



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE EXAMINATIONS/ NATIONAL SENIOR CERTIFICATE EXAMINATIONS

MATHEMATICS P2/*WISKUNDE V2*

MAY/JUNE 2025/*MEI/JUNIE 2025*

MARKING GUIDELINES/*NASIENRIGLYNE*

MARKS/*PUNTE*: 150

**These marking guidelines consist of 23 pages.
*Hierdie nasienriglyne bestaan uit 23 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 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.

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.*
- *Aanvaar 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 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 statement AND reason are both correct
	Ken 'n punt toe as die bewering EN rede beide korrek is

QUESTION/VRAAG 1

134	215	325	326	362	429	515	531	598	610	624	728	923	1 034	1 200
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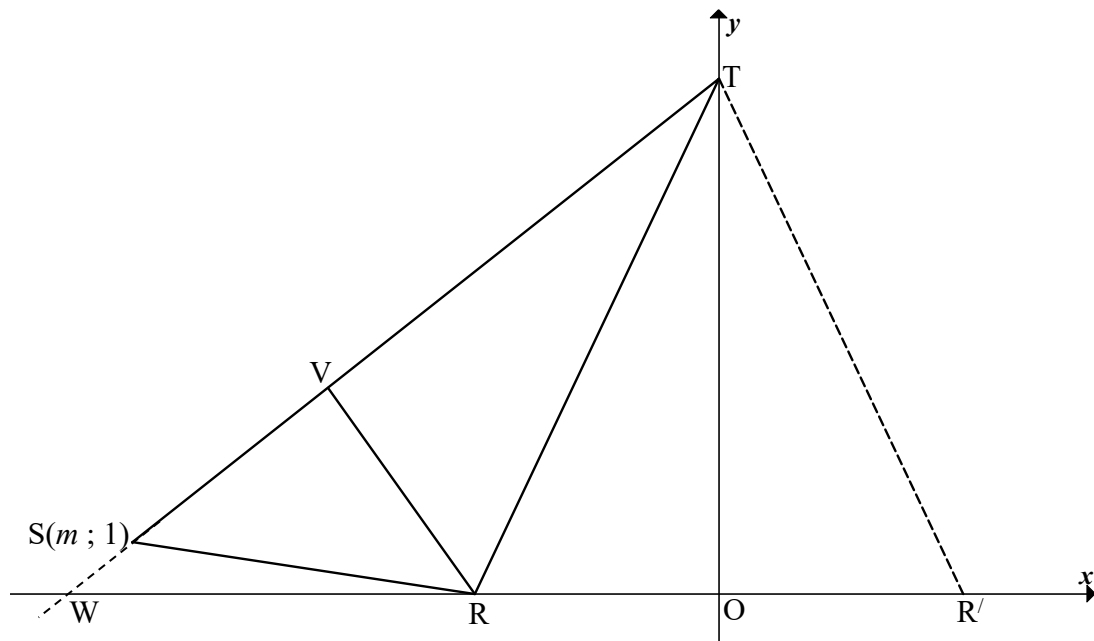
1.1	$\bar{x} = \frac{8554}{15}$ $= 570,27$	✓ 8554 ✓ answer (2)
1.2	$\sigma = 291,03$	✓ 291,03 (1)
1.3	$(279,24 ; 861,3)$ $\therefore 10$ premiums	✓ $(\bar{x} - \sigma ; \bar{x} + \sigma)$ ✓ answer (2)
1.4	$\frac{\left(1791 \times \frac{118}{100}\right) + \left(6763 \times \frac{k+100}{100}\right)}{15} = 686,44$ $6763 \times \frac{k+100}{100} = 8183,22$ $\frac{k+100}{100} = 1,209...$ $k+100 = 120,999...$ $k = 21\%$	✓ $1791 \times \frac{118}{100}$ ✓ $6763 \times \frac{k+100}{100}$ ✓ $\frac{\text{sum of new premiums}}{15} = 686,44$ ✓ answer (4)
		[9]

QUESTION/VRAAG 2

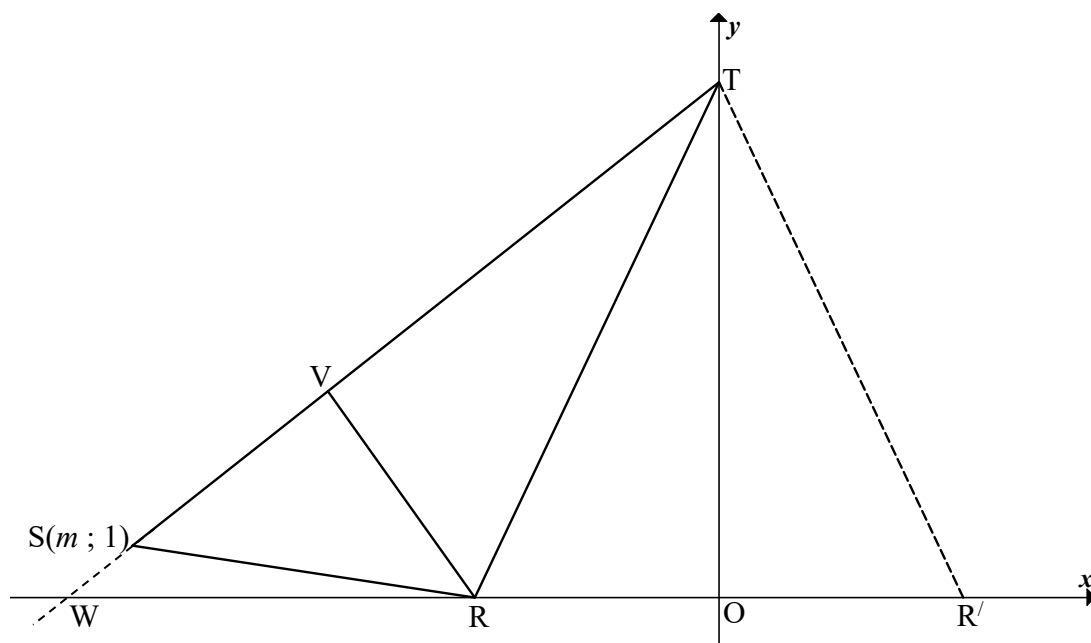
Number of items/ <i>Aantal items</i> (x)	10	3	20	14	17	9	12	18	15	19
Time (in minutes)/ <i>Tyd in minute</i> (y)	5	5	9	7	6	6	8	11	10	12

2.1	Scatter plot / Spreidiagram	✓ 3 points correct ✓ 6 points correct ✓ all points correct
2.2	$a = 3,079\dots$ $b = 0,351\dots$ $\hat{y} = 3,08 + 0,35x$	✓ $a = 3,08$ ✓ $b = 0,35$ ✓ equation
2.3	$r = 0,74$	✓ 0,74
2.4	$y = 3,08 + 0,35(13)$ $y = 7,63$ OR $y = 7,65$ (calculator)	✓ substitute $x=13$ ✓ answer ✓✓ 7,65
2.5	It does not make sense to pack 0 items in 3,08 minutes. <i>Dit maak nie sin dat 0 items in 3,08 minute gepak kan word nie.</i>	✓ answer
		[10]

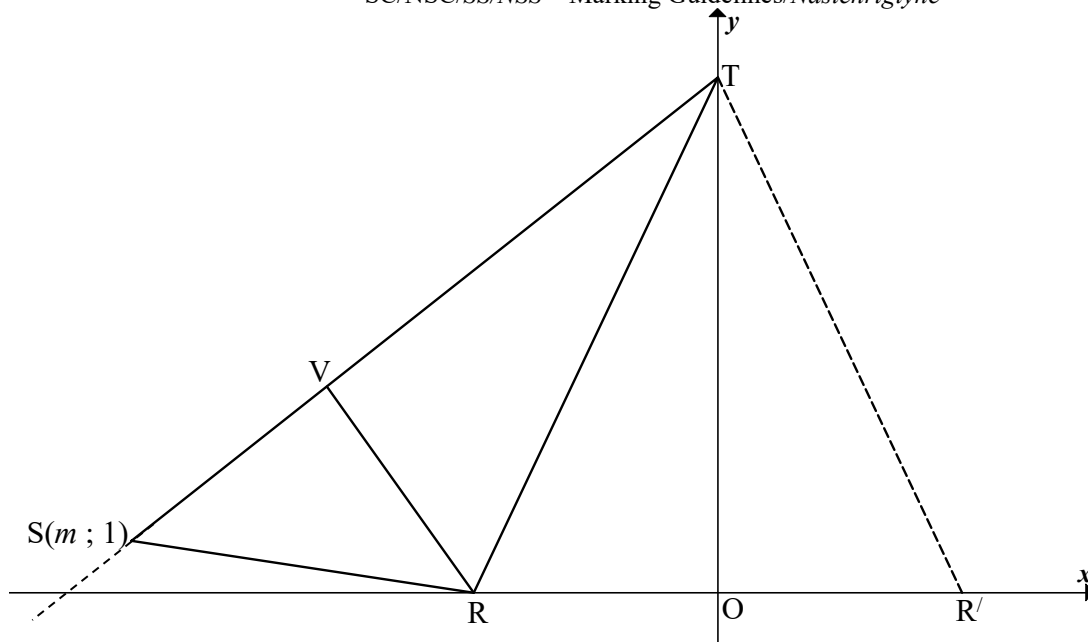
QUESTION/VRAAG 3



3.1	$2x - y + 10 = 0$ $2x - 0 + 10 = 0$ $x = -5$ $R(-5; 0)$	✓ $y = 0$ ✓ $x = -5$	(2)
3.2	$R(-5; 0)$ $T(0; 10)$ $(RT)^2 = (-5 - 0)^2 + (0 - 10)^2$ OR $(RT)^2 = 5^2 + 10^2$ (Pythag) $RT = \sqrt{125}$ units OR/OF $RT = 5\sqrt{5}$ units	✓ $T(0; 10)$ ✓ subst of R & T into distance formula or Pythagoras ✓ answer	(3)
3.3	$2RT^2 = 5SR^2$ $2(125) = 5[(m - (-5))^2 + (1 - 0)^2]$ $5[(m + 5)^2 + (1)^2] = 250$ $(m + 5)^2 + 1 = 50$ $m^2 + 10m - 24 = 0$ OR/OF $(m + 5)^2 = 49$ $(m - 2)(m + 12) = 0$ $m + 5 = \pm 7$ $m = 2$ or $m = -12$ $m = -5 \pm 7$ N/A $m = 2$ or $m = -12$ $\therefore m = -12$ $\therefore m = -12$	✓ length of $2RT^2$ ✓ length of $5SR^2$ ✓ standard form or isolating square ✓ negative answer	(4)

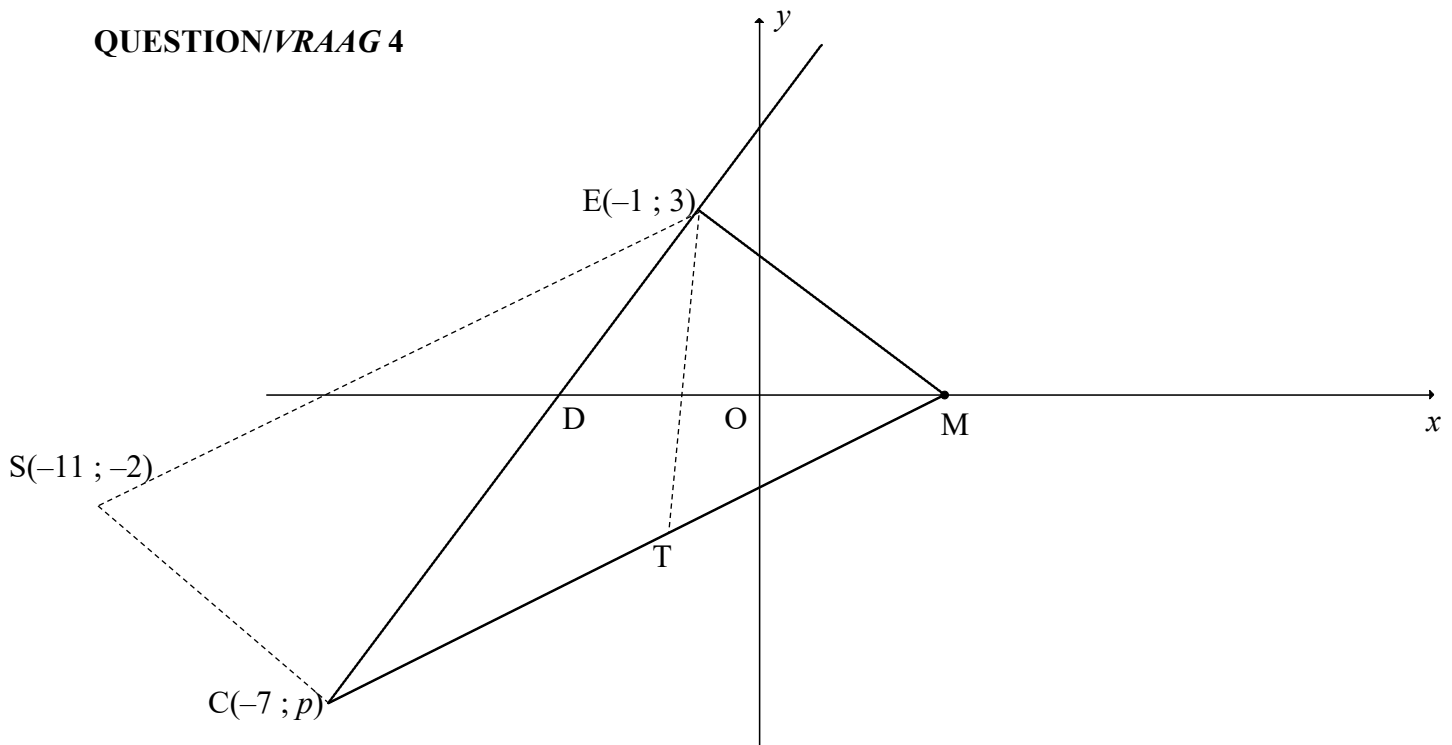


3.4	$m_{ST} = \frac{1-10}{-12-0}$ $m_{ST} = \frac{3}{4}$ $\therefore m_{VR} = -\frac{4}{3}$ $y = -\frac{4}{3}x + c \quad \text{OR/OF} \quad y - y_1 = -\frac{4}{3}(x - x_1)$ $0 = -\frac{4}{3}(-5) + c \quad y - 0 = -\frac{4}{3}(x - (-5))$ $c = -\frac{20}{3} \quad y = -\frac{4}{3}(x + 5)$ $y = -\frac{4}{3}x - \frac{20}{3} \quad y = -\frac{4}{3}x - \frac{20}{3}$	✓ substitution of S & T into gradient formula ✓ m_{ST} ✓ $m_{VR} = -\frac{1}{m_{ST}}$ ✓ substitution of R ✓ equation (5)
3.5	$\text{VR: } y = -\frac{4}{3}x - \frac{20}{3}$ $\text{ST: } y = \frac{3}{4}x + 10$ $\frac{3}{4}x + 10 = -\frac{4}{3}x - \frac{20}{3}$ $9x + 120 = -16x - 80$ $25x = -200$ $x = -8$ $y = 4$ $\therefore V(-8; 4)$	✓ equating VR and ST ✓ simplification leading to $x = -8$ (2)



3.6	$R'(5;0)$ $VR = \sqrt{[-8 - (-5)]^2 + (4 - 0)^2} = 5$ $VT = \sqrt{(-8 - 0)^2 + (4 - 10)^2} = 10$ $\text{Area of } RVTR' = \frac{1}{2}(VR)(VT) + \frac{1}{2}(RR')(OT)$ $= \frac{1}{2}(5)(10) + \frac{1}{2}(10)(10)$ $= 25 + 50$ $= 75 \text{ units}^2$ OR/OF $ST: y = \frac{3}{4}x + 10$ $0 = \frac{3}{4}x + 10$ $x = -\frac{40}{3} \text{ or } -13\frac{1}{3}$ $W\left(-\frac{40}{3}; 0\right)$ $WR' = 5 - \left(-\frac{40}{3}\right) = \frac{55}{3} = 18\frac{1}{3}$ $\text{Area of } RVTR' = \text{Area of } \triangle TWR' - \text{Area of } \triangle WVR$ $= \frac{1}{2}\left(5 + \frac{40}{3}\right)(10) - \frac{1}{2}\left(-5 + \frac{40}{3}\right)(4)$ $= 75 \text{ units}^2$	✓ length of VR ✓ length of VT ✓ area $\triangle VRT$ ✓ area $\triangle RTR'$ ✓ answer (5) ✓ x-intercept of ST ✓ length of WR' ✓ area $\triangle TWR'$ ✓ area $\triangle WVR$ ✓ answer (5)
		[21]

QUESTION/VRAAG 4

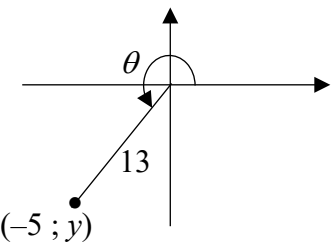


4.1	$\hat{C}\hat{E}\hat{M} = 90^\circ$	✓ answer (1)
4.2	$m_{ME} = \frac{0-3}{3-(-1)}$ $m_{ME} = -\frac{3}{4}$ $\therefore m_{ED} = \frac{4}{3}$ $3 = \frac{4}{3}(-1) + c$ $y = \frac{4}{3}x + \frac{13}{3}$ OR/OF $DM = \sqrt{(5)^2 + \left(\frac{15}{4}\right)^2}$ $DM = \frac{25}{4} \text{ or } 6,25 \text{ units}$ $\therefore D\left(-\frac{13}{4}; 0\right)$ $m_{ED} = \frac{3-0}{-1-\left(-\frac{13}{4}\right)}$ $\therefore m_{ED} = \frac{4}{3}$ $3 = \frac{4}{3}(-1) + c$ $y = \frac{4}{3}x + \frac{13}{3}$	$y-3 = \frac{4}{3}(x-(-1))$ $y = \frac{4}{3}x + \frac{13}{3}$ OR/OF [Pythagoras] ✓ $m_{ME} = -\frac{3}{4}$ ✓ m_{ED} ✓ substitution of E(-1 ; 3) ✓ equation (4) ✓ coordinates of D ✓ m_{ED} ✓ substitution of E(-1 ; 3) ✓ equation (4)

4.3	$y = \frac{4}{3}x + \frac{13}{3}$ $0 = \frac{4}{3}x + \frac{13}{3}$ $x_D = -\frac{13}{4}$ $\therefore DM = 3 - \left(-\frac{13}{4}\right)$ $DM = \frac{25}{4} \text{ or } 6,25 \text{ units}$ OR/OF $EM = 5 \text{ units}$ $ED = \frac{15}{4} \text{ units}$ $DM = \sqrt{(5)^2 + \left(\frac{15}{4}\right)^2}$ [Pythagoras] $DM = \frac{25}{4} \text{ or } 6,25 \text{ units}$	✓ x_D ✓ $x_M - x_D$ ✓ answer (3) ✓ $EM = 5 \text{ units}$ ✓ substitution of EM & ED ✓ answer (3)
4.4	$\text{EC: } y = \frac{4}{3}x + \frac{13}{3}$ $p = \frac{4}{3}(-7) + \frac{13}{3}$ $p = -5$ OR/OF $m_{EC} = \frac{4}{3}$ $\frac{p-3}{-7-(-1)} = \frac{4}{3}$ $p-3 = \frac{4}{3}(-6)$ $p = -5$	✓ substitution of $C(-7; p)$ into equation of EC (1) ✓ substitution of $C(-7; p)$ into gradient of EC (1)

4.5	$M \rightarrow E: (x; y) \rightarrow (x - 4; y + 3)$ [translation] $C \rightarrow S: (-7; -5) \rightarrow (-7 - 4; -5 + 3)$ $\therefore S(-11; -2)$ OR/OF $M \rightarrow C: (x; y) \rightarrow (x - 10; y - 5)$ [translation] $E \rightarrow S: (-1; 3) \rightarrow (-1 - 10; 3 - 5)$ $\therefore S(-11; -2)$ OR/OF $E(-1; 3)$ and $C(-7; -5)$ $\left(\frac{-1 + (-7)}{2}; \frac{3 + (-5)}{2} \right)$ [Midpoint of EC] $= (-4; -1)$ $S(x; y)$ and $M(3; 0)$ $\frac{x_s + 3}{2} = -4$ $\frac{y_s + 0}{2} = -1$ $x_s = -11$ $y_s = -2$ $\therefore S(-11; -2)$	$\checkmark$ method: translation $\checkmark x_s = -11 \checkmark y_s = -2$ (3) $\checkmark$ method: translation $\checkmark x_s = -11 \checkmark y_s = -2$ (3) $\checkmark$ method: midpoint $\checkmark x_s = -11 \checkmark y_s = -2$ (3)
4.6	$r_{\text{NEW}} = 5 + 7$ $r_{\text{NEW}} = 12$ $MS = \sqrt{(3 - (-11))^2 + (0 - (-2))^2}$ $MS = \sqrt{200}$ or $10\sqrt{2}$ or 14,14 units $14,14 > 12$ $\therefore S(-11; -2)$ lies outside the circle	$\checkmark r_{\text{NEW}} = 12$ $\checkmark MS$ $\checkmark$ conclusion (3)

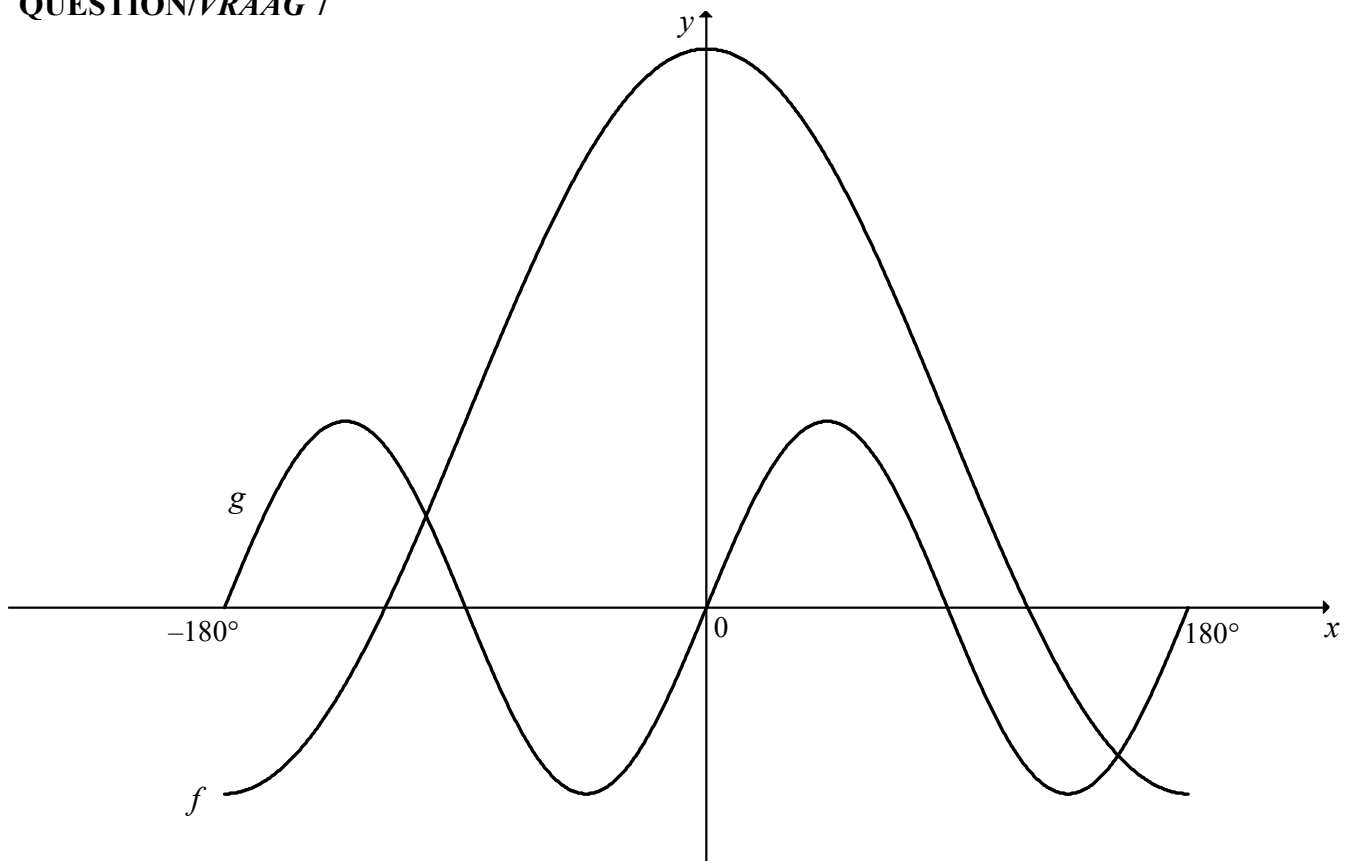
QUESTION/VRAAG 5

5.1.1	$y^2 = \sqrt{13^2 - (-5)^2}$ [Pythagoras] $y = -12$ $\sin^2 \theta$ $= \left(-\frac{12}{13}\right)^2$ $= \frac{144}{169}$ OR/OF $\sin^2 \theta = 1 - \cos^2 \theta$ $\sin^2 \theta = 1 - \left(-\frac{5}{13}\right)^2$ $\sin^2 \theta = \frac{144}{169}$	 $\checkmark y = -12$ $\checkmark$ substitution $\checkmark$ answer (3)
5.1.2	$\tan(360^\circ - \theta)$ $= -\tan \theta$ $= -\left(\frac{-12}{-5}\right)$ $= -\frac{12}{5}$	$\checkmark -\tan \theta$ $\checkmark$ answer (2)
5.1.3	$\cos(\theta - 135^\circ)$ $= \cos \theta \cos 135^\circ + \sin \theta \sin 135^\circ$ $= \cos \theta (-\cos 45^\circ) + \sin \theta (\sin 45^\circ)$ $= \left(-\frac{5}{13}\right)\left(-\frac{\sqrt{2}}{2}\right) + \left(-\frac{12}{13}\right)\left(\frac{\sqrt{2}}{2}\right)$ OR $\left(-\frac{5}{13}\right)\left(-\frac{1}{\sqrt{2}}\right) + \left(-\frac{12}{13}\right)\left(\frac{1}{\sqrt{2}}\right)$ $= -\frac{7\sqrt{2}}{26}$ $= -\frac{7}{13\sqrt{2}}$	$\checkmark$ cpd. $\angle$ expansion $\checkmark$ reduction $\checkmark$ substitution $\checkmark$ answer (4)

5.2	$\frac{2 \cos(180^\circ - x) \sin(-x)}{1 - 2 \cos^2(90^\circ - x)}$ $= \frac{2(-\cos x)(-\sin x)}{1 - 2 \sin^2 x}$ $= \frac{2 \sin x \cos x}{\cos 2x}$ $= \frac{\sin 2x}{\cos 2x}$ $= \tan 2x$	✓ $\cos(180^\circ - x) = -\cos x$ ✓ $\sin(-x) = -\sin x$ ✓ $\cos^2(90^\circ - x) = \sin^2 x$ ✓ $1 - 2 \sin^2 x = \cos 2x$ ✓ $2 \sin x \cos x = \sin 2x$ ✓ answer (6)
5.3	$(\tan 92^\circ)(\tan 94^\circ)(\tan 96^\circ) \dots (\tan 176^\circ)(\tan 178^\circ)$ $= \left(\frac{\sin 92^\circ}{\cos 92^\circ}\right) \left(\frac{\sin 94^\circ}{\cos 94^\circ}\right) \left(\frac{\sin 96^\circ}{\cos 96^\circ}\right) \dots \left(\frac{\sin 176^\circ}{\cos 176^\circ}\right) \left(\frac{\sin 178^\circ}{\cos 178^\circ}\right)$ $= \left(\frac{\cos 2^\circ}{-\sin 2^\circ}\right) \left(\frac{\cos 4^\circ}{-\sin 4^\circ}\right) \left(\frac{\cos 6^\circ}{-\sin 6^\circ}\right) \dots \left(\frac{\sin 4^\circ}{-\cos 4^\circ}\right) \left(\frac{\sin 2^\circ}{-\cos 2^\circ}\right)$ $= 1$ OR $(\tan 92^\circ)(\tan 94^\circ)(\tan 96^\circ) \dots (\tan 176^\circ)(\tan 178^\circ)$ $= (\tan 92^\circ)(\tan 94^\circ)(\tan 96^\circ) \dots (-\tan 4^\circ)(-\tan 2^\circ)$ $= \left(\frac{\sin 92^\circ}{\cos 92^\circ}\right) \left(\frac{\sin 94^\circ}{\cos 94^\circ}\right) \left(\frac{\sin 96^\circ}{\cos 96^\circ}\right) \dots \left(-\frac{\sin 4^\circ}{\cos 4^\circ}\right) \left(-\frac{\sin 2^\circ}{\cos 2^\circ}\right)$ $= \left(\frac{\cos 2^\circ}{-\sin 2^\circ}\right) \left(\frac{\cos 4^\circ}{-\sin 4^\circ}\right) \left(\frac{\cos 6^\circ}{-\sin 6^\circ}\right) \dots \left(-\frac{\sin 4^\circ}{\cos 4^\circ}\right) \left(-\frac{\sin 2^\circ}{\cos 2^\circ}\right)$ $= 1$	✓ quotient identity ✓ co-ratios ✓ reduction ✓ answer (4) ✓ reduction ✓ quotient identity ✓ co-ratios ✓ answer (4)
		[19]

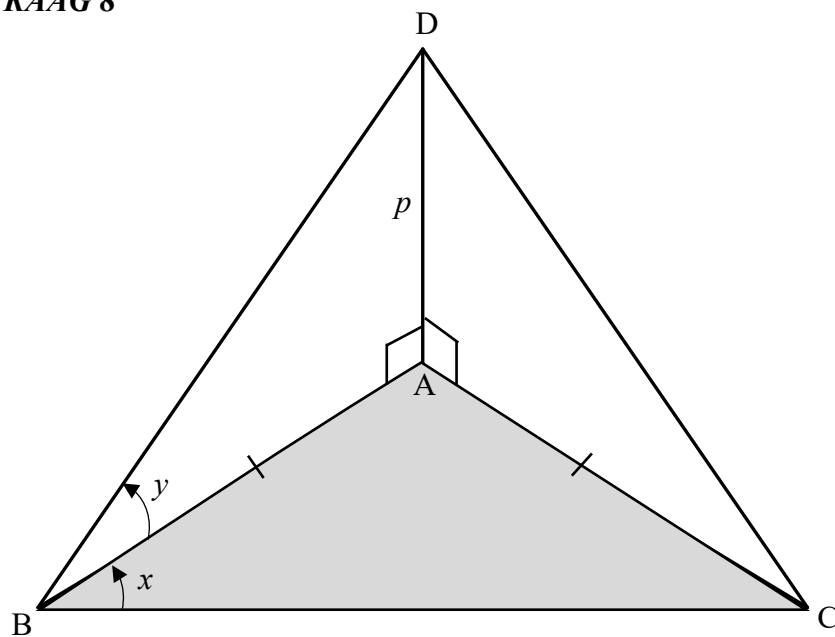
QUESTION/VRAAG 6

6.1	$\begin{aligned} \text{LHS} &= 2 \cos^2(45^\circ + x) \\ &= 2 \cos^2(45^\circ + x) + 1 - 1 \\ &= \cos[2(45^\circ + x)] + 1 \\ &= \cos(90^\circ + 2x) + 1 \\ &= (-\sin 2x) + 1 \\ &= 1 - \sin 2x \\ &= \text{RHS} \end{aligned}$ OR/OF $\begin{aligned} \text{LHS} &= 2 \cos^2(45^\circ + x) \\ &= 2(\cos(45^\circ + x))^2 \\ &= 2(\cos 45^\circ \cos x - \sin 45^\circ \sin x)^2 \\ &= 2\left(\frac{\sqrt{2}}{2} \cos x - \frac{\sqrt{2}}{2} \sin x\right)^2 \\ &= 2\left(\frac{1}{2} \cos^2 x - \sin x \cos x + \frac{1}{2} \sin^2 x\right) \\ &= \cos^2 x - 2 \sin x \cos x + \sin^2 x \\ &= 1 - \sin 2x \\ &= \text{RHS} \end{aligned}$	$\checkmark + 1 - 1$ $\checkmark$ double angle $\checkmark$ simplification $\checkmark$ reduction $\checkmark$ compound $\angle$ expansion $\checkmark$ subst. special $\angle$ values $\checkmark$ simplification $\checkmark \sin^2 x + \cos^2 x = 1$
6.2.1	$\begin{aligned} \text{LHS} &= \sin(A - B) - \sin(A + B) \\ &= \sin A \cos B - \cos A \sin B - (\sin A \cos B + \cos A \sin B) \\ &= \sin A \cos B - \cos A \sin B - \sin A \cos B - \cos A \sin B \\ &= -2 \cos A \sin B \\ &= \text{RHS} \end{aligned}$	$\checkmark \sin A \cos B - \cos A \sin B$ $\checkmark -\sin A \cos B - \cos A \sin B$
6.2.2	$\begin{aligned} \sin 4x - \sin 10x \\ &= \sin(7x - 3x) - \sin(7x + 3x) \\ &= -2 \cos 7x \sin 3x \end{aligned}$	$\checkmark 4x = 7x - 3x \text{ \& } 10x = 7x + 3x$ $\checkmark$ answer
6.2.3	$\begin{aligned} \sin 4x - \sin 10x &= \sin 3x \\ -2 \cos 7x \sin 3x &= \sin 3x \\ 2 \cos 7x \sin 3x + \sin 3x &= 0 \\ \sin 3x(2 \cos 7x + 1) &= 0 \\ \sin 3x &= 0 & \text{ or } & \cos 7x = -\frac{1}{2} \\ 3x &= 0^\circ & & 7x = 120^\circ \text{ or } 7x = 240^\circ \\ x &= 0^\circ & & x = 17,14^\circ \quad x = 34,29^\circ \\ & & & \text{N/A} \end{aligned}$	$\checkmark$ substitution $\checkmark$ factorisation $\checkmark$ both equations $\checkmark$ answer $\checkmark$ answer
[13]		

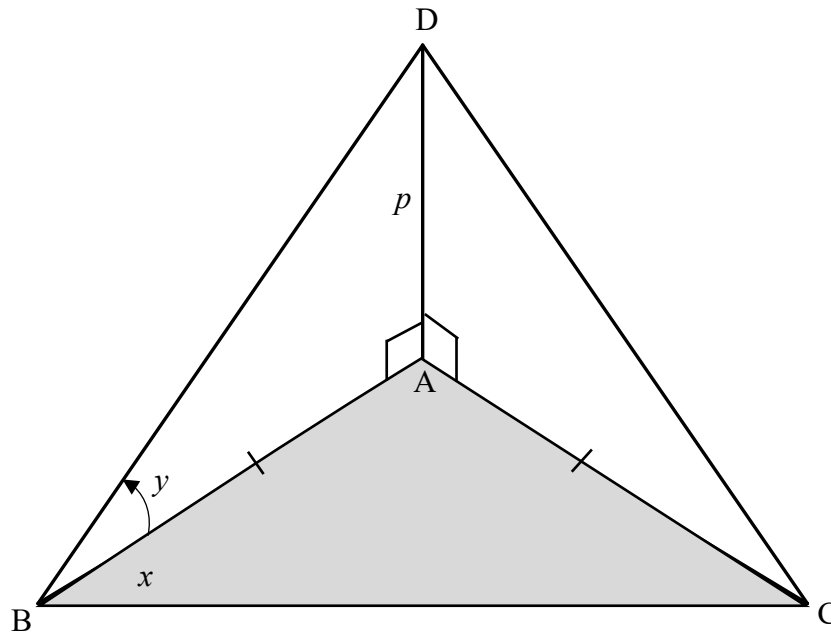
QUESTION/VRAAG 7

7.1	Range of f : $y \in [-1 ; 3]$ OR/OF $-1 \leq y \leq 3$	$\checkmark y \in [-1 ; 3]$ (1) $\checkmark -1 \leq y \leq 3$ (1)
7.2	Period of g : 180°	$\checkmark 180^\circ$ (1)
7.3	f increasing: $x \in (-180^\circ ; 0^\circ)$ OR/OF $-180^\circ < x < 0^\circ$	$\checkmark x \in (-180^\circ ; 0^\circ)$ (1) $\checkmark -180^\circ < x < 0^\circ$ (1)
7.4.1	$g(x) \cdot f'(x) < 0$ $x \in (-90^\circ ; 0^\circ) \cup (0^\circ ; 90^\circ)$ OR/OF $-90^\circ < x < 0^\circ$ or $0^\circ < x < 90^\circ$	$\checkmark x \in (-90^\circ ; 0^\circ) \checkmark x \in (0^\circ ; 90^\circ)$ (2) $\checkmark -90^\circ < x < 0^\circ \checkmark 0^\circ < x < 90^\circ$ (2)

7.4.2	$\cos x \leq -\frac{1}{2}$ $2 \cos x + 1 \leq 0$ $x \in [-180^\circ; -120^\circ] \cup [120^\circ; 180^\circ]$ OR/OF $2 \cos x + 1 \leq 0$ $-180^\circ \leq x \leq -120^\circ \quad \text{or} \quad 120^\circ \leq x \leq 180^\circ$	$\checkmark \quad 2 \cos x + 1 \leq 0$ $\checkmark \quad x \in [-180^\circ; -120^\circ] \checkmark x \in [120^\circ; 180^\circ]$ (3) $\checkmark \quad 2 \cos x + 1 \leq 0$ $\checkmark \quad -180^\circ \leq x \leq -120^\circ \quad \checkmark \quad 120^\circ \leq x \leq 180^\circ$ (3)
7.5	$g(x) = \sin 2x$ $h(x) = \sin 2(x - 45^\circ)$ $\quad = \sin(2x - 90^\circ)$ $\quad = -\sin(90^\circ - 2x)$ $\quad = -\cos 2x$	$\checkmark \quad \sin(2x - 90^\circ)$ $\checkmark \quad \text{equation of } h$ (2)
[10]		

QUESTION/VRAAG 8

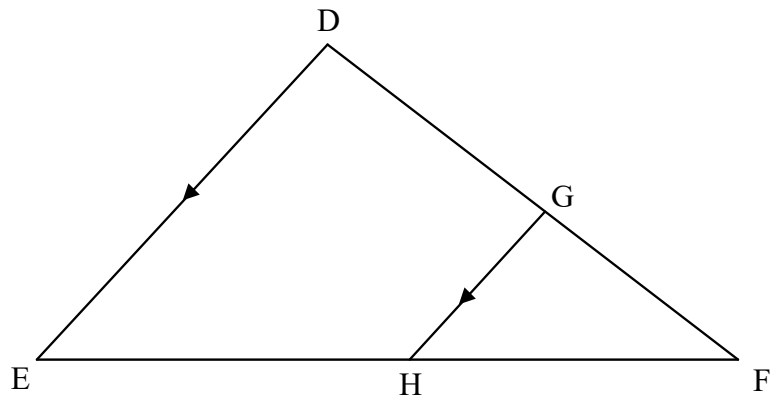
8.1	$\tan y = \frac{p}{AB}$ $AB = \frac{p}{\tan y}$	✓ correct trig ratio ✓ answer (2)
8.2	In $\triangle BAC$: $\frac{\sin \hat{BAC}}{BC} = \frac{\sin \hat{ACB}}{AB}$ $\frac{\sin(180^\circ - 2x)}{2p} = \frac{\sin x}{\left(\frac{p}{\tan y}\right)}$ $\frac{\sin 2x}{2p} = \sin x \times \left(\frac{\tan y}{p}\right)$ $\frac{2 \sin x \cos x}{2p} = \sin x \times \left(\frac{\tan y}{p}\right)$ $2 \cos x = \left(\frac{\tan y}{p}\right)(2p)$ $\cos x = \tan y$	✓ correct use of sine-rule ✓ substitute BC & AB ✓ $\sin(180^\circ - 2x) = \sin 2x$ ✓ $\sin 2x = 2 \sin x \cos x$ (4)



8.2	OR/OF In $\triangle BAC$: $BC^2 = AB^2 + AC^2 - 2(AB)(AC)\cos \hat{BAC}$ $(2p)^2 = \left(\frac{p}{\tan y}\right)^2 + \left(\frac{p}{\tan y}\right)^2 - 2\left(\frac{p}{\tan y}\right)\left(\frac{p}{\tan y}\right)\cos(180^\circ - 2x)$ $4p^2 = \frac{2p^2}{\tan^2 y} - \frac{2p^2(-\cos 2x)}{\tan^2 y}$ $4p^2 \tan^2 y = 2p^2(1 + \cos 2x)$ $\tan^2 y = \frac{1 + 2\cos^2 x - 1}{2}$ $\tan^2 y = \cos^2 x$ $\tan y = \cos x$	✓ correct use of cos-rule ✓ substitute AB & BC ✓ $\cos(180^\circ - 2x) = -\cos 2x$ ✓ $\cos 2x = 2\cos^2 x - 1$ (4)
8.3	$\cos x = \tan y$ $\tan y = \cos 60^\circ$ $\tan y = 0,5$ $y = 26,57^\circ$	✓ substitution of 60° ✓ answer (2)
[8]		

QUESTION/VRAAG 9

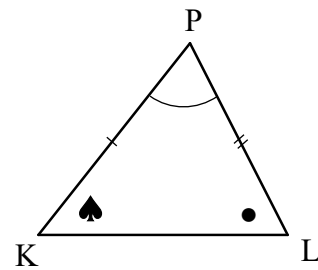
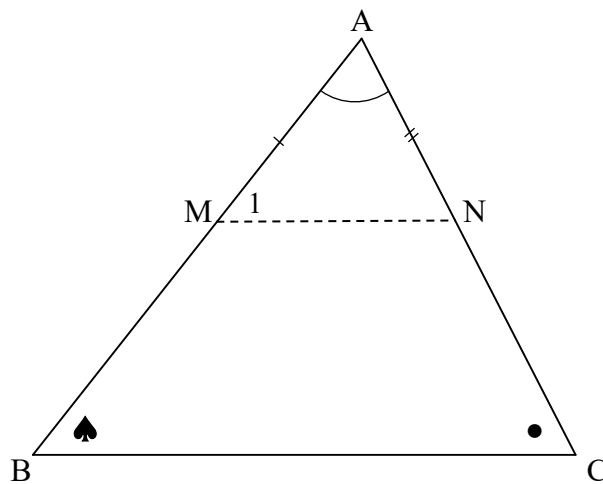
9.1



9.1.1	$\frac{HF}{EH} = \frac{GF}{GD} = \frac{2}{5}$ [line to one side of Δ/lyn een sy van Δ] OR [prop theorem; $GH \parallel DE$/eweredigheidst.; $GH \parallel DE$]	✓ S ✓ R (2)
9.1.2	$\frac{EH}{EF} = \frac{DG}{DF} = \frac{5}{7}$ [line to one side of Δ/lyn een sy van Δ] OR [prop theorem; $GH \parallel DE$/eweredigheidst.; $GH \parallel DE$] $\frac{EH}{21} = \frac{5}{7}$ $EH = 15\text{cm}$ OR/OF $\frac{HF}{EF} = \frac{2}{7}$ [line to one side of Δ/lyn een sy van Δ] OR [prop theorem; $GH \parallel DE$/eweredigheidst.; $GH \parallel DE$] $\frac{HF}{21} = \frac{2}{7}$ $HF = 6\text{cm}$ $EH = 21 - 6$ $EH = 15\text{cm}$	✓ S ✓ answer (2) ✓ S ✓ answer (2)
9.1.3	$\Delta FGH \parallel \Delta FDE$ [$\angle \angle \angle$]	✓ S (1)
9.1.4	$\frac{GH}{DE} = \frac{FH}{FE}$ [$\parallel \Delta$'s] OR/OF $\frac{GH}{DE} = \frac{FG}{FD}$ [$\parallel \Delta$'s]	✓ S ✓ S (2)

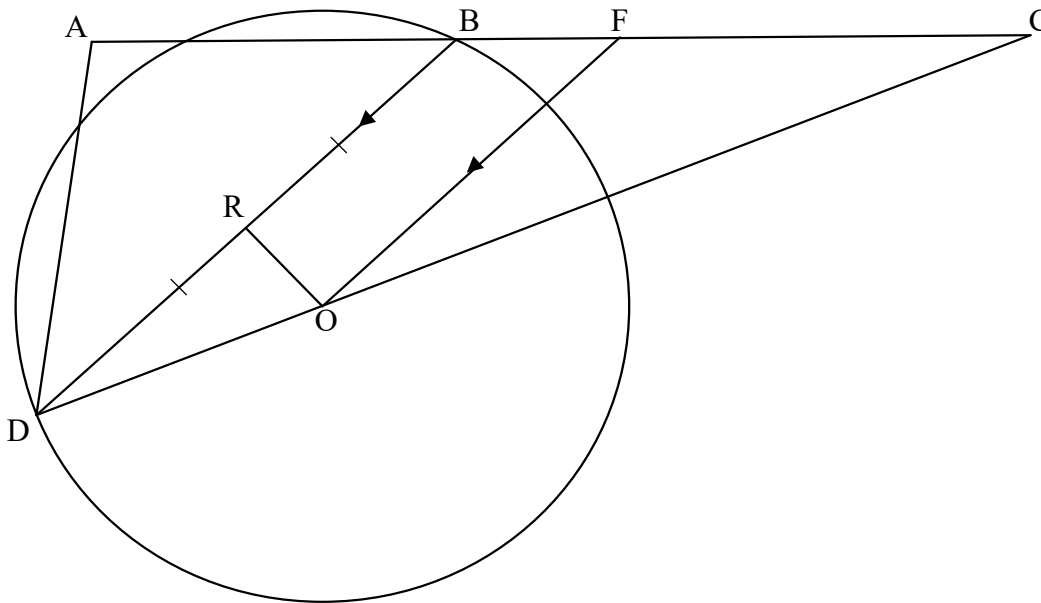
QUESTION/VRAAG 10

10.1



10.1	Construction: Draw line MN, where M and N are points on AB and AC respectively such that $AM = PK$ and $AN = PL$. In $\triangle AMN$ and $\triangle PKL$ $\hat{A} = \hat{P}$ [given] $AM = PK$ [construction] $AN = PL$ [construction] $\triangle AMN \equiv \triangle PKL$ [s.s.s.] $\therefore \hat{M}_1 = \hat{K}$ But $\hat{B} = \hat{K}$ [given] $\therefore \hat{M}_1 = \hat{B}$ $\therefore MN \parallel BC$ [corresp $\angle$s =/ooreenk. $\angle e =$] $\therefore \frac{AB}{AM} = \frac{AC}{AN}$ [line $\parallel$ one side of $\triangle$/lyn $\parallel$ een sy v $\triangle$] But $AM = PK$ and $AN = PL$ $\therefore \frac{AB}{PK} = \frac{AC}{PL}$	✓ construction ✓ S/R ✓ S ✓ S / R ✓ S ✓ R (6)
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10.2



10.2.1	In $\triangle CFO$ and $\triangle CBD$ $\hat{C} = \hat{C}$ [common] $\hat{CFO} = \hat{CBD}$ [corresp $\angle$s; $BD \parallel FO$/ooreenk. $\angle$e; $BD \parallel FO$] $\hat{COF} = \hat{CDB}$ [sum of $\angle$s in $\triangle$/binne $\angle$e v $\triangle$] OR $\triangle CFO \sim \triangle CBD$ [corresp $\angle$s; $BD \parallel FO$/ ooreenk. $\angle$e; $BD \parallel FO$] $\triangle CFO \sim \triangle CBD$ [$\angle\angle\angle$]	✓ S ✓ S/R ✓ S/R OR R (3)
10.2.2	$\frac{FO}{BD} = \frac{CO}{CD}$ [$\sim \triangle$s] $FO \cdot CD = CO \cdot BD$ But $\hat{RDO} = \hat{FCO}$ [given] $\therefore BD = BC$ [sides opp equal $\angle$s/sye teenoor gelyke $\angle$e] $\therefore FO \cdot CD = CO \cdot BC$	✓ S/R ✓ S/R (2)

10.2.3	RD = 6 units [DR = RB] $\frac{RO}{RD} = \frac{3}{4}$ $\therefore RO = \frac{3}{4}(6)$ RO = 4,5 units OR $\perp$ BD [line from centre to midpt of chord/ midpt. sirkel; midpt koord] $\therefore DO = \sqrt{6^2 + 4,5^2}$ [Pythagoras] DO = 7,5 units $\frac{BF}{BC} = \frac{DO}{DC}$ [line $\parallel$ to one side of Δ /lyn $\parallel$ een sy v Δ] OR/OF [prop theorem; BD $\parallel$ FO/eweredigheidst.; BD $\parallel$ FO] BC = BD = 12 units [sides opp equal $\angle$s/sye teenoor gelyke $\angle$e] $\therefore \frac{BF}{12} = \frac{7,5}{19,2}$ $BF = \frac{7,5 \times 12}{19,2}$ $BF = \frac{75}{16} \text{ units}$	✓ S ✓ S/R ✓ S ✓ S/R ✓ S ✓ S (6)
10.2.4	$\tan \hat{RDO} = \frac{RO}{RD} = \frac{4,5}{6} = \frac{3}{4}$ $\hat{RDO} = 36,87^\circ$ $\hat{FCO} = \hat{RDO} = 36,87^\circ$ [given] $\therefore \hat{ABD} = 73,74^\circ$ [ext $\angle$ of Δ /buite $\angle$ v. Δ] OR/OF $CD^2 = BC^2 + BD^2 - 2(BC)(BD)\cos \hat{DBC}$ $\cos \hat{DBC} = \frac{12^2 + 12^2 - 19,2^2}{2(12)(12)}$ $\cos \hat{DBC} = -\frac{7}{25}$ $\hat{DBC} = 106,26^\circ$ $\therefore \hat{ABD} = 73,74^\circ$ [$\angle$ s on a straight line/ $\angle$ e op 'n reguitlyn]	✓ ratio ✓ $\hat{RDO}$ ✓ answer (3) ✓ substitution into cosine-rule ✓ $\hat{DBC}$ ✓ answer (3)
		[20]

TOTAL/TOTAAL: 150