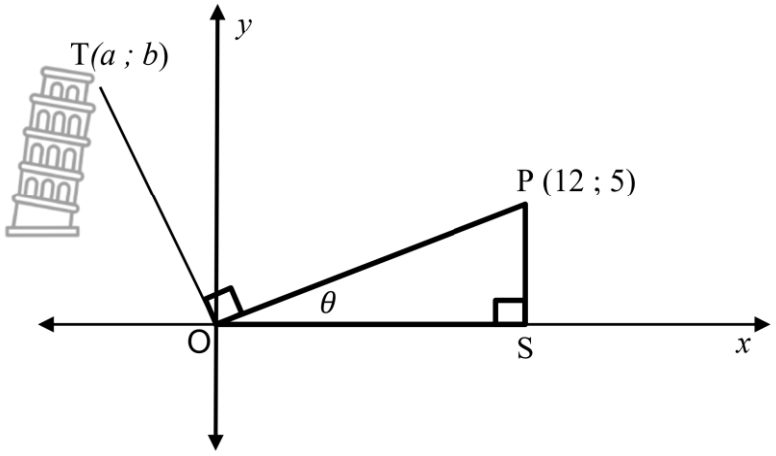


4.1	$(x+2)^2+(y-3)^2=r^2$ $(1+2)^2+(-1-3)^2=r^2$ $9+16=r^2$ $\therefore (x+2)^2+(y-3)^2=25$ **OR/*OF*** $AM=\sqrt{(-2-1)^2+(3+1)^2}$ $AM=\sqrt{9+16}$ $r=5$ $\therefore r^2=25$ $\therefore (x+2)^2+(y-3)^2=25$	✓subs of M and A into the distance formula/ *vervang M en A in die afstandformule* ✓ $r^2=25$ ✓equation/*vergelyking* **OR/*OF*** ✓subs of M and A into the distance formula/ *vervang M en A in die afstandformule* ✓ $r^2=25$ ✓equation/*vergelyking* (3)
4.2	C(−2 − 5 ; 3) (by symmetry/*deur simmetrie)* C(−7 ; 3)	✓ $x_C=-7$ ✓ $y_C=3$ (2)

4.3	$m_{AM} = \frac{3-(-1)}{-2-1} = -\frac{4}{3}$ $m_{AB} = \frac{3}{4}$ (radius $\perp$ tangent/*raaklyn)* $y-(-1) = \frac{3}{4}(x-1)$ (subst./*vervang* A(1 ; –1)) $y = \frac{3}{4}x - \frac{3}{4} - 1$ $y = \frac{3}{4}x - \frac{7}{4}$	✓subs A and M into gradient formula/ *vervang A en M in die gradiënt formule* ✓ $m_{radius} = -\frac{4}{3}$ ✓ $m_{tangent} = \frac{3}{4}$ ✓substitute *m* and A/*vervang m en A* ✓equation/*vergelyking* (5)
4.4	B$(-7 ; y_B)$ subs./*vervang* B(–7; y_B) into eqn of AB/*in die vergelyking van AB* $y_B = \frac{3}{4}(-7) - \frac{7}{4}$ $y_B = -7$ B(–7 ; – 7) BC = 10 units/*eenhede*	✓ subs./*vevang* $x = -7$ ✓ $y_B = -7$ ✓BC = 10 (3)
4.5	$(x-1)^2 + (y+1)^2 = 1$	✓LHS/*LK* ✓RHS/*RK* (2)
4.6	$r_2 - r_1 < MN < r_2 + r_1$ $1 < p+2 < 9$ or/*of* $1 < -2-p < 9$ $-1 < p < 7$ or/*of* $3 < -p < 11$ $-1 < p < 7$ or/*of* $-11 < p < -3$ **OR/OF** Two circles will touch when:/ *Twee sirkels sal sny indien:* Distance between centre/*Afstand tussen middelpunte* = $r_1 + r_2$ or /*of* distance between centres/ *Afstand tussen middelpunte* = $r_2 - r_1$ $\sqrt{(p+2)^2 + (3-3)^2} = 4+5$ *or / of* $\sqrt{(p+2)^2 + (3-3)^2} = 5-4$ $(p+2)^2 = 9^2$ *or / of* $(p+2)^2 = 1$ $p+2 = \pm 9$ *or / of* $p+2 = \pm 1$ $p = \pm 9 - 2$ *or / of* $p = -2 \pm 1$ $p = -11$ *or / of* $p = 7$ *or / of* $p = -3$ *or / of* $p = -1$ Two circles intersect in two different points if / *twee sirkels sny in twee verskillende punte as* $-11 < p < -3$ *or* $-1 < p < 7$	✓value of 1 and 9 (Sum and difference of radii)/*Waarde van 1 en 9 (som en verskil van radiusse)* ✓✓ $-1 < p < 7$ ✓✓ $-11 < p < -3$ (5) **OR/OF** ✓value of 1 and 9 (Sum and difference of radii)/*Waarde van 1 en 9 (som en verskil van radiusse)* ✓✓ $-1 < p < 7$ ✓✓ $-11 < p < -3$ (5)
		[20]

QUESTION/*VRAAG* 5

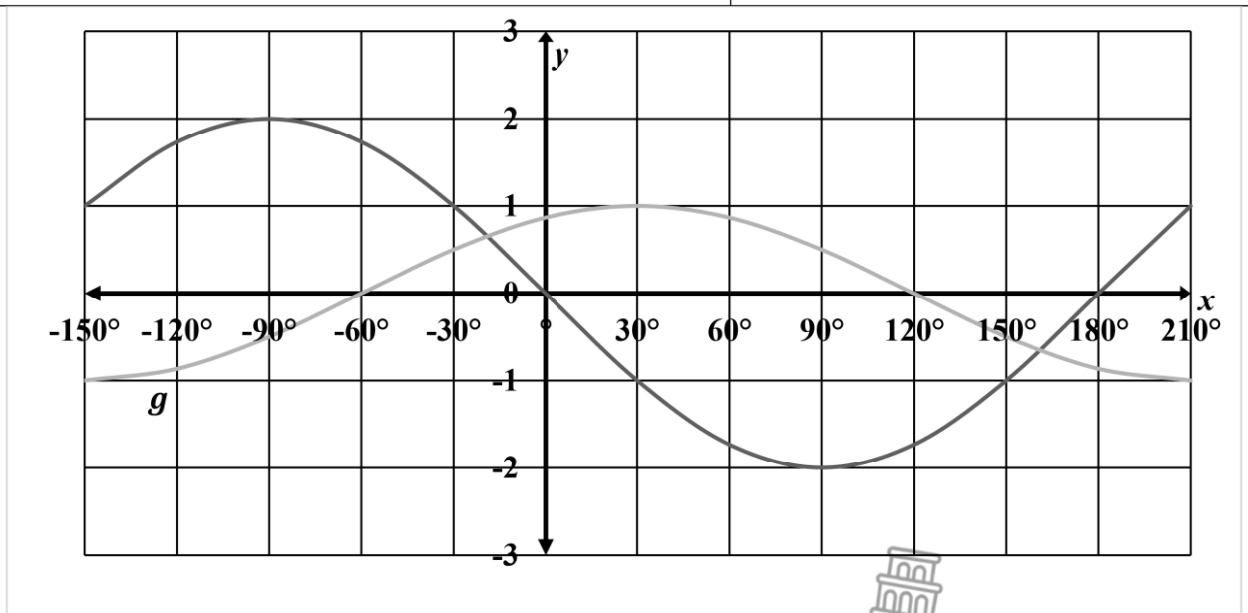
5.1



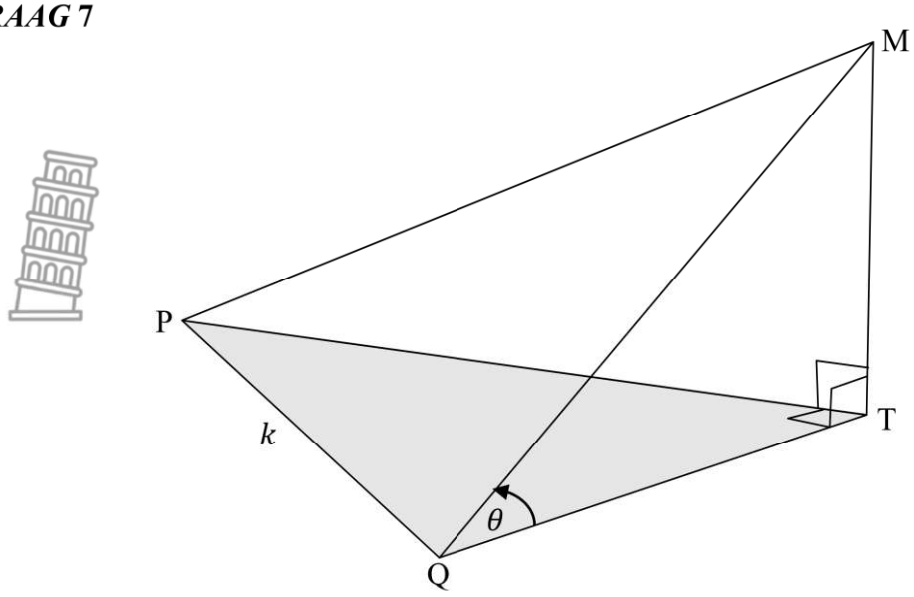
5.1.1	$\tan\theta = \frac{5}{12}$	✓ answer/*antwoord* (1)
5.1.2	$r^2 = 5^2 + 12^2$ $r = 13$ $\sin\theta = \frac{5}{13}$	✓ value of/*waarde van r* ✓answer/*antwoord* **Answer only: Full marks** ***Slegs antwoord: Volpunte*** (2)
5.1.3	$\cos(90° + \theta) = \frac{a}{19,5}$ $-\sin\theta = \frac{a}{19,5}$ $-\frac{5}{13} = \frac{a}{19,5}$ $a = \frac{-5 \times 19,5}{13}$ $a = -7,5$	✓ ratio/*verhouding* ✓ $-\sin\theta$ ✓ substitute/*vervang* $\sin\theta$ ✓ value of/*waarde van a* (4)
5.2	$\frac{\sin(360° - 2x).\sin(-x)}{\sin(90° + x)} + 2\cos^2(180° + x)$ $= \frac{(-\sin 2x).(-\sin x)}{\cos x} + 2\cos^2 x$ $= \frac{(-2\sin x.\cos x).(-\sin x)}{\cos x} + 2\cos^2 x$ $= 2\sin^2 x + 2\cos^2 x$ $= 2(\sin^2 x + \cos^2 x)$ $= 2$	✓ $-\sin 2x$ ✓ $-\sin x$ ✓ $\cos x$ ✓ $2\cos^2 x$ ✓ $\sin 2x = 2\sin x.\cos x$ ✓answer/*antwoord* (6)

5.3	$\cos 42° = 2\cos^2 21° - 1$ $\sqrt{k} = 2\sin^2 69° - 1$ $\frac{\sqrt{k}+1}{2} = \sin^2 69°$	✓double angle expansion/ *dubbelhoek uitbreiding* ✓co-function/*ko-funksie* ✓answer/*antwoord* (3)
5.4.1	LHS/*LK* $= \frac{\sin 5x.\cos 3x - \cos 5x.\sin 3x}{\tan 2x} - 1$ $= \frac{\sin(5x-3x)}{\frac{\sin 2x}{\cos 2x}} - 1$ $= \cos 2x - 1$ $= (1 - 2\sin^2 x) - 1$ $= -2\sin^2 x$ $= RHS$	✓ $\sin(5x-3x)$ ✓ $\tan 2x = \frac{\sin 2x}{\cos 2x}$ ✓ $\cos 2x - 1$ ✓double angle identity/*dubbelhoek identiteit* (4)
5.4.2	Undefined if/*Ongedefinieërd as* $\tan 2x = 0$ $x = 0°$ or/*of* $\tan 2x$ is undefined if/*ongedefinieërd as* $2x = 90°$ $x = 45°$	✓ $x = 0°$ ✓ $x = 45°$ (2)
5.5.1	$f(x) = 2\cos x - \sin^2 x$ $= 2\cos x - (1 - \cos^2 x)$ $= 2\cos x - 1 + \cos^2 x$ $= \cos^2 x + 2\cos x + 1 - 1 - 1$ $= (\cos x + 1)^2 - 2$	✓identity/*identiteit* ✓completing the square/*voltooi die vierkant* (2)
5.5.2	Maximum of/*Maksimum van* $\cos x = 1$ Max. of/*Maks. van* $(\cos x + 1)^2$ is $(1+1)^2 = 4$ Max. of/*Maks. van* $(\cos x + 1)^2 - 2$ is 2	✓Max. of/*Maks. van* $\cos x = 1$ ✓answer/*antwoord* **Answer only: Full marks** ***Slegs antwoord: Volpunte*** (2)
		[26]

QUESTION/*VRAAG* 6

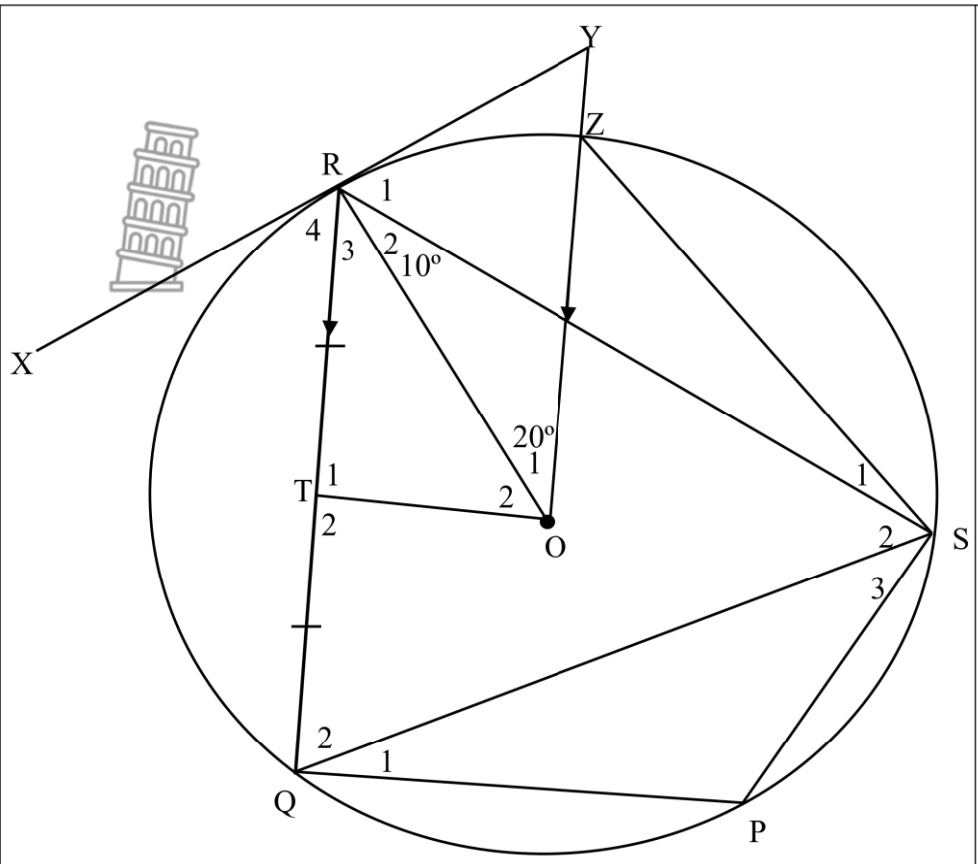
6.1	$\cos(x-30°)+2\sin x=0$ $\cos x\cos 30°+\sin x\sin 30°+2\sin x=0$ $\frac{\sqrt{3}}{2}\cos x+\frac{1}{2}\sin x+2\sin x=0$ $\sqrt{3}\cos x+\sin x+4\sin x=0$ $5\sin x=-\sqrt{3}\cos x$ $\tan x=-\frac{\sqrt{3}}{5}$	✓expansion of compound angle/ *uitbreiding van saamgestelde hoek* ✓special angles/*spesiale hoeke* ✓simplification/*vereenvoudiging* ✓ $5\sin x=-\sqrt{3}\cos x$ (4)
6.2	$\tan x=\frac{-\sqrt{3}}{5}$ ref. angle/*verwys. hoek* = 19,106 ..° $x = 160{,}89° + k.180;\ k \in Z$ $x=-19{,}11°$ or/*of* $x=160{,}89°$ **OR/OF** $\tan x=\frac{-\sqrt{3}}{5}$ $x=-19{,}11°+k.180°;\ k\in Z$ $x=-19{,}11°$ *or* $x=160{,}89°$	✓ref angle/*verwys. hoek* ✓ $x=-19{,}11°$ ✓ $x=160{,}89°$ **OR/OF** ✓ $x=-19{,}11°+k.180°;\ k\in Z$ ✓ $x=-19{,}11°$ ✓ $x=160{,}89°$ (3)
6.3.1	Amplitude = 2	✓answer/*antwoord* (1)
6.3.2		
	✓both *x*-intercepts/*albei x-afsnitte* ✓turning points/*draaipunte* $(-150°;-1)$, $(30°;1)$, $(210°;-1)$ ✓shape/*vorm* (3)	
6.3.3	(a) $x\in(-19{,}11°;160{,}89°)$ or $-19{,}11°<x<160{,}89°$	✓ Correct intervals/*korrekte intervalle* ✓ Correct notations/*korrekte notasies* (2)
	(b) $x=180°$	✓ answer (1)
		[14]

QUESTION/*VRAAG* 7



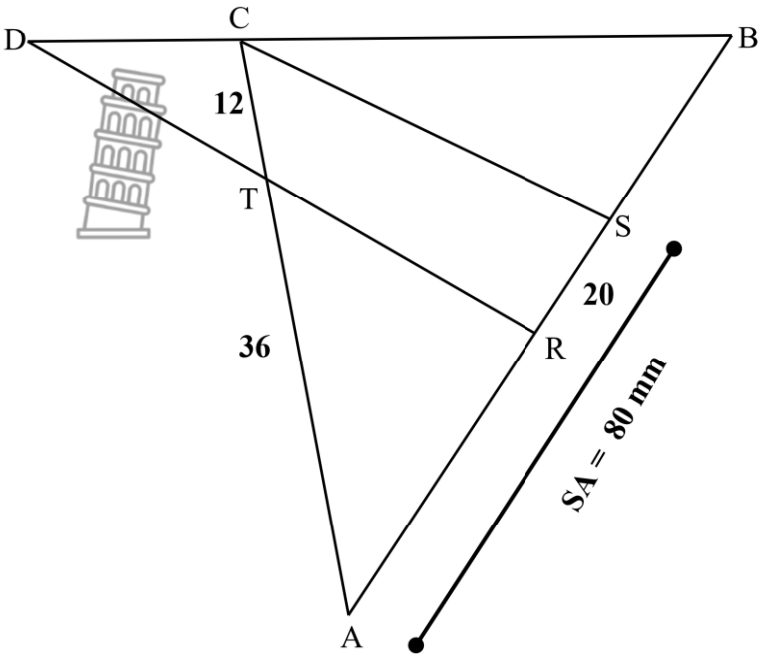
7.1	$Area / \text{Opp} = \frac{1}{2} \times k \times 2k \times \sin \text{M}\hat{\text{P}}\text{Q}$ $2k^2.\sin\theta\cos\theta = \frac{1}{2} \times k \times 2k \times \sin \text{M}\hat{\text{P}}\text{Q}$ $k^2.\sin 2\theta = k^2 \times \sin \text{M}\hat{\text{P}}\text{Q}$ $\sin 2\theta = \sin \text{M}\hat{\text{P}}\text{Q}$ $\text{M}\hat{\text{P}}\text{Q} = 2\theta$	✓subs in area rule/*vervang in opp. reël* ✓area of/*van* $\Delta\text{MPQ} = \text{k}^2 \times \sin \text{M}\hat{\text{P}}\text{Q}$ ✓ $2k^2.\sin\theta.\cos\theta = k^2 \sin 2\theta$ (3)
7.2	$\text{MQ}^2 = k^2 + (2k)^2 - 2(k)(2k)\cos 2\theta$ $\text{MQ}^2 = k^2 + 4k^2 - 4k^2 \cos 2\theta$ $= 5k^2 - 4k^2 \cos 2\theta$ $= 5k^2 - 4k^2(1 - 2\sin^2\theta)$ $= 5k^2 - 4k^2 + 8k^2 \sin^2\theta$ $= k^2 + 8k^2 \sin^2\theta$ $= k^2(1 + 8\sin^2\theta)$ $\text{MQ} = k\sqrt{1 + 8\sin^2\theta}$	✓correct subst into cosine rule/*korrekte substitusie in die cos reël* ✓ $5k^2 - 4k^2 \cos 2\theta$ ✓ $\cos 2\theta = 1 - 2\sin^2\theta$ ✓ $k^2(1 + 8\sin^2\theta)$ (4)
7.3	$\text{MQ} = 139,5\sqrt{1 + 8\sin^2 42°}$ $\text{MQ} = 298,6045..$ $\frac{\text{MT}}{\text{MQ}} = \sin\theta$ $\text{MT} = 298,6045.. \times \sin 42°$ $\text{MT} = 199,805..$ $\text{MT} \approx 200\ m$	✓value of/*waarde van* MQ ✓ratio/*verhouding* ✓MT = 200 m (3) **1 mark penalty for incorrect rounding/ *Penaliseer met 1 punt vir verkeerde afronding***
		[10]

QUESTION/*VRAAG* 8

8.1			
8.1.1	$\hat{S}_1 = 10°$	∠ centre = 2 x ∠ at circumference/*midpt* ∠ = *2* x *omtrek* ∠	✓S ✓R (2)
8.1.2	$\hat{R}_3 = 20°$	Alt ∠ 's/*Verwis.* $\angle^e$, RQ//YO	✓S/R (1)
8.1.3	$\hat{P} = 150°$	opposite $\angle^s$ of cyclic quad/*teenoorst.* $\angle^e$ *van koordevierhoek*	✓S ✓R (2)
8.1.4	$\hat{R}_3 + \hat{R}_4 = 90°$ $\hat{R}_4 = 90° - 20° = 70°$ $\hat{S}_2 = \hat{R}_4 = 70°$ **OR/OF** $\hat{R}_1 + \hat{R}_2 = 90°$ $\hat{R}_1 = 80°$ $\hat{Q}_2 = 80°$ $\hat{S}_2 = 70°$	radius ⊥ tangent/*raaklyn* tan chord theorem/*raaklyn koord stelling* radius ⊥ tangent/*raaklyn* tan chord theorem/*raaklyn koord stelling* sum of $\angle^s$ in a triangle/*binne* $\angle^e$ *van 'n driehoek*	✓R ✓S ✓S ✓R (4) **OR/OF** ✓R ✓S ✓S /R ✓S (4)

8.2	$\hat{T}_1 = 90°$	line from centre to midpoint of chord/*lyn vanaf middelpunt tot middelpunt van koord*	✓S/R	
	$\hat{O}_2 = 70°$	sum of $\angle^s$ in a triangle/*binne* $\angle^e$ *van 'n driehoek*	✓S	
	$\hat{R}_4 = \hat{O}_2 = 70°$			
	∴ XRY is a tangent/ *'n raaklyn*	converse tan chord theorem/*omgekeerde raaklyn koord stelling*	✓R	(3)
		OR/*OF*	✓S	
	$\hat{R}_1 + \hat{R}_2 = 90°$	radius ⊥ tangent/*raaklyn*	✓S/R	
	$\hat{T}_1 = 90°$	line from centre to midpoint of chord/*lyn*		
	$O\hat{R}Y = \hat{T}_1$	*vanaf middelpunt tot middelpunt koord*	✓R	
	∴ XRY is a tangent/ *'n raaklyne*	converse tan chord theorem/*omgekeerde raaklyn koord stelling*		(3)
				[12]

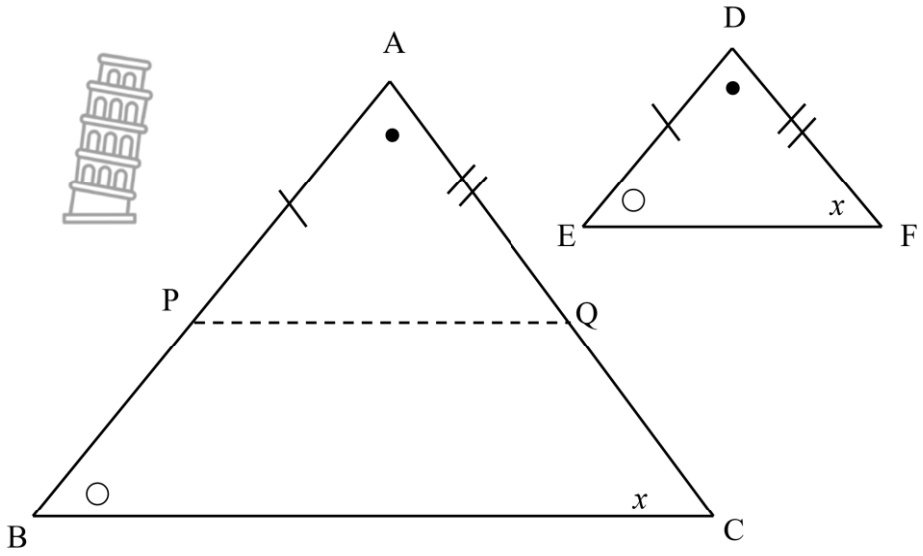
QUESTION/*VRAAG* 9



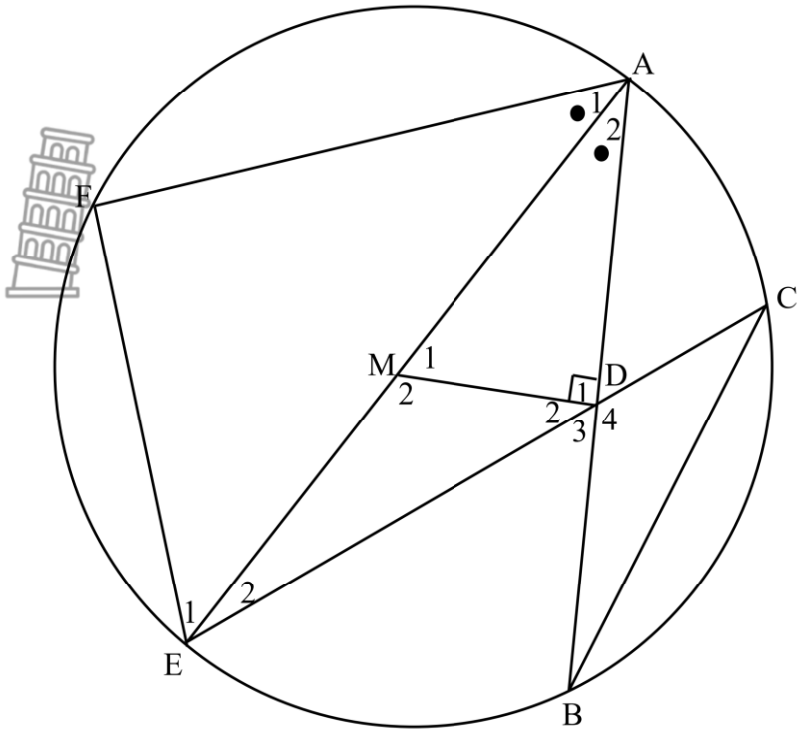
9.1	$\frac{CT}{TA}=\frac{12}{36}=\frac{1}{3}$		✓S	
	$\frac{SR}{RA}=\frac{20}{60}=\frac{1}{3}$		✓S	
	$\therefore \frac{CT}{TA}=\frac{SR}{RA}$			
	$\therefore CS \parallel TR$	line divides the sides of Δ in proportion/*lyn verdeel die sye van die* Δ *in verhouding*	✓R	(3)
	OR/*OF*			
	$\frac{SR}{SA}=\frac{20}{80}=\frac{1}{4}$		✓S	
	$\frac{CT}{CA}=\frac{12}{48}=\frac{1}{4}$		✓S	
	$\therefore \frac{CT}{CA}=\frac{SR}{SA}$			
	$\therefore CS \parallel TR$	line divides the sides of Δ in proportion/ *lyn verdeel die sye van die* Δ in verhouding	✓R	(3)

9.2	$\frac{AR}{RB} = \frac{2}{3}$ $\frac{60}{RB} = \frac{2}{3}$ $RB = 90$ mm $\therefore SB = 70$ mm	✓S ✓value of/*waarde van* RB
	$\frac{BS}{SR} = \frac{BC}{CD}$ proportion theorem/*eweredigheidstelling* CS||TR	✓S ✓R
	$\frac{70}{20} = \frac{2x}{\frac{1}{2}x + 1}$ $40x = 35x + 70$ $x = 14$ mm	✓substitution/ *substitusie* ✓answer/*antwoord* (6)
	OR/*OF*	
	$2k = 60$ $\therefore k = 30$ $\therefore 3k = 90$	✓value of/*waarde van k* ✓value of/*waarde van* $3k$
	$\frac{SR}{RB} = \frac{DC}{DB}$ prop. theorem/*eweredigheidstelling* CS||TR	✓S ✓R
	$\frac{20}{90} = \frac{\frac{1}{2}x+1}{\frac{5}{2}x+1}$ $5x + 2 = \frac{9}{2}x + 9$ $\frac{1}{2}x = 7$ $\therefore x = 14$ mm	✓substitution/ *substitusie* ✓answer/*antwoord* (6)
		[9]

QUESTION/*VRAAG* 10

10.1	 **NB: No construction/*Geen konstruksie nie* 0/6**	
	On AB, mark of AP = DE and on AC, mark off AQ = DF./*Op AB, merk AP = DE of en op AC, merk AQ = DF af.* Draw/*Trek* PQ. Proof/*Bewys*: In ΔAPG and/*en* ΔDEF $\hat{A} = \hat{D}$ given/*gegee* AQ = DF construction/*konstruksie* AP = DE construction/*konstruksie* $\therefore \Delta APQ \equiv \Delta DEF$ S∠S $A\hat{P}Q = \hat{E}$ $A\hat{P}Q = \hat{B}$ [$\hat{E} = \hat{B}$] $\therefore$ PQ ∥BC corresponding angles are equal/*ooreenk. hoeke is gelyk* $\frac{AB}{AP} = \frac{AC}{AQ}$ line ∥ to one side of Δ/*lyn* ∥ *aan een sy van* Δ AP = DE and/*en* AQ = DF $\therefore \frac{AB}{DE} = \frac{AC}{DF}$	✓ construction/ *konstruksie* ✓S ✓R ✓S ✓R ✓S/R (6)

10.2



10.2.1	$\hat{F} = 90°$	$\angle$ in semi-circle/*halwe sirkel*	✓S/R
	In ΔAEF and/*en* ΔAMD		
	$\hat{A}_1 = \hat{A}_2$	given/*gegee*	✓S
	$\hat{F} = \hat{D}_1 = 90°$	proved/*bewys*	✓S
	$\therefore \Delta AEF \,\|\|\| \Delta AMD$	$\angle\angle\angle$	✓R (4)
	OR/OF		**OR/OF**
	$\hat{F} = 90°$	$\angle$ in semi-circle/*halwe sirkel*	✓S/R
	In ΔAEF and/*en* ΔAMD		
	$\hat{A}_1 = \hat{A}_2$	given/*gegee*	✓S
	$\hat{F} = \hat{D}_1 = 90°$	proved/*bewys*	✓S
	$\hat{E}_1 = \hat{M}_1$	sum of $\angle$'s in Δ/*binne* $\angle$*e van* Δ	✓R
	$\therefore \Delta AEF \,\|\|\| \Delta AMD$		(4)

10.2.2	$\frac{AF}{AD} = \frac{AE}{AM}$	$\Delta AEF \,|||\, \Delta AMD$	✓S/R
	but/*maar* AE = 2AM		✓S
	$\frac{AF}{AD} = \frac{2AM}{AM} = 2$		✓answer/*antwoord*
			(3)
10.2.3	In ΔCDB and/*en* ΔADE		✓identifying Δs/ *identifiseer* Δe
	$\hat{C} = \hat{A}_2$	$\angle s$ in same segment/$\angle$e *in dieselfde segment*	✓S/R
	$\hat{D}_4 = E\hat{D}A$	vertically opposite $\angle$'s/*regoorstaande* $\angle$e	✓S
	$\Delta CDB \,|||\, \Delta ADE$	$\angle\angle\angle$	✓R
	$\therefore \frac{CD}{AD} = \frac{DB}{DE}$		✓S
	but/*maar* AD = DB	line from centre $\perp$ to chord/*lyn vanaf midpt.* $\perp$ *op koord*	✓S/R
	$\frac{CD}{AD} = \frac{AD}{DE}$		
	$\therefore AD^2 = CD \times DE$		(6)
	OR/OF		**OR/OF**
	In ΔCDB and/*en* ΔADE		✓identifying Δs/ *identifiseer* Δe
	$\hat{C} = \hat{A}_2$	$\angle s$ in same segment/$\angle$e *in dieselfde segment*	✓S/R
	$\hat{D}_4 = E\hat{D}A$	vertically opposite $\angle$'s/*regoorstaande* $\angle$e	✓S
	$\hat{B} = \hat{E}_2$	$\angle s$ in same segment/$\angle$e *in dieselfde segment*	✓R
	$\Delta CDB \,|||\, \Delta ADE$		✓S
	$\therefore \frac{CD}{AD} = \frac{DB}{DE}$		
	but/*maar* AD = DB	line from centre $\perp$ to chord/*lyn vanaf midpt.* $\perp$ *op koord*	✓S/R
	$\frac{CD}{AD} = \frac{AD}{DE}$		
	$\therefore AD^2 = CD \times DE$		
			[19]

TOTAL/*TOTAAL:* 150