education

Department:
Education
North West Provincial Government
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE/
NASIONALE SENIOR SERTIFIKAAT

GRADE/*GRAAD* 12

MATHEMATICS P2/*WISKUNDE V2*

SEPTEMBER 2025

MARKING GUIDELINES/*NASIENRIGLYNE*

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MARKS/*PUNTE*: 150

These marking guidelines consist of 18 pages
Hierdie nasienriglyne bestaan uit 18 bladsye

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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 in order to solve a problem is NOT acceptable.

NOTA:

- *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, merk die doodgetrekte poging.*
- *Volgehoue akkuraatheid word in ALLE aspekte van die Nasienriglyne toegepas. Hou op nasien by die tweede berekeningsfout.*
- *Aanvaar van antwoorde/waardes om 'n probleem op te los, word NIE toegelaat nie.*

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QUESTION/*VRAAG* 1

AMOUNT/ *BEDRAG* (R)	**FREQUENCY/ *FREKWENSIE***
$0 \le x < 1000$	8
$1000 \le x < 2000$	12
$2000 \le x < 3000$	P
$3000 \le x < 4000$	30
$4000 \le x < 5000$	Q
$5000 \le x < 6000$	12

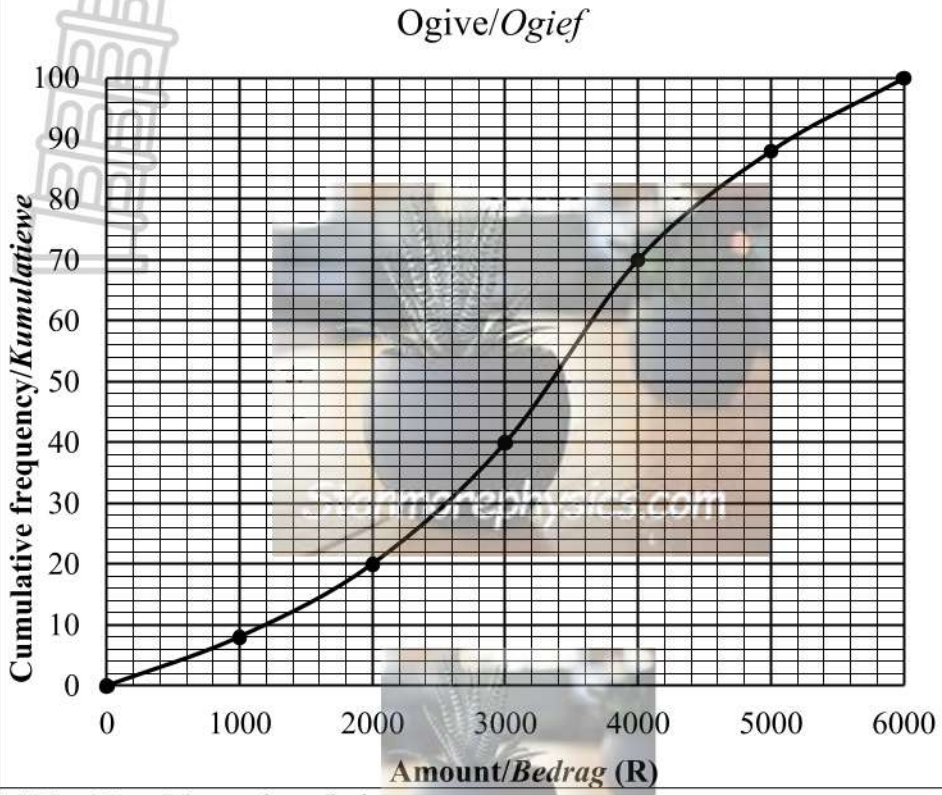
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1.1	20	✓answer/*antwoord* (1)
1.2	$8+12+P+30+Q+12=100$ $P+Q=38$ .....①	✓ $P+Q=38$
	$\bar{x}=3240=\frac{8(500)+12(1500)+P(2500)+30(3500)+Q(4500)+12(5500)}{100}$	✓eq of $\bar{x}=3240$
	$\therefore 1310=25P+45Q$ $\therefore 262=5P+9Q$	✓ $262=5P+9Q$
	$5(38-Q)+9P=262$ $190-5Q+9Q=262$ $4Q=72$ $Q=18$ $P=20$	✓subst/*vervang* ① ✓ subst/*vervang* $Q=18$ (5)
1.3		

AMOUNT/ *BEDRAG* (R)	**FREQUENCY/ *FREKWENSIE***	**CUMULATIVE FREQUENCY/ *KUMULATIEWE FREKWENSIE***
$0 \le x \le 1000$	8	8
$1000 \le x \le 2000$	12	20
$2000 \le x \le 3000$	20	40
$3000 \le x \le 4000$	30	70
$4000 \le x \le 5000$	18	88
$5000 \le x \le 6000$	12	100

✓ 8, 20, 40

✓ 70, 88, 100 (2)

1.4		✓ min/max values ✓ all coordinates *(*penalise without grouning*/penaliseer sonder beginpunt)* ✓ Shape/*Vorm* (3)
1.5	100 – 74 = 26 members/*lede* • Possibility of an interval {73 - 75} CA from graph	✓ answer/antwoord (1)
		[12]

QUESTION/*VRAAG* 2

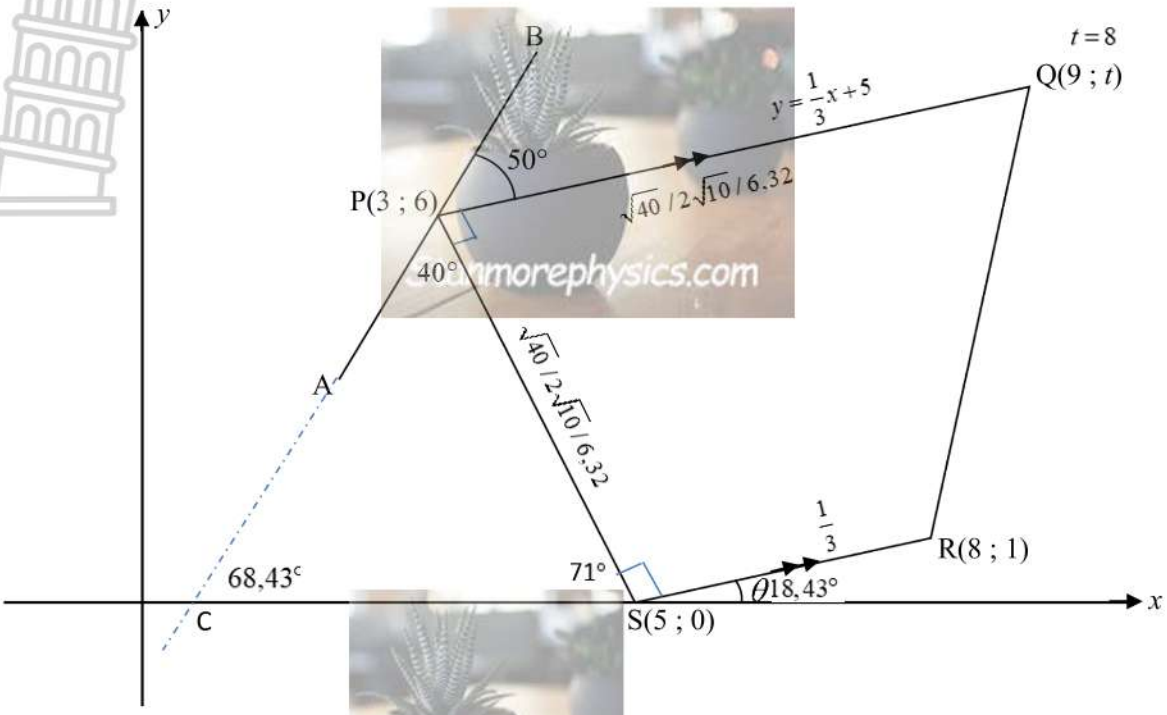
COUPLE/PAAR	1	2	3	4	5	6	7	8
JUDGE/*BEOORDELAAR* 1	18	4	6	8	5	12	10	14
JUDGE/*BEOORDELAAR* 2	15	6	3	5	5	14	8	15

2.1	$a = -0.03$ $b = 0,93$ $\hat{y} = -0.03 + 0,93x$	Answer only: full marks, but if *a* and *b* are swopped only 1/3 marks/ *Slegs antwoord: vol punte maar as a en b omgeruil is, slegs 1/3 punte.*	✓ *a* ✓ *b* ✓ equation/*vergelyking* (3)
2.2	$\hat{y} = -0.03 + 0,93(15)$ $= 13,92$ *OR / OF* $13,85$ ≈ 14	Answer only: full marks *Slegs antwoord: vol punte* CA from 2.1	✓substitute 15 into eq. / *vervang 15 in vgl.* ✓answer/*antwoord* (2)
2.3	Yes, they are consistent. r = 0.9 – positive strong correlation / *Ja, hulle is konsekwent. r = 0.9 – positief sterk korrelasie*		✓yes/*ja* ✓ $r = 0,9$ ✓positive strong/ positief *sterk* (3)

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[8]

QUESTION/*VRAAG 3*



3.1	$m_{SR} = \frac{1-0}{8-5}$ $= \frac{1}{3}$	✓subst./*vervang* ✓answer/*antwoord* (2)
3.2	Eqution/Vergelyking: PQ $m_{PQ} = m_{SR} = \frac{1}{3}$ $P(3:6)$: $6 = \left(\frac{1}{3}\right)(3) + c$ $\therefore \quad c = 5$ $\therefore y = \frac{1}{3}x + 5$ CA from 3.1 only if gradient is +	✓ $m_{PQ} = m_{SR} = \frac{1}{3}$ ✓subst. coordinates of/ *vervang koördinate van P* ✓equation of PQ/ *vergelyking van PQ* (3)
3.3	$Q\ (9:t)\ in\ y = \frac{1}{3}x + 5$ $t = \frac{1}{3}(9) + 5$ $t = 8$ CA from 3.2 only if gradient is +	✓subst. coordinates of/ *vervang koördinate van P* ✓value of/ *waarde van* y (2)
3.4	$PQ = \sqrt{(3-9)^2 + (6-8)^2}$ $PQ = \sqrt{36+4}$ $PQ = \sqrt{40} / 2\sqrt{10} / 6,32$	✓subst. coordinates in correct formula/ *vervang koördinate in korrekte formule* ✓answer/*antwoord*

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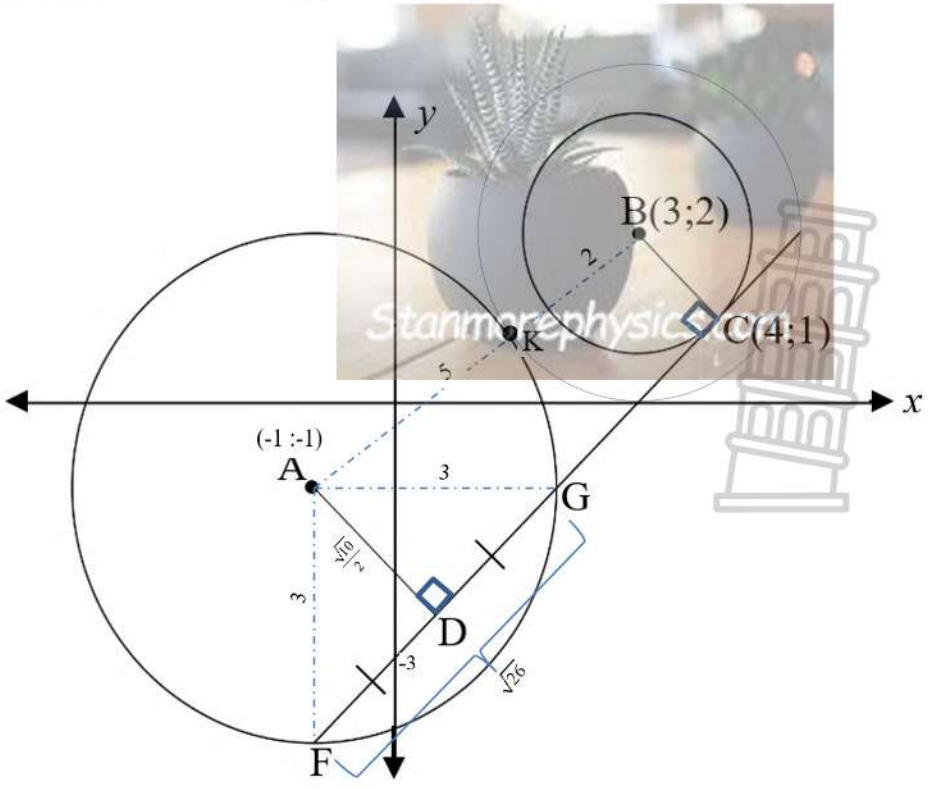
		(2)
3.5	$m_{PS}=\frac{6-0}{3-5}=\frac{6}{-2}=-3$ $m_{SR}=\frac{1}{3}$ $m_{PS}\times m_{RS}$ $=-3\times\frac{1}{3}$ $=-1$ $\therefore$ PS ⊥ SR	✓ $m_{PS}=-3$ $m_{PS}\times m_{RS}$ ✓ $=-3\times\frac{1}{3}$ $=-1$ ✓ conclusion/*gevolgtrekking* (3)
3.6	$SR=\sqrt{(8-5)^2+(1-0)^2}$ $PS=\sqrt{(5-3)^2+(0-6)^2}$ $SR=\sqrt{9+1}$ $PS=\sqrt{4+36}$ $SR=\sqrt{10}\,/\,3{,}16$ $PS=\sqrt{40}\,/\,2\sqrt{10}\,/\,6{,}32$ area of trapezium/ *oppv van trapesium* $=\frac{1}{2}(PQ+RS)\,.\,PS$ $=\frac{1}{2}(\sqrt{40}+\sqrt{10})\times\sqrt{40}$ $=30$ square units / *vierkante eenhede* Please note: Shoe-lace method is not in CAPS. Answer (ACC) only is 6/6	✓ SR ✓ PS ✓area of trapezium/ *oppv van trapezium* ✓ $\sqrt{40}$ ✓ $\sqrt{10}$ ✓answer/*antwoord* (6)
3.7	$\tan\theta=\frac{1}{3}$ CA from 3.1 only if gradient is + $\therefore\theta=18{,}43°$ Answer only: full marks	✓ $\tan\alpha=m_{SR}$ ✓answer/*antwoord* (2)

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3.8	$\hat{QPS} = 90°$ [co-int $\angle$'s / *ko – binne* $\angle^e$ $PQ \parallel SR$] $\hat{P}_1 = 40°$ [straight line / *reguitlyn*] $\hat{C} = 68{,}43°$ [ext $\angle$ of Δ / *buite* $\angle$ *v* Δ] $\tan 68{,}43° = 2{,}53$ OR/*OF* $P\hat{S}C = 71{,}57°$ $C\hat{P}S = 40°$ $\therefore P\hat{C}S = 68{,}43°$ $P(3:6)$: $6 = (2{,}53)(3) + c$ $\therefore \quad c = -1{,}59$ $\therefore\ y = 2{,}53x - 1{,}59$	✓ $\hat{QPS}=90°$ ✓ $\hat{P}_1 = 40°$ ✓ $P\hat{C}S = 68{,}43°$ ✓ $m = 2{,}53$ ✓ $P\hat{S}C = 71{,}57°$ ✓ $C\hat{P}S = 40°$ ✓ $P\hat{C}S = 68{,}43°$ ✓subst. coordinates of/ *vervang koördinate van P* ✓ equasion/ vergelyking (6)
		[26]

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QUESTION/*VRAAG 4* $\sqrt{26}$



4.1	A $(-1;-1)$	✓ answer/*antwoord* (1)
4.2	$A\hat{D}C = 90°$ (line from centre bisect cord / *mdpt ; mdpt koord*) FGC is a tangent to circle B / *'n raaklyn aan sirkel B* $\therefore B\hat{C}G = 90°$ (tan ⊥ chord / *rklyn ⊥ rad*) $m_{BC} = \frac{2-1}{3-4}$ $= -1$ $\therefore m_{AD} = -1$ CA only if BC gradient is - $\perp m_{FC} = 1$ $1 = 1(4) + c$ C (4;1): $c = -3$ $\therefore y = x - 3$	✓ $m_{BC} = -1$ ✓ $m_{FC} = 1$ ✓equation of FC/ *vergelyking van FC* (4)
4.3	$A\hat{D}F = 90°$ $FD^2 = 3^2 - \left(\frac{\sqrt{10}}{2}\right)^2$ (*pyth*) $FD^2 = 9 - \frac{10}{4}$ $FD = \sqrt{6\frac{1}{2}} = \frac{\sqrt{26}}{2} / 2,55$ $FD = DG$ $\therefore FG = 2 \times \frac{\sqrt{26}}{2}$ $\therefore FG = \sqrt{26} / 5,10$	✓radii ✓subst. in pyth formula/ *vervang in pyth formule* ✓ $FD = \frac{\sqrt{26}}{2} / 2,55$ ✓ $FG = \sqrt{26} / 5,10$ (4)
4.4	$AB = \sqrt{(-1-3)^2 + (-1-2)^2}$ $AB = \sqrt{16+9}$ $AB = 5$ Answer only – full marks	✓subst. coordinates in correct formula/ *vervang koördinate in korrekte formule* ✓answer/*antwoord* (2)
4.5	$BK = AB - AK$ $BK = 5 - 3$ $BK = 2$ $(x-3)^2 + (y-2)^2 = 4$ Answer only – full marks	✓ $BK = 2$ ✓subst. coordinates in correct formula/ *vervang koördinate in korrekte formule* ✓ $r^2 = 4$ (3)
		[14]

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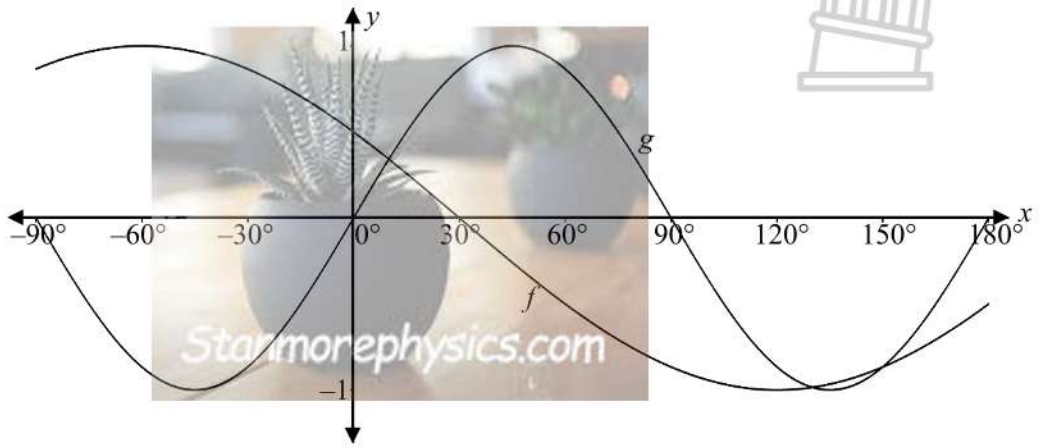
QUESTION/*VRAAG 5*

5.1.1	$\sin^2(180°+\theta)$ $=\sin^2\theta$ $=\left(\frac{-5}{\sqrt{41}}\right)^2$ $=\frac{25}{41}$ $OP^2 = OK^2 + KP^2$ $OP^2 = 4^2 + (-5)^2$ $OP = \sqrt{41}$	✓ $r = \sqrt{41}$ ✓ $\sin^2\theta$ ✓subst./*vervang* ✓answer/*antwoord* (4)
5.1.2	$\tan(-\theta)$ $=-\tan\theta$ $=-\left(\frac{-5}{4}\right)$ $=\frac{5}{4}$	✓ -tanθ ✓answer/*antwoord* (2)
5.2.1	$\cos 15°$ $=\cos(60°-45°)$ $=\cos 60°.\cos 45° + \sin 60°.\sin 45°$ $=\frac{1}{2}.\frac{1}{\sqrt{2}} + \frac{\sqrt{3}}{2}.\frac{1}{\sqrt{2}}$ $=\frac{1+\sqrt{3}}{2\sqrt{2}} / \frac{\sqrt{6}+\sqrt{2}}{4}$ Accept $\frac{\sqrt{2}}{2}$ ANSWER ONLY – NO MARKS DECIMAL ANSWERS – NO MARKS	✓ expansion ✓ $\frac{1}{2}$ ✓ $\frac{1}{\sqrt{2}}$ ✓ $\frac{\sqrt{3}}{2}$ ✓ $\frac{1}{\sqrt{2}}$ ✓ answer/*antwoord* (6)
5.2.2	$\frac{\cos(90°+x).\cos(180°-x)}{\cos^2(180°+x).\tan(180°-x)}$ $=\frac{(-\sin x)(-\cos x)}{(\cos^2 x)(-\tan x)}$ $=-\frac{\tan x}{\tan x}$ -1	✓ $-\sin x$ ✓ $-\cos x$ ✓ $\cos^2 x$ ✓ - tan$x$ ✓ -1 (5)

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5.3.1	$\dfrac{\sin 2\theta + 2\cos\theta - 2\cos^3\theta}{1+\sin\theta} = \sin 2\theta$ $LHS = \dfrac{2\sin\theta\cos\theta + 2\cos\theta - 2\cos^3\theta}{1+\sin\theta}$ $= \dfrac{2\sin\theta\cos\theta + 2\cos\theta(1 - \cos^2\theta)}{1+\sin\theta}$ $= \dfrac{2\sin\theta\cos\theta + 2\cos\theta(\sin^2\theta)}{1+\sin\theta}$ $= \dfrac{2\sin\theta\cos\theta(1+\sin\theta)}{1+\sin\theta}$ $= 2\sin\theta\cos\theta$ $= \sin 2\theta$ $= RHS$	✓ $2\sin\theta\cos\theta$ ✓ $2\cos\theta$ *(*commen factor/*gem faktor)* ✓ $\sin^2\theta$ ✓ $2\sin\theta\cos\theta$ *(*commen factor/*gem faktor* ✓ $2\sin\theta\cos\theta$ (5)
5.3.2	$1+\sin\theta = 0$ $\therefore \sin\theta = -1$ $\theta = -90°$ *or* $\theta = 270°$ Answer only – full marks	✓ $1+\sin\theta = 0$ ✓ -90°, 270° (both/beide) (2)
5.4	$\dfrac{4}{2+\cos x}$ $= \dfrac{4}{2+(-1)}$ $= \dfrac{4}{1}$ $= 4$ For max value, cos x should be a min/ *Vir maks waarde, moet cos x 'n min wees* Answer only – full marks	✓ -1 ✓ answer/*antwoord* (2)
		[26]

QUESTION/*VRAAG 6*



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6.1	$\cos(x+60°)=\sin 2x$ $\therefore \cos(x+60°)=\cos[90°-2x]$ reference/*verwysings* $\angle$: $x+60°=90°-2x$ 1: $x+60°=90°-2x+k.360°$ $k\in\mathbb{Z}$ $3x=30°+k.360°$ $\therefore\ x=10°+k.120°$ $x+60°=360°-(90°-2x)+k.360°$ $k\in\mathbb{Z}$ $\therefore x+60°=360°-90°+2x+k.360°$ 4: $-x=210°+k.360°$ $\therefore\ x=-210°+k.360°$ But/*maar* $x\in[-90°;180°]$ $\therefore x=10°;130°;150°$ OR/*OF* $\sin[90°\pm(x+60°)]=\sin 2x$ 1: $90°-x-60°=2x+k.360°$ $k\in\mathbb{Z}$ $-3x=-30°+k.360°$ $x=10°+k.120°$ *or / of* 2: $90°+x+60°=2x+k.360°$ $k\in\mathbb{Z}$ $-x=-150°+k.360°$ $x=150°-k.360°$ But/*maar* $x\in[-90°;180°]$ $\therefore x=10°;130°;150°$	✓ $\cos(x+60°)=\cos[90°-2x]$ ✓ $x+60°=90°-2x+k.360°$ ✓ $x=10°+k.120°$ ✓ $x+60°=360°-(90°-2x)+k.360°$ ✓ $x=-210°+k.360°$ ✓ $k\in\mathbb{Z}$ (provided k.360° is stated/*slegs as k.360°gegee word*) ✓ all three answers/al drie *antwoorde* ✓ $\sin[90°\pm(x+60°)]=\sin 2x$ ✓ $90°-x-60°=2x+k.360°$ ✓ $-3x=-30°+k.360°$ ✓ $90°+x+60°=2x+k.360°$ ✓ $-x=-150°+k.360°$ ✓ $k\in\mathbb{Z}$ ✓ all three answers/al drie *antwoorde* (7)
6.2	$180°$	✓ answer/*antwoord* (1)
6.3	$10°\le x\le 130°\cup 150°\le x\prec 180°$ *of* $[10°;130°]\cup[150°;180)$	✓ values/*waardes* ✓ notation/*notasie* (2)
6.4	$p(x)=\sin(x-30°)$ The graph of h is shifted/moved 30° to the right./ Die grafiek het 30° na regs geskuif.	✓ shifted/moved/*geskuif* ✓ *30°* ✓ right/*regs* (3)
		[13]

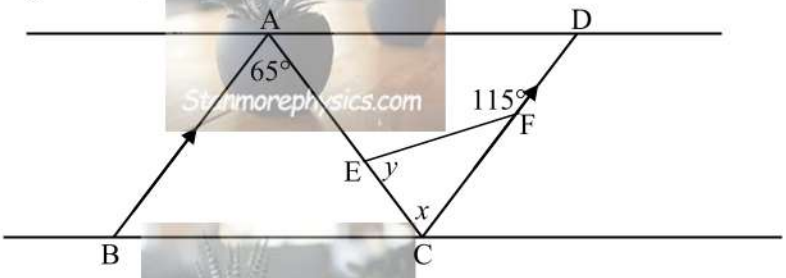
QUESTION/*VRAAG 7*

7.1	$A(b\cos A;b\sin A)$ $c^2 = AB^2 = (x_A - x_B)^2 + (y_A - y_B)^2$ $c^2 = (b\cos C - a)^2 + (b\sin C - 0)^2$ $c^2 = b^2\cos^2 C - 2ab\cos C + a^2 + b^2\sin^2 C$ $c^2 = b^2(\cos^2 c + \sin^2 c) + a^2 - 2ab\cos c$ $c^2 = b^2(1) + a^2 - 2ab\cos c$ $c^2 = a^2 + b^2 - 2ab\cos c$	✓ coordinates of/*coordinate van* A ✓ correct subst into distance/korrekte invervanging in afstands formulae ✓ simplification/vereenvoudig ✓ $\sin^2 x + \cos^2 x = 1$ (4)
7.2.1	$AC^2 = d^2 + \left(\frac{d}{2}\right)^2 - 2.d.\frac{d}{2}.\cos(90° - \alpha)$ $AC^2 = d^2 + \frac{d^2}{4} - d^2\sin\alpha$ $AC^2 = \frac{5d^2}{4} - \frac{4d^2\sin\alpha}{4}$ $AC^2 = \frac{d^2(5 - 4\sin\alpha)}{4}$ $AC = \frac{d\sqrt{5 - 4\sin\alpha}}{2}$ $\tan\theta = \frac{h}{AC}$ $\therefore h = AC.\tan\theta$ $\therefore h = \frac{d\sqrt{5 - 4\sin\alpha}}{2}.\tan\theta$	✓ correct subst into cosine rule/*korrekte vervanging in kosinus formule* ✓ $BC = \frac{d}{2}$ ✓ $\sin\alpha$ ✓ factorise/faktoriseer (4)
7.2.2	$\tan\theta = \frac{h}{AC}$ $\therefore h = AC.\tan\theta$ $\therefore h = \frac{300.\sqrt{5 - 4\sin 32°}}{2}.\tan 63°$ $\therefore h = 499,63m$	✓ trig ratio ✓ correct subst into tan ratio/*korrekte vervanging in tan verhouding* ✓ answer/*antwoord* (3)
		[11]

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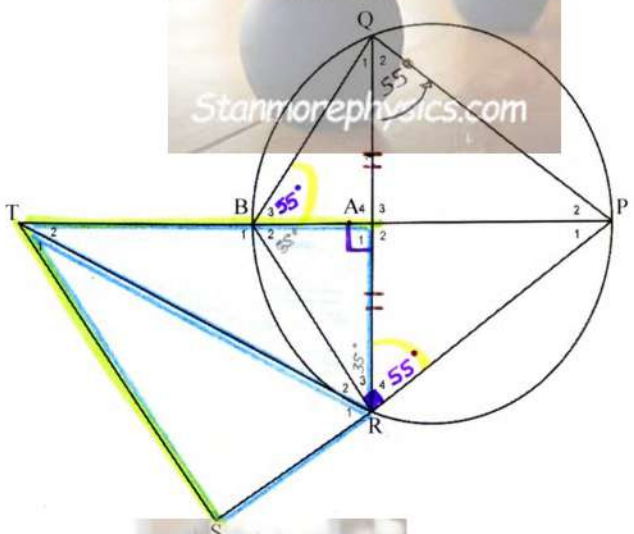
GEOMETRY/*MEETKUNDE*

Please read carefully through the following table before marking **QUESTION 8–10** /
*Lees asseblief sorgvuldig deur die volgende tabel alvorens **VRAE 8–10** nagesien word.*

	The order in which the candidate answers a geometry question must follow logically/ *Die volgorde waarin 'n kandidaat 'n meetkundevraag beantwoord moet logies volg.* **Example/*Voorbeeld*** Given/*Gegee* AB || CD and/*en* $E\hat{F}D = 115°$  The candidate first needs to calculate *x* BEFORE he/she can calculate *y/Die kandidaat moet eerste vir x bereken VOORDAT hy/sy vir y kan bereken.*
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 the 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 (Both MUST be correct to get one mark) *Ken 'n punt toe as die bewering EN rede beide korrek is* *(Beide MOET korrek wees om een punt te kry)*

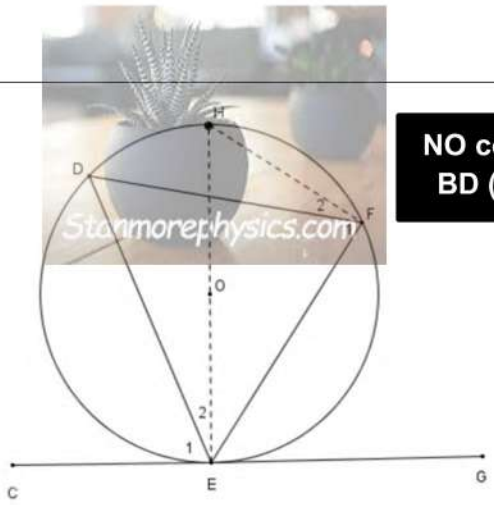
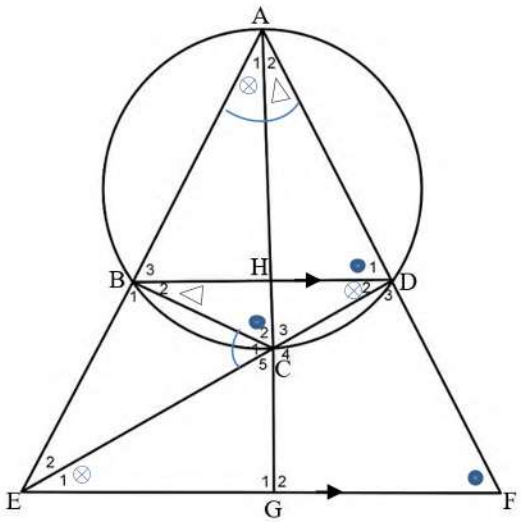
QUESTION/*VRAAG 8*

CHECK CANDIDATES DIAGRAM!!



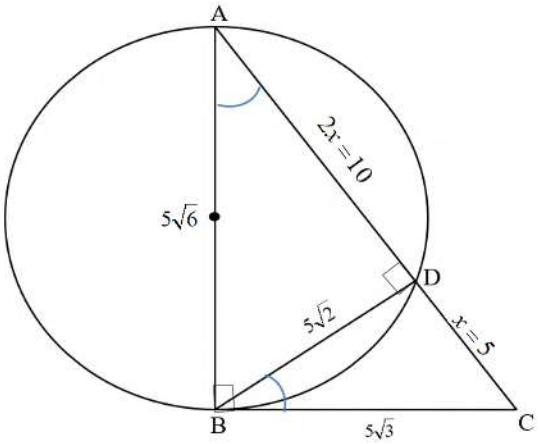
8.1.1	$\hat{R}_4 = 55°$ [∠s opp. = sides/*∠e teenoor = sye*]	✓S ✓R (2)
8.1.2	$\hat{B}_3 = 55°$ [∠s in the same segment/*∠e in dieselfde sirkel segment*]	✓S ✓R (2)
8.1.3	$B\hat{R}P = 90°$ [∠ in semi circle./*∠ in halfsirkel*]	✓S ✓R (2)
8.1.4	$\hat{R}_4 = 55°$ [proved / *bewys* in 8.1.1] $B\hat{R}P = 90°$ [proved / *bewys* in 8.1.3] $\therefore \hat{R}_3 = 35°$ $\hat{B}_2 = \hat{Q}_2 = 55°$ [∠s in the same segment/*∠e in dieselfde sirkel segment*] $\hat{A}_1 = 90°$	✓S ✓S ✓**S** (3)
8.2	[line from centre ⊥ to chord/*lyn vanuit midpt ⊥ op koord*]	✓S (1)
8.4	In ΔTAR and/*en* ΔTSR is: TR = TR [common / *gemeenskaplik*] $\hat{R}_2 + \hat{R}_3 = \hat{R}_1$ [given / *gegee*] $\hat{A}_1 = \hat{S} = 90°$ [$\hat{A}_1 = 90°$, line from centre ⊥ to cord bicects the cord / *lyn van uit midpt ⊥ op koord halveer koord*] $\therefore \Delta TAR \equiv \Delta TSR$ [RHS] $\therefore AT = TS$	✓S ✓S ✓S ✓R (4)
		[14]

QUESTION/*VRAAG 9*

9.1	Stanmorephysics.com **NO construction = BD (0/5 MARKS)** Construction/*konstruksie:* Line EH through midpoint to circumference to F/*Middellyn EH en verbind met F* $\hat{E}_1 + \hat{E}_2 = 90°$ [rad ⊥ tan/ *rklyn*] $\hat{F}_1 + \hat{F}_2 = 90°$ [∠ in semi circle./*∠ in halfsirkel*] $\hat{F}_1 + \hat{F}_2 = \hat{E}_1 + \hat{E}_2$ But/*maar* $\hat{E}_2 = \hat{F}_2$ [∠sin the same segment/*∠e in dieselfde sirkelsegment*] $\therefore \hat{E}_1 = \hat{F}_1$ $C\hat{E}D = F_1$	✓ constr/*konstr* ✓ S ✓ R ✓ S/R ✓ S/R (5)
		
9.2.1	$\hat{E}_1 = \hat{D}_2$ [alt ∠s / *verw.∠e*; BD||EF] $\hat{D}_2 = \hat{A}_1$ [∠s in the same segment/*∠e in dieselfde sirkel segment*] $\therefore \hat{E}_1 = \hat{A}_1$	✓ S/R (with //) ✓ S ✓ R (3)
9.2.2	∴ EF is a tangent/EF is 'n *raaklyn* [converse tan chord / *omgekeerde raaklyn koord stelling*]	✓ R (1)

9.2.3	In ΔABC and/*en* ΔEDF is: $\hat{A}_1 = \hat{E}_1$ [proved/*bewys* in 9.2.1] $\hat{B}_2 + \hat{B}_3 = \hat{D}_3$ [ext ∠ of cyclic quad / *buite ∠ v kvh*] $\hat{C}_2 = \hat{F}$ [3^{rd} ∠sum of Δ / 3^{de} ∠ *som ∠ v Δ*] $\therefore \Delta ABC \,|||\, \Delta EDF$ [∠,∠,∠] OR/*OF* In Δ*ABC* and Δ*DEF* : $\hat{A}_1 = \hat{E}_1$ [proven / *bewys* in 9.2.1 $\hat{B}_2 + \hat{B}_3 = \hat{D}_3$ [ext ∠'s of cyclic quad / *buite ∠ v vierhoek*] $\therefore \Delta ABC \,|||\, \Delta EDF$ [∠,∠,∠]	✓ S ✓ S ✓ R ✓S/R ✓ S ✓ S ✓ R ✓ R (4)
9.2.4	$\frac{AB}{ED} = \frac{BC}{DF}$ [out of ||| / uit |||] $\therefore AB = \frac{BC.ED}{DF}$ But/*maar* $\frac{AB}{BE} = \frac{AH}{HG}$ [*BH* ‖ *EG*] [line ‖ to one side of a Δ / *lyn ‖ ander sy v Δ*] [prop theorem BD‖ EF / *BD* ‖ EF] $\therefore AB = \frac{AH.BE}{HG}$ $\therefore \frac{AH.BE}{HG} = \frac{BC.ED}{DF}$ penalize once if // lines not shown/ penaliseer 1x as // ontbreek	✓ S ✓ R ✓ S (making AB the subject/*maak AB die onderwerp)* ✓ S ✓ R ✓ S (making AB the subject/*maak AB die onderwerp)* (6)
		[19]

QUESTION/*VRAAG 10*



10.1	$A\hat{D}B = 90°$ [∠ in semi circle./∠ *in halfsirkel*] $A\hat{B}C = 90°$ [rad ⊥ tan/ *rklyn*] $AB^2 = (2x)^2 + BD^2$ .....1 $BC^2 = (x)^2 + BD^2$ .....2 $AB^2 + BC^2 = 5x^2 + 2BD^2$ $9x^2 = 5x^2 + 2BD^2$ $\therefore 4x^2 = 2BD^2$ $\therefore BD = \sqrt{2}x$ $\therefore \frac{BD}{DC} = \sqrt{2}$ OR/*OF* $BD^2 = AD.CD$ [right angled Δwith BD ⊥ AC / *loodlyn vanuit reghoekige hoekpunt*] $BD^2 = 2x.x$ $\therefore BD = \sqrt{2}x$ $\frac{BD}{DC} = \frac{\sqrt{2}x}{x} = \sqrt{2}$	✓ both 90° S/R ✓ both eq ✓ $4x^2 = 2BD^2$ ✓ $BD = \sqrt{2}x$ ✓ S ✓ R ✓ $BD = \sqrt{2}x$ (4)

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10.2	$AB^2 = 10.15$ $AB = 5\sqrt{6}$ $BC^2 = 5.15$ $BC = 5\sqrt{3}$ $AB + BC + AC$ $= 5\sqrt{6} + 5\sqrt{3} + 15$ $= 35,91$	✓ $AB = 5\sqrt{6}$ ✓ $BC = 5\sqrt{3}$ ✓ answer/*antwoord* (3)
		[7]

TOTAL/*TOTAAL*: 150



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