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 2024

MARKING GUIDELINES/*NASIENRIGLYNE*

Stanmorephysics.com

MARKS/*PUNTE*: 150

These marking guidelines consist of 19 pages and 3 pages containing the cognitive grid./
Hierdie nasienriglyne bestaan uit 19 bladsye en 3 bladsye wat die kognitiewe tabel bevat.

Copyright reserved/*Kopiereg voorbehou*

NOTE:

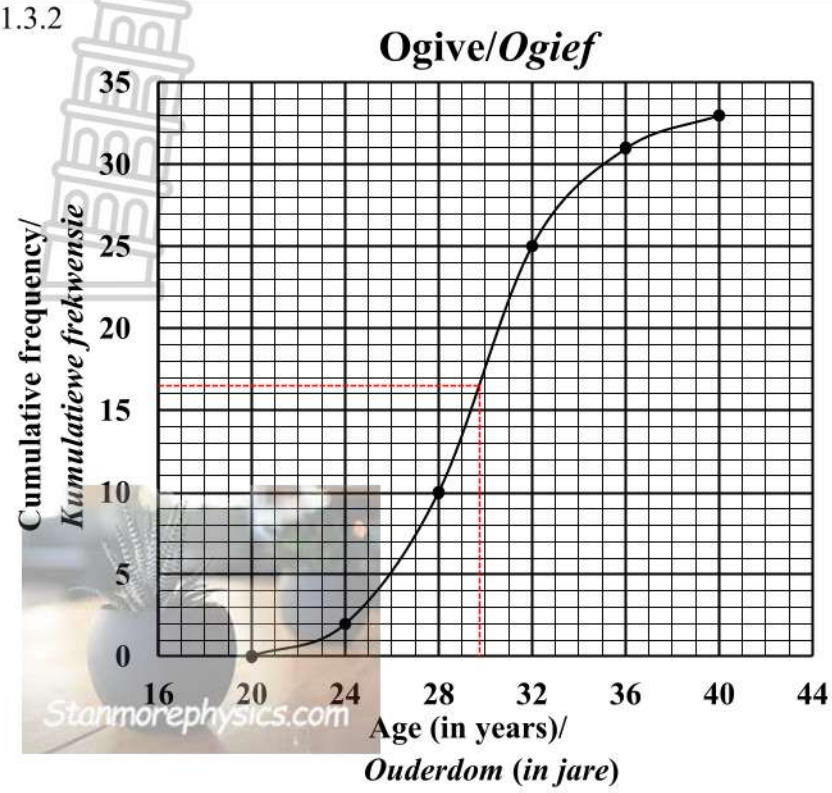
- If a candidate answers a question TWICE, only mark the FIRST attempt.
- If a candidate has crossed out an attempt of a question and not redone the question, mark the crossed out version.
- Consistent accuracy applies in ALL aspects of the Marking Guidelines. Stop marking at the second calculation error.
- 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.*

QUESTION/*VRAAG* 1

<table>
<tr><td>1.1</td><td>33 players/spelers</td><td>✓ 33
(1)</td></tr>
<tr><td>1.2</td><td>$\bar{x} = \frac{(2\times22)+(8\times26)+(15\times30)+(6\times34)+(2\times38)}{33}$
$= \frac{982}{33}$
$= 29,76$
Answer only: full marks</td><td>✓ 982
✓ answer/antwoord
(CA if/as ÷33)
(2)</td></tr>
<tr><td>1.3.1</td><td>
<table>
<tr><th>Age class
Ouderdomklas</th><th>Frequency
Frekwensie</th><th>Cumulative frequency
Kumulatiewe frekwensie</th></tr>
<tr><td>$20 < x \leq 24$</td><td>2</td><td>2</td></tr>
<tr><td>$24 < x \leq 28$</td><td>8</td><td>10</td></tr>
<tr><td>$28 < x \leq 32$</td><td>15</td><td>25</td></tr>
<tr><td>$32 < x \leq 36$</td><td>6</td><td>31</td></tr>
<tr><td>$36 < x \leq 40$</td><td>2</td><td>33</td></tr>
</table>
</td><td>✓ 2 & 10
✓ 33
(2)</td></tr>
</table>

1.3.2		✓grounding/*anker* (20 ; 0) ✓plotting ogive at upper limits correctly/*korrekte plot van ogief by boonste limiete* ✓shape (smooth)/ *vorm* (*vryhand*) (3)
1.4	On graph the *y*-value at 16,5 / *y-waarde van 16,5 op die grafiek.* median / *mediaan* $\approx 29{,}8$ years / *jare* (accept values/*aanvaar waardes*: $29{,}4 \leq x < 30$)	✓graph/*grafiek* ✓ 29,8 (2)
1.5	The affected intervals are/ *die geaffekteerde intervalle is*: $24 < x \leq 28$ and / *en* $32 < x \leq 36$. If the frequency of both intervals are increased to 9 players, the data will be symmetrical/*as die frekwensie van beide intervalle tot 9 spelers verhoog word, is die data simmetries.* $\therefore k = 4$ Answer only: full marks	✓identify affected intervals/ *identifiseer geaffekteerde intervalle* ✓increase frequency to 9 players/*verhoog frekwensie na 9 spelers* ✓ $k = 4$ (3)
		[13]

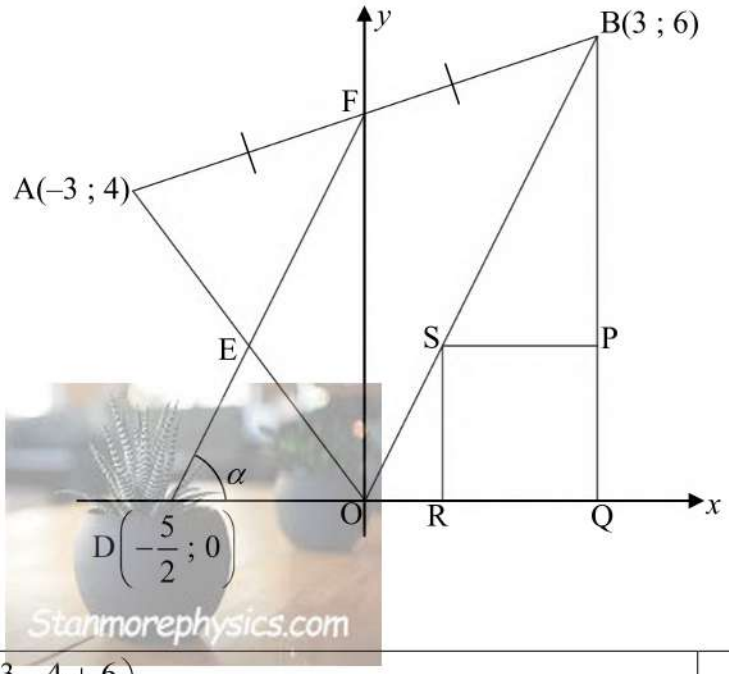
Stanmorephysics.com

QUESTION/*VRAAG* 2

Preparatory examination (*x*)/ *Voorbereidende eksamen* (*x*)	38	65	78	23	67	93	39	83	51	66
Final examination (*y*)/ *Finale eksamen* (*y*)	57	72	81	27	59	94	41	85	54	79

2.1	$a = 10,85$ $b = 0,90$ $\hat{y} = 10,85 + 0,9x$ Answer only: full marks, but if *a* and *b* are swopped only 1/3 marks/ *maar as a en b omgeruil is, slegs 1/3 punte.*	✓ *a* ✓ *b* ✓ equation/ *vergelyking* (3)
2.2.1	$\hat{y} = 10,85 + 0,9(46)$ $= 52,25\%$ Answer only: full marks **OR/*OF*** $46\hat{y} = 52,08\%$ (calculator / *sakrekenaar*)	✓substitute 46 into eq. / *vervang 46 in vgl.* ✓answer/*antwoord* (2) ✓✓ 52,08 % (2)
2.2.2	$r = 0,94$ Yes, because there is a very strong correlation between the data/ *Ja, want die korrelasie tussen die data is baie sterk.*	✓yes/*ja* ✓very strong/*baie sterk* (2)
2.3	B	✓B (1)
		[8]

QUESTION/*VRAAG* 3



Stanmorephysics.com

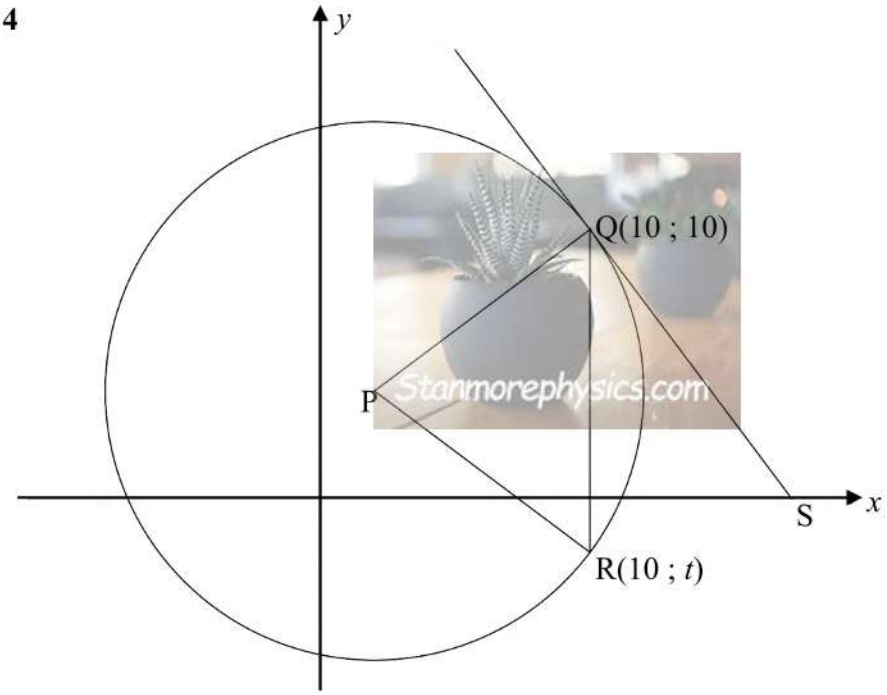
3.1.1	$F\left(\frac{-3+3}{2};\frac{4+6}{2}\right)$ $= F(0\ ;\ 5)$	✓*x*-value/*waarde* ✓*y*-value/*waarde* (2)
3.1.2	$m_{DF} = \frac{5-0}{0-\left(-\frac{5}{2}\right)}$ $= 2$ Answer only: full marks	✓subst./*vervang* ✓answer/*antwoord* (2)
3.1.3	$\tan\alpha = 2$ $\therefore \alpha = 63,43°$	✓ $\tan\alpha = m_{DF}$ ✓answer/*antwoord* (2)
3.2	$y = 2x$	✓answer/*antwoord* (1)
3.3	$m_{DF} = m_{OB} = 2$ $\therefore$ Lines have the same gradient/*lyne het dieselfde gradiënte*	✓answer/*antwoord* (1)

3.4	$QR = PQ = 3x$ $\therefore R(3 - 3x\ ;\ 0)$ $QP = 3x$ $\therefore S(3 - 3x\ ;\ 3x)$ Equation / *vergelyking* : OB $y = 2x$ $3x = 2(3 - 3x)$ $3x = 6 - 6x$ $x = \frac{2}{3}$ Substitute/*vervang* $S\left(3 - 3\left(\frac{2}{3}\right)\ ;\ 3\left(\frac{2}{3}\right)\right)$ $\therefore S(1\ ;\ 2)$	✓QR = PQ = 3*x* ✓coordinates of/ *koördinate van* R ✓coordinates of/ *koördinate van* S ✓value of/ *waarde van x* ✓ x_s-value/*waarde* ✓ y_s-value/*waarde* (6)
	OR/*OF*	
	$SR = 3x$ $\tan S\hat{O}R = \tan 63,43° = \frac{SR}{OR}$ $OR = \frac{3x}{2}$ $OQ = 3$ units / *eenhede* $RQ = 3x$ $\frac{3x}{2} + 3x = 3$ $x = \frac{2}{3}$ $S(3 - 3x\ ;\ 3x)$ $S\left(3 - 3\left(\frac{2}{3}\right)\ ;\ 3\left(\frac{2}{3}\right)\right)$ $S(1\ ;\ 2)$	✓SR = 3*x* ✓OR ✓value of/ *waarde van x* ✓coordinates of/ *koördinate van* S ✓ x_s-value/*waarde* ✓ y_s-value/*waarde* (6)

Stanmorephysics.com

3.5	E is midpt. of / *van* $\parallel$ AO $\begin{bmatrix}\text{converse midpt.theorem /}\\ \textit{omgekeerde midpt.}-\textit{stelling}\end{bmatrix}$	✓S
	$E\left(\frac{-3}{2}\,;\,2\right)$	✓coordinates of E/ *koördinate van* E
	ES $\parallel$ DO (same $y-$coordinates / *dieselfde* $y-$*koördinate*)	✓S/R
	$\therefore$EDOS is $\parallel^m$ [both pairs opp. sides $\parallel$ / *beide pare teenoorst. sye* $\parallel$]	✓reason/*rede*
		(4)
	OR/*OF*	
	E is midpt. of / *van* $\parallel$ AO $\begin{bmatrix}\text{converse midpt.theorem /}\\ \textit{omgekeerde midpt.}-\textit{stelling}\end{bmatrix}$	✓S
	$E\left(\frac{-3}{2}\,;\,2\right)$	✓coordinates of E/ *koördinate van* E
	Midpt. EO $=\left(\frac{-3}{4}\,;\,1\right)$ & Midpt. DS $=\left(\frac{-3}{4}\,;\,1\right)$	✓$\left(\frac{-3}{4}\,;\,1\right)$
	$\therefore$EDOS is $\parallel^m$ [converse diag. of/*omgekeerde hoeklyne van* $\parallel^m$]	✓reason/*rede*
		(4)
		[18]

QUESTION/*VRAAG* 4

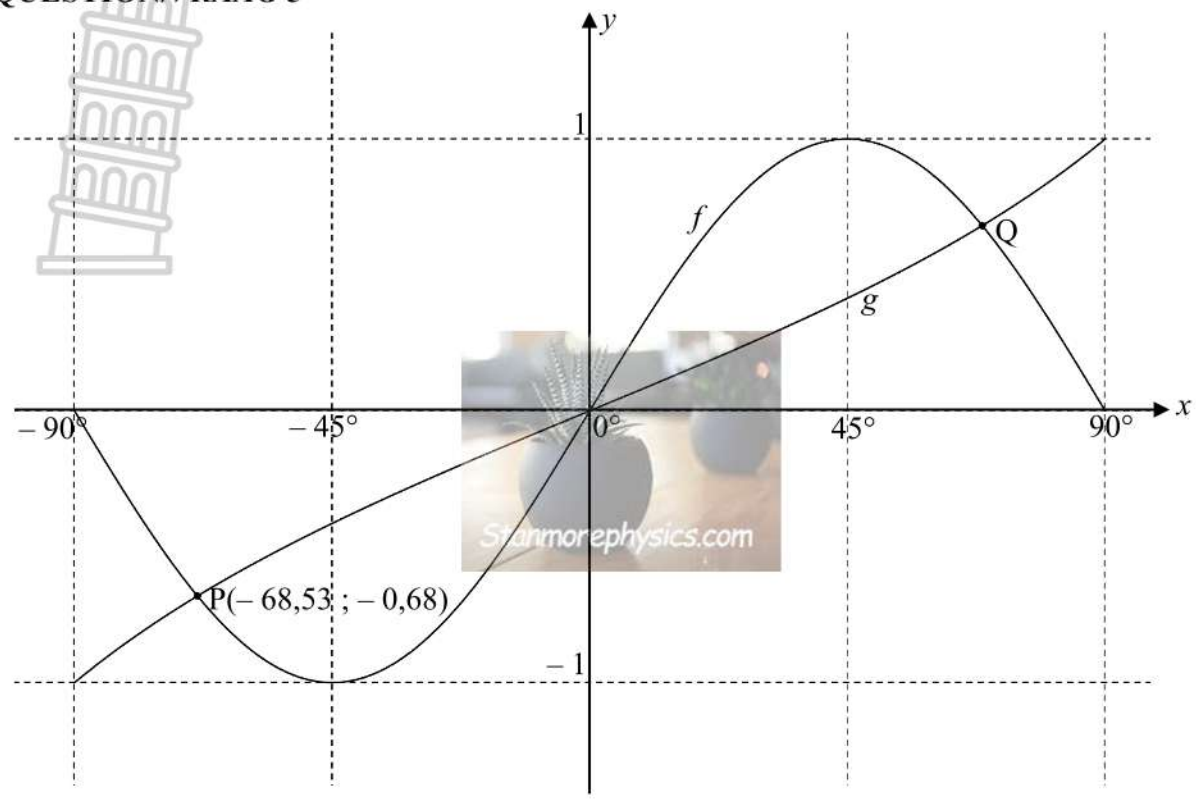


4.1	$x^2 - 4x + (-2)^2 + y^2 - 8y + (-4)^2 = 80 + (-2)^2 + (-4)^2$ $(x-2)^2 + (y-4)^2 = 100$	✓LHS/*LK* ✓RHS/*RK* (2)
4.2.1	P(2 ; 4)	✓$x = 2$ ✓$y = 4$ (2)
4.2.2	$x = 10$	✓equation/*vergelyking* (1)
4.3	$m_{QP} = \frac{10-4}{10-2}$ $= \frac{3}{4}$ $\therefore m_{QS} = -\frac{4}{3}$ [rad ⊥ tangent / *rad ⊥ raaklyn*] $10 = -\frac{4}{3}(10) + c$ **OR / *OF*** $y - 10 = -\frac{4}{3}(x - 10)$ $c = \frac{70}{3}$ $y = -\frac{4}{3}x + \frac{70}{3}$	✓subst./*vervanging* ✓ $m_{QP} = \frac{3}{4}$ ✓ $m_{QS} = -\frac{4}{3}$ ✓subst./*vervang m* & (10 ; 10) ✓equation/*vergelyking* (5)

4.4	$\tan \hat{QSx} = -\frac{4}{3}$ $\hat{QSx} = 126,87°$ $126,87° = \hat{RQS} + 90°$ [ext $\angle$ of Δ / *buite* $\angle$ *van* Δ] $\hat{RQS} = 36,87°$	✓ $\hat{QSx}$ ✓method/*metode* ✓answer/*antwoord* (3)
4.5	$\hat{PQR} = 53,13°$ [radius $\perp$ tangent / *raaklyn*] $\hat{PQR} = \hat{QRP} = 53,13°$ [$\angle$s opp. = radii/$\angle$*e teenoor = radiusse*] $\hat{QPR} = 73,74°$ [$\angle$s of Δ / $\angle$*e van* Δ] area $\Delta PQR = \frac{1}{2}(PQ)(PR)\sin \hat{QPR}$ $= \frac{1}{2}(10)(10)\sin 73,74°$ $= 48$ units^2 / *eenhede*^{2} **OR/*OF*** $\hat{PQR} = 53,13°$ [radius $\perp$ tangent / *raaklyn*] Q and R are symmetrical about the line $y = 4$/ *Q en R is simmetries rondom die lyn* $y = 4$ $\therefore t = -2$ & $QR = 12$ area $\Delta PQR = \frac{1}{2}(PQ)(QR)\sin \hat{PQR}$ $= \frac{1}{2}(10)(12)\sin 53,13°$ $= 48$ units^2 / *eenhede*^{2}	✓ $\hat{PQR}$ ✓ $\hat{QPR}$ ✓subst. in area rule correctly/*vervang korrek in oppv.-reël* ✓answer/*antwoord* (4) ✓ $\hat{PQR}$ ✓ QR ✓subst. in area rule correctly/*vervang korrek in oppv.-reël* ✓answer/*antwoord* (4)
4.6	$\sum_{x=-8}^{2} h(x) = \sum_{x=2}^{12} h(x) = k$ $h(2) = 14$ $\sum_{x=3}^{12} h(x) = \sum_{x=2}^{12} h(x) - h(2)$ $\therefore \sum_{x=3}^{12} h(x) = k - 14$	✓ $\sum_{x=-8}^{2} h(x) = \sum_{x=2}^{12} h(x) = k$ ✓ $h(2) = 14$ ✓ $\sum_{x=3}^{12} h(x) = \sum_{x=2}^{12} h(x) - h(2)$ ✓answer/*antwoord* (4)
		[21]

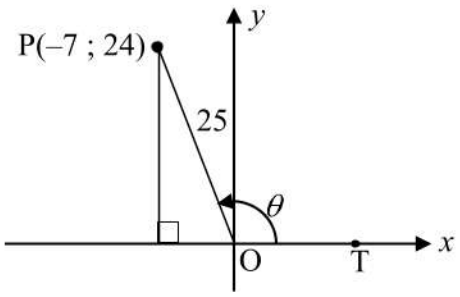
Stanmorephysics.com

QUESTION/*VRAAG* 5



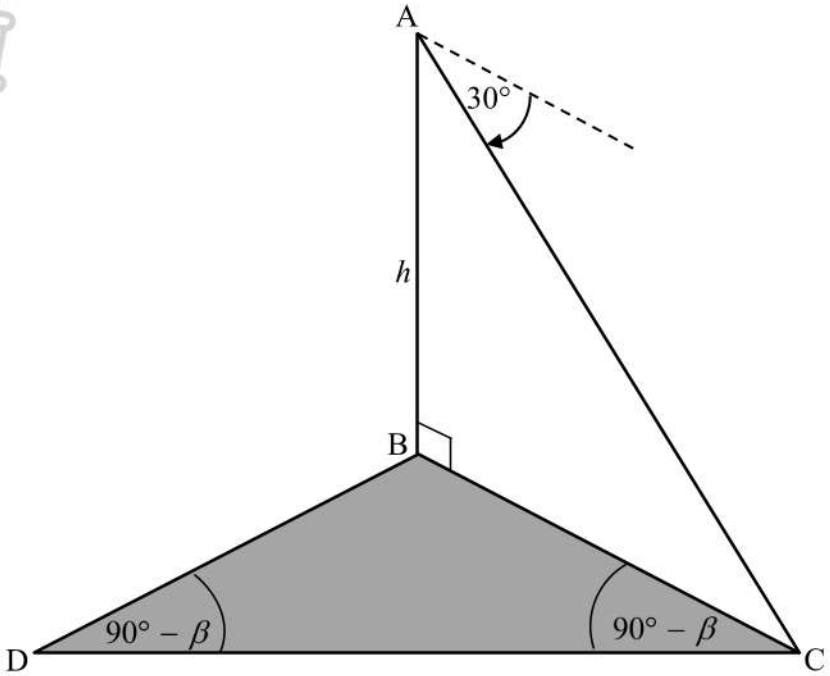
5.1.1	$a = 1$	✓answer/*antwoord* (1)
5.1.2	$Q(68,53° ; 0,68)$	✓*x*-value/*waarde* ✓ *y*-value/*waarde* (2)
5.1.3	$x = -75°$ or / *of* $x = 15°$	✓ –75° ✓ 15° (2)
5.1.4	$x \in (-68,53° ; 90°]$ **OR / *OF*** $-68,53° < x \leq 90°$	✓ – 68,53° & 90° ✓ notation/*notasie* (2)
5.1.5	$f(x - 45°)$ $m = -45°$	✓ $f(x - 45°)$ ✓ – 45° (2)
5.1.6	$b = \frac{1}{2}$	✓ $\frac{1}{2}$ (1)
5.2	$x \in (68,53° ; 90°]$ **OR / *OF*** $68,53° < x \leq 90°$	✓✓accuracy/*akkuraatheid* (2)
		[12]

QUESTION/*VRAAG* 6

6.1.1	$x^2 + 24^2 = 25^2$ $x^2 = 49$ $x = -7$ 	✓ $x^2 + y^2 = r^2$ ✓ $x = -7$ (2)
6.1.2	$\tan(360° - \theta)$ $= -\tan\theta$ $= -\left(-\frac{24}{7}\right)$ $= \frac{24}{7}$ Answer only: full marks	✓ $-\tan\theta$ ✓answer/*antwoord* (2)
6.1.3	$\tan\theta = \frac{24}{7}$ $\theta = 73,74°$ $P\hat{O}T = 180° - 73,74°$ $= 106,26°$	✓size of/*grootte van* θ ✓answer/*antwoord* (2)
6.2.1	$\sin 20° + \cos 120°.\tan 405° + \cos 110°$ $= \sin 20° + \cos(180° - 60°).\tan(360° + 45°) + \cos(90° + 20°)$ $= \sin 20° - \cos 60°.\tan 45° - \sin 20°$ $= -\frac{1}{2}$	✓ $-\cos 60°$ ✓ $\tan 45°$ ✓ $-\sin 20°$ ✓answer/*antwoord* (4)
6.2.2	$\frac{(\sqrt{2}\cos 15° + 1)(\sqrt{2}\cos 15° - 1)\sin(-2x)}{4\sin x\cos x}$ $= \frac{(2\cos^2 15° - 1).(-\sin 2x)}{4\sin x\cos x}$ $= \frac{(\cos 30°).(-2\sin x\cos x)}{4\sin x\cos x}$ $= -\frac{\sqrt{3}}{4}$	✓ $2\cos^2 15° - 1$ ✓ $-2\sin x\cos x$ ✓ $\cos 30°$ ✓answer/*antwoord* (4)

6.3	$4\cos(90° - 2y).\cos 2x + 4\sin 2x.\cos(360° + 2y)$ $= 4\sin 2y.\cos 2x + 4\sin 2x.\cos 2y$ $= 4\left[\sin(2y + 2x)\right]$ $= 4\left[\sin 2(y + x)\right]$ $= 4.2\sin(y + x).\cos(y + x)$ $= 8t$	✓ $\sin 2y$ ✓ $\cos 2y$ ✓compound angle/ *saamgestelde hoek* ✓double angle/*dubbelhoek* ✓answer/*antwoord* (5)
6.4.1	$\text{LHS / } LK = \sin^2 x + \cos^2 x + \tan^2 x$ $= 1 + \tan^2 x$ $= 1 + \frac{\sin^2 x}{\cos^2 x}$ $= \frac{\cos^2 x + \sin^2 x}{\cos^2 x}$ $= \frac{1}{\cos^2 x}$	✓ $\sin^2 x + \cos^2 x = 1$ ✓ $\frac{\sin^2 x}{\cos^2 x}$ ✓ $\frac{\cos^2 x + \sin^2 x}{\cos^2 x}$ (3)
6.4.2	If/*as* $x \in (180° ; 270°)$, then/*dan is* $\cos x < 0$ $\sqrt{\sin^2 x + \cos^2 x + \tan^2 x} \neq$ negative / *negatief* $\therefore$ Attie is correct / *korrek*	✓statement/*bewering* ✓answer/*antwoord* (2)
6.5	$2^{2\sin^2 x} - 5.2^{\cos 2x} = -3$ $2^{2\sin^2 x} - 5.2^{1-2\sin^2 x} = -3$ $2^{2\sin^2 x} - 5.2.2^{-2\sin^2 x} = -3$ $2^{2\sin^2 x} - \frac{10}{2^{2\sin^2 x}} + 3 = 0$ $2^{2\sin^2 x}.2^{2\sin^2 x} + 3.2^{2\sin^2 x} - 10 = 0$ $\left(2^{2\sin^2 x} + 5\right)\left(2^{2\sin^2 x} - 2\right) = 0$ $2^{2\sin^2 x} \neq -5$ or / *of* $2^{2\sin^2 x} = 2^1$ $2\sin^2 x = 1$ $\sin^2 x = \frac{1}{2}$ $\sin x = \pm\frac{1}{\sqrt{2}}$	✓ $1 - 2\sin^2 x$ ✓ $\frac{10}{2^{2\sin^2 x}}$ ✓standard form/*standaardvorm* ✓factors/*faktore* ✓ $2^{2\sin^2 x} \neq -5$ ✓ $\sin^2 x = \frac{1}{2}$ (6)
		[30]

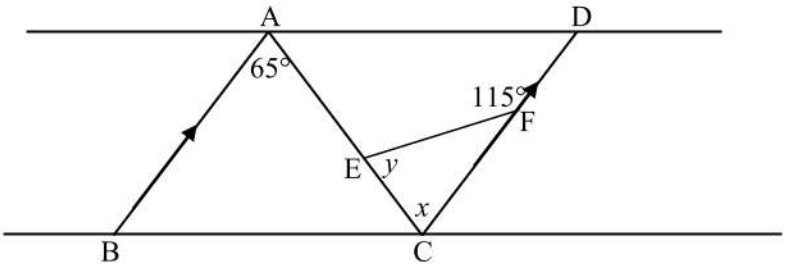
QUESTION/*VRAAG* 7



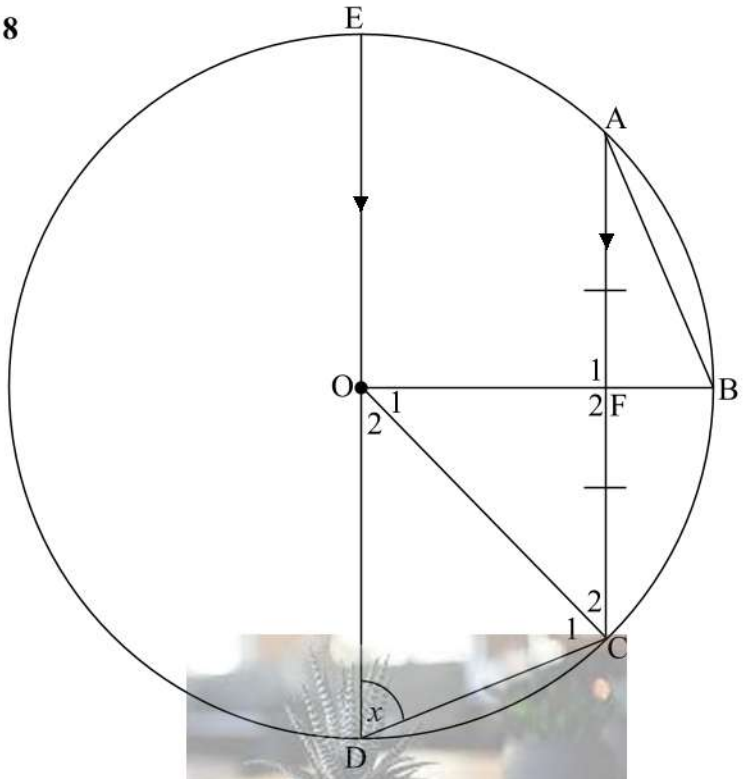
7.1	$\tan 30° = \frac{h}{BC}$ $BC = \frac{h}{\tan 30°}$ $= \frac{h}{\frac{1}{\sqrt{3}}} = \sqrt{3}h$	✓ correct trig ratio/ *korrekte trig verhouding* ✓ BC as the subject/ *as die onderwerp* (2)
7.2	$D\hat{B}C = 2\beta$	✓answer/*antwoord* (1)
7.3	$\frac{DC}{\sin B} = \frac{BC}{\sin D}$ $\frac{DC}{\sin 2\beta} = \frac{BC}{\sin(90° - \beta)}$ $DC.\cos\beta = BC.2\sin\beta\cos\beta$ $DC = \frac{\sqrt{3}h.2\sin\beta\cos\beta}{\cos\beta}$ $= 2\sqrt{3}\,h\sin\beta$ $= \sqrt{12}h\sin\beta$	✓correct use of sine-rule/ *korrekte gebruik van sinus-reël* ✓correct substitution into the formula/*korrekte vervanging in die formule* ✓ $\sin 2\beta = 2\sin\beta\cos\beta$ ✓co-ratio/*ko-verhouding* ✓ $2\sqrt{3}h\sin\beta$ (5)
		[8]

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)*

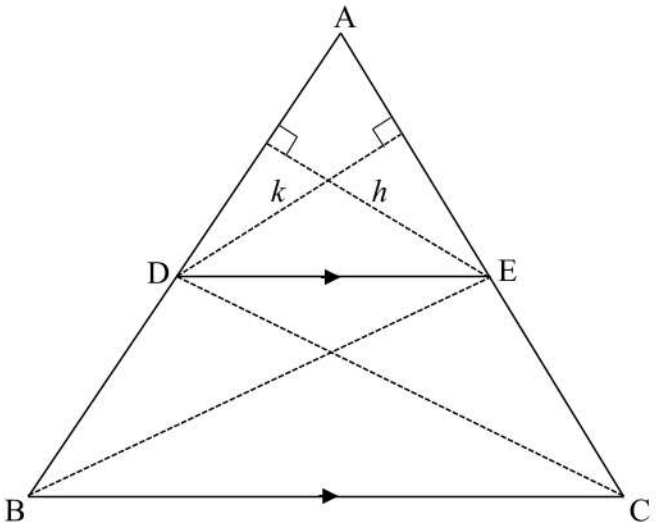
QUESTION/*VRAAG* 8



8.1	$\hat{F}_2 = 90°$ [line from centre to midpt.chord/*midpt.sirkel, midpt.koord*]	✓S✓R (2)
8.2.1	$\hat{C}_1 = x$ [∠s opp. = radii/*∠e teenoor = radiusse*] $\hat{O}_2 = 180° - 2x$ [sum of ∠s of / *som van ∠e van* ΔDOC]	✓ S ✓S (2)
8.2.2	$D\hat{O}F = 90°$ [co – int.∠s / *ko – binne ∠e*; AC ‖ ED] $\hat{O}_1 = 90° - (180° - 2x) = 2x - 90°$ $C\hat{A}B = x - 45°$ [∠at centre = 2× ∠ at circ. / *midpts∠ = 2× omtreks∠*] $\hat{B} + x - 45° + 90° = 180°$[sum of ∠s of / *som van ∠e van* ΔFAB] $\hat{B} = 135° - x$	✓ S/R ✓S ✓S✓R ✓ S/R ✓S (6)
		[10]

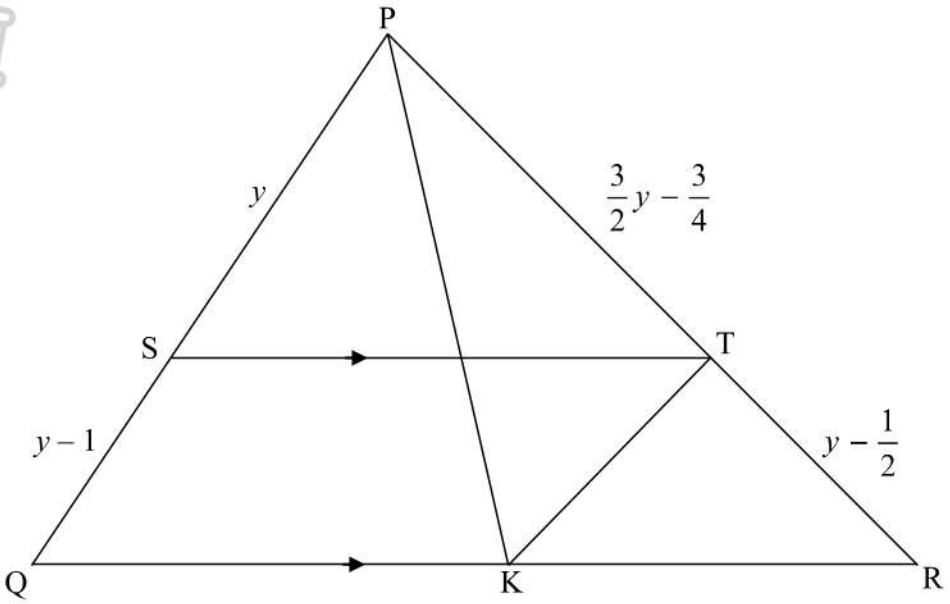
Stanmorephysics.com

[*G* 9

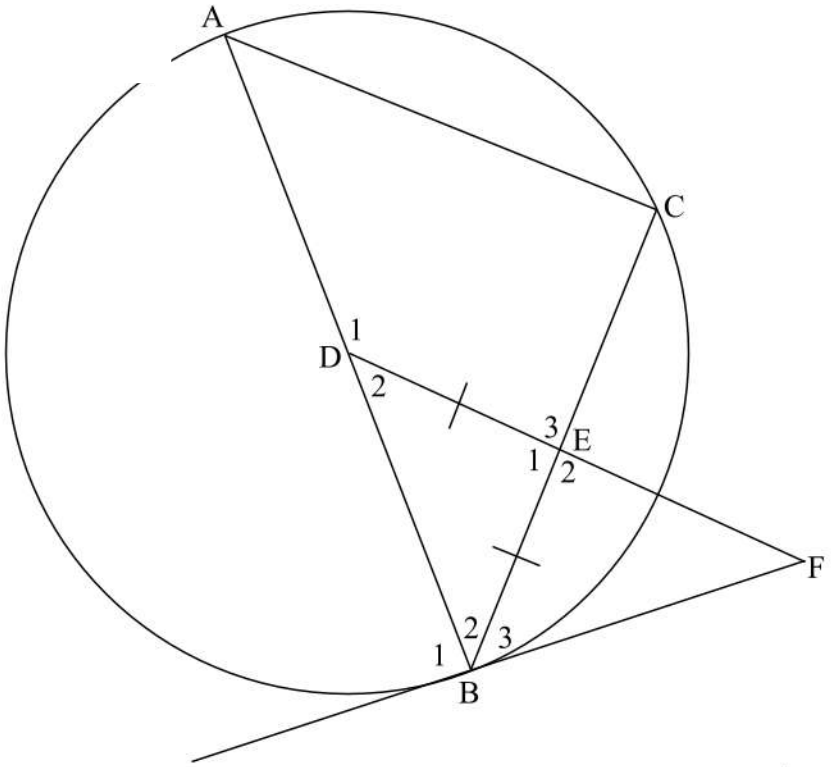


9.1	Construction: draw altitudes h and k; join B with E and D with C/ Konstruksie: trek hoogtelyne h en k; verbind B met E en D met C.	✓construction/ *konstruksie*
	$\frac{\text{area } \Delta ADE}{\text{area } \Delta DEB} = \frac{\frac{1}{2}AD \times h}{\frac{1}{2}DB \times h} = \frac{AD}{DB}$	✓S
	$\frac{\text{area } \Delta ADE}{\text{area } \Delta DEC} = \frac{\frac{1}{2}AE \times k}{\frac{1}{2}EC \times k} = \frac{AE}{EC}$	✓S
	$\text{area } \Delta DEB = \text{area } \Delta DEC$ [same base; same ‖; *dieselfde basisse*; *dieselfde* ‖]	✓S/R
	$\therefore \frac{\text{area } \Delta ADE}{\text{area } \Delta DEB} = \frac{\text{area } \Delta ADE}{\text{area } \Delta DEC}$ $\therefore \frac{AD}{DB} = \frac{AE}{EC}$	✓S (5)

9.2



9.2.1	$\frac{y}{y-1} = \frac{\frac{3}{2}y - \frac{3}{4}}{y - \frac{1}{2}}$ [prop.th / *eweredigheidst.*; ST ‖ QR] $y\left(y - \frac{1}{2}\right) = (y-1)\left(\frac{3}{2}y - \frac{3}{4}\right)$ $y^2 - \frac{1}{2}y = \frac{3}{2}y^2 - \frac{9}{4}y + \frac{3}{4}$ $4y^2 - 2y = 6y^2 - 9y + 3$ $0 = 2y^2 - 7y + 3$ $0 = (y-3)(2y-1)$ $y = 3$ or / *of* $y \neq \frac{1}{2}$	✓S/R ✓simplification/ *vereenvoudiging* ✓standard form/ *standaardvorm* ✓factors/*faktore* ✓only/*slegs* $y = 3$ (5)
9.2.2	$P\hat{S}T = \hat{Q}$ [corresp∠s/*ooreenk.∠e*; ST ‖ QR] $P\hat{S}T = P\hat{K}T = \hat{Q}$ P, S, K and/*en* T are / *is* consyclic/*konsiklies* [converse ∠s in same segment / *omgekeerde ∠e in dies. segment*] ∴ PSKT is a / *is* '*n* cyclic quadrilateral / *koordevierhoek*	✓S/R ✓R (2)
		[12]



10.1.1	$\hat{C} = 90°$ [∠ in semi circle./∠ *in halfsirkel*] $A\hat{B}F = 90°$ [radius ⊥ tangent / *raaklyn*] $\therefore \hat{C} = A\hat{B}F = 90°$	✓S ✓R ✓S ✓R (4)
10.1.2	In ΔDBF and / *en* ΔBCA $\hat{D}_2 = \hat{B}_2$ [∠s opp. equal sides/∠*e teenoor gelyke sye*] $D\hat{B}F = \hat{C}$ [from / *vanuit* 10.1.1] Δ DFB ||| ΔBAC [∠ ∠ ∠] $\frac{DF}{BA} = \frac{DB}{BC}$ [from / *vanuit* ||| Δs] $\therefore$ DF.BC = AB.BD **OR / *OF*** In ΔDBF and / *en* ΔBCA $\hat{D}_2 = \hat{B}_2$ [∠s opp. equal sides/∠*e teenoor gelyke sye*] $D\hat{B}F = \hat{C}$ [from / *vanuit* 10.1.1] $\hat{F} = \hat{A}$ [sum of ∠s of Δ /*binne∠e van* Δ] Δ DFB ||| ΔBAC [∠ ∠ ∠] $\frac{DF}{BA} = \frac{DB}{BC}$ [from / *vanuit* ||| Δs] $\therefore$ DF.BC = AB.BD	✓S/R ✓S ✓R ✓S/R (4) ✓S/R ✓S ✓S ✓S/R (4)

10.1.3	$\hat{B}_3 = \hat{A}$ [tan chord theorem / *raaklyn – koordst.*] $\hat{B}_3 = \hat{F} = \hat{A}$ BE = EF [sides opp. = ∠s/*sye teenoor = ∠e*] ∴ BE = EF = DE ∴ E is the midpt. of circle through D, B and F/ *E is die midpt. van sirkel deur D, B en F*	✓S ✓R ✓S/R ✓S (4)
10.2	$\frac{AC}{BF} = \frac{AB}{DF}$ [from / *vanuit* ||| Δs] $= \frac{2AD}{2EF}$ $= \frac{AD}{EF}$ $\frac{1}{AC^3} \times \frac{AC}{BF} = \frac{1}{AC^3} \times \frac{AD}{EF}$ $\frac{1}{AC^2} = \frac{AD.BF}{EF.AC^3}$ $\frac{1}{AB^2 - BC^2} = \frac{AD.BF}{EF.AC^3}$ $-\frac{1}{BC^2 - AB^2} = \frac{AD.BF}{EF.AC^3}$ $\frac{1}{BC^2 - AB^2} = -\frac{AD.BF}{EF.AC^3}$	✓S ✓S ✓$\times \frac{1}{AC^3}$ both sides/*beide kante* ✓S ✓Pythagoras ✓$-\frac{1}{BC^2 - AB^2}$ (6)
		[18]

TOTAL/*TOTAAL*: 150

Copyright reserved/*Kopiereg voorbehou*