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Northern Cape Department of Education

**CURRICULUM PROVINCIAL QUESTION PAPER/
KURRIKULUM PROVINSIALE VRAESTEL**

GRADE/GRAAD 12

MATHEMATICS/WISKUNDE

PAPER/VRAESTEL 2

JUNE/JUNIE 2026

MARKING GUIDELINES/NASIENRIGLYNE

ADJUSTED MARKING GUIDELINE 9 JUNE 2026

MARKS/PUNTE: 150

**These marking guidelines consist of 20 pages./
Hierdie nasienriglyne bestaan uit 20 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 after the second calculation error.
- Assuming answers/values to solve a problem is NOT acceptable.

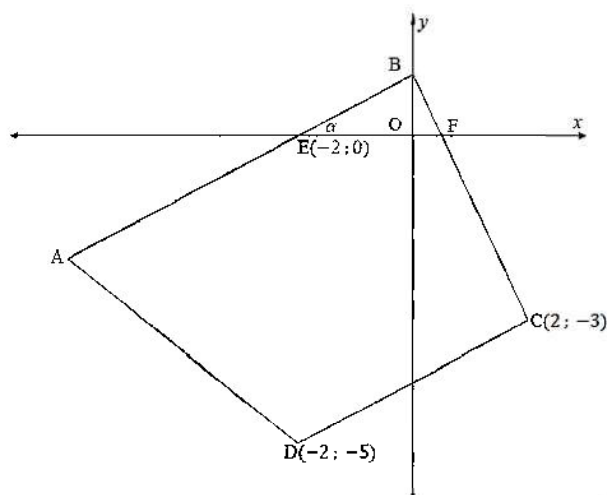
GEOMETRY	
S	A mark for a correct statement (A statement mark is independent of a reason)
R	A mark for the correct reason (A reason mark may only be awarded if the statement is correct)
S/R	Award a mark if statement AND reason are both correct

QUESTION/VRAAG 1		
1.1	10,23 Penalise for rounding	✓ answer ✓ rounding (2)
1.2	$[26,93 - 10,23 ; 26,93 + 10,23]$ $[16,7 ; 37,16]$ $\frac{11}{15} \times 100 = 73,33\%$	✓ interval ✓ interval ✓ answer % (3)
1.3	$\frac{1}{4}(15+1) = 4^{th}$ position $\therefore 19$ $\frac{3}{4}(15+1) = 12^{th}$ position $\therefore 35$ $Q_3 - Q_1$ $= 35 - 19$ $= 16$ $12 - 4 = 8$ (B/D) Zero marks	✓ Q1 19 ✓ Q3 35 ✓ answer (3)
1.4.1	$26,93 - 5 = 21,93$	✓ 21,93 (1)
1.4.2	10,23	✓ answer (1)
		[10]



QUESTION/VRAAG 2		
2.1	$A = 12$	✓12 (1)
2.2	$\frac{1755}{51} = 34,41$ Answer Only CA IF A incorrect: $\frac{1455 + A(25)}{51} = \bar{x}$	✓ method ✓ answer (2)
2.3	Ultra marathon distance ran	✓ upper boundaries + C.F ✓ shape ✓ (70;51) ✓ (0;0) (4)
2.4	Median at C.F 25,5 34 (CA vanaf grafiek / CA from ogive)	✓ answer (33,34,35) (1)
2.5	More than 55km: 47 Athletes / Atlete $51 - 47 = 4$ (CA vanaf grafiek / CA from ogive)	✓ value (47) (46,47,48) ✓ answer (2)
		[10]



QUESTION/VRAAG 3

3.1	$m_{CD} = \frac{-5+3}{-2-2}$ $= \frac{-2}{-4}$ $= \frac{1}{2}$	✓ substitution C & D ✓ answer (2)
3.2	$m_{AB} = m_{CD} = \frac{1}{2} \quad (AB \parallel CD)$ $y = \frac{1}{2}x + c$ $0 = \frac{1}{2}(-2) + c$ $c = 1$ $y = \frac{1}{2}x + 1$	✓ gradient (3.1) ✓ Substitute E (-2;0) ✓ value of c /equation (3)
3.3	$\tan \alpha = \frac{1}{2}$ $\alpha = 26,57^\circ$	✓ method (3.1) ✓ answer (2)
3.4	$BE = \sqrt{(0+2)^2 + (1-0)^2}$ $= \sqrt{5}$ OR $\text{In } \triangle EBO: \cos 26,7^\circ = \frac{2}{EB}$ $EB = 2,24 \text{ units}$ OR Any other correct method	✓ substitution B (3.2) & E ✓ answer (2) ✓ substitution $\cos \alpha$ (3.3) ✓ answer

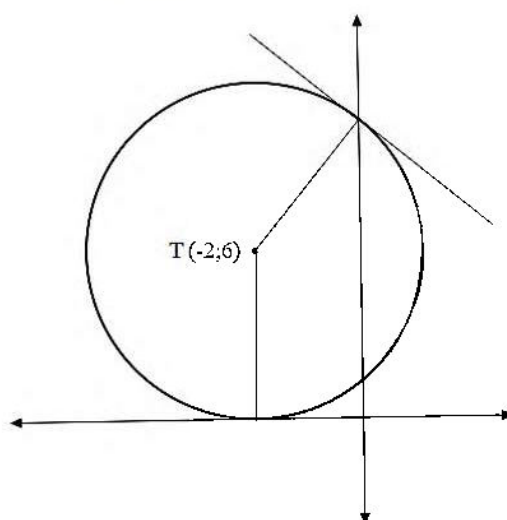
3.5	$m_{BC} \times m_{CD}$ $= -2 \times \frac{1}{2}$ $= -1$ $\therefore$ perpendicular / loodreg $\therefore \hat{ABC} = 90^\circ$	✓ method (3.1) ✓ answer (2)
3.6	$D' (-4; -6)$ D to D' 2 units left, 1 unit down OR $D' (-4; -6)$ D to D' $(x - 2; y - 1)$	✓ -4 ✓ -6 ✓ answer ✓ answer (4) ✓ -4 ✓ -6 ✓ answer ✓ answer (4)
3.7	midpoint AC: $\left(\frac{-6+2}{2}; \frac{-2-3}{2} \right)$ $\left(-2; \frac{-5}{2} \right)$ OR midpoint BD': $\left(\frac{0-4}{2}; \frac{1-6}{2} \right)$ $\left(-2; \frac{-5}{2} \right)$ Answer Only	✓ substitute A & C ✓ answer ✓ answer (3) ✓ substitute B (3.2) & D' (3.6) ✓ answer ✓ answer
3.8	BC: $y = -2x + 1$ F: $\left(\frac{1}{2}; 0 \right)$ EF = 2,5 units OB = 1 unit Area $\triangle BEF = \frac{1}{2} EF \cdot OB$ $= \frac{1}{2} (2,5)(1)$ $= 1,25 \text{ units}^2$ OR	✓ EF length ✓ OB length (3.2) ✓ answer



$\text{Area } \triangle BEF = \frac{1}{2} EF \cdot EB \cdot \sin \alpha$ $= \frac{1}{2} \left(2\frac{1}{2} \right) (\sqrt{5}) \sin 26,57^\circ$ $= 1,25 \text{ units}^2$	✓ EF length ✓ substitution area rule (3.4) ✓ answer (3)
	[21]

QUESTION/VRAAG 4**ERRATA: EQUATION AS GIVEN ON QUESTION PAPER:**

$$x^2 + y^2 + 4x - 12y = 0$$



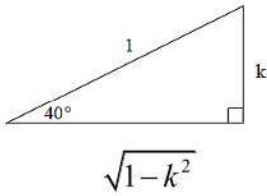
4.1	$x^2 + y^2 + 4x - 12y = 0$ $x^2 + 4x + 4 + y^2 - 12y + 36 = 0 + 4 + 36$ $(x + 2)^2 + (y - 6)^2 = 40$ $\therefore$ midpt $T(-2; 6)$ but $r \neq 6$ If started with $(x+2)^2 + (y-6)^2 = 36$ Break Down (0 out of 3)	✓ Complete square LHS ✓ Complete square RHS ✓ $(x + 2)^2 + (y - 6)^2 = 40$ (3)
4.2 Hence	$(-2; 0)$	✓ $(-2;0)$ (1)

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4.4	$m_{\text{radius}} = \frac{6 - (6 + 4\sqrt{2})}{-2 - 0}$ $= \frac{-4\sqrt{2}}{-2}$ $= 2\sqrt{2}$ $m_{\text{tangent}} = -\frac{2}{2\sqrt{2}} \text{ or } \frac{-\sqrt{2}}{4} \text{ (rad } \perp \text{ tan) or } \frac{-1}{2\sqrt{2}}$ $y = -\frac{1}{2\sqrt{2}}x + 6 + 4\sqrt{2}$ OR $y = -0,35x + 11,66$	✓ substitute T and $(0 ; 6 + 4\sqrt{2})$ ✓ answer ✓ gradient of tangent ✓ equation (4)
4.5	$6 + k > 6$ $k > 0$ OR $6 + k < -6$ $k < -12$	✓ > 6 ✓ answer ✓ < -6 ✓ answer (4)
		[16]



QUESTION/VRAAG 5		
5.1	$LHS: \frac{-1 + \cos(180^\circ - \theta) \cdot -\cos \theta}{\cos(-\theta) \cdot \cos \theta \cdot \tan^2(540^\circ + \theta)}$ $= \frac{-1 - \cos \theta \cdot -\cos \theta}{\cos \theta \cdot \cos \theta \cdot (\tan \theta)^2}$ $= \frac{-1 + \cos^2 \theta}{\cos^2 \theta \cdot \frac{\sin^2 \theta}{\cos^2 \theta}}$ $= \frac{-(1 - \cos^2 \theta)}{\sin^2 \theta}$ $= \frac{-\sin^2 \theta}{\sin^2 \theta}$ $= -1$ $= RHS$	$\checkmark -\cos \theta$ $\checkmark \cos \theta$ $\checkmark \tan \theta$ $\checkmark \frac{\sin \theta}{\cos \theta}$ $\checkmark -(1 - \cos^2 \theta)$ $\checkmark \sin^2 \theta$ identity (6)
5.2.1	$\sin 40^\circ = k$ $\frac{1}{\sin 140^\circ} = \frac{1}{\sin 40^\circ} = \frac{1}{k}$	$\checkmark \sin 40^\circ$ $\checkmark$ answer (2)
5.2.2	$\frac{1}{2}(2\sin 20^\circ \cdot \cos 20^\circ)$ $= \frac{1}{2}(\sin 40^\circ) = \frac{1}{2}k$	$\checkmark$ half a double angle $\checkmark$ answer (2)
5.2.3	$\sin(60^\circ - 40^\circ)$ $= \sin 60^\circ \cos 40^\circ - \cos 60^\circ \sin 40^\circ$ $= \frac{\sqrt{3}}{2} \cdot \sqrt{1 - k^2} - \frac{1}{2} \cdot k$ $= \frac{\sqrt{3} \cdot \sqrt{1 - k^2} - k}{2}$  OR $\sin(50^\circ - 30^\circ)$ OR Any other valid solution NOTE: FORMULA OF $\sin(\alpha - \beta)$ omitted on formula sheet. Do not penalize incorrect $\sin(\alpha - \beta)$ expansion	$\checkmark$ sketch/ $\sqrt{1 - k^2}$ $\checkmark \sin(60^\circ - 40^\circ)$ $\checkmark$ expansion $\checkmark$ substitution (4)

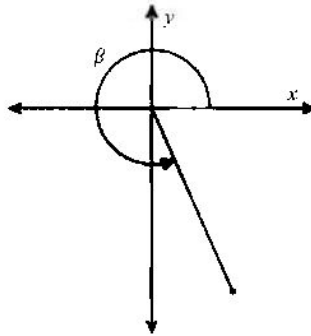


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5.3	$\sin^2 76^\circ - \cos^2 76^\circ$ $= -(\cos^2 76^\circ - \sin^2 76^\circ)$ $= -\cos 152^\circ$ $= -(-\cos 28^\circ)$ $= \cos 28^\circ$ OR $(\sin 76^\circ)^2 - (\cos 76^\circ)^2$ $= (\cos 14^\circ)^2 - (\sin 14^\circ)^2$ $= \cos 2(14^\circ)$ $= \cos 28$	✓ common factor ✓ $-\cos 152^\circ$ cos double angle ✓ $-\cos 28^\circ$ (3)
		✓ co-function ✓ co-function ✓ cos double angle (3)
		[17]



QUESTION/VRAAG 6

6.1.1

 $r = 5$ (Pythagoras)

$$\sin \beta = -\frac{4}{5}$$

Answer Only

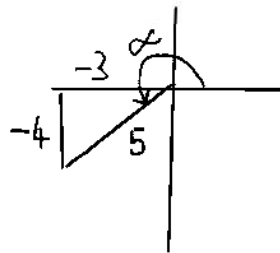
✓ $r = 5$

✓ answer

(2)

6.1.2

$$\begin{aligned} & \sin(\beta + \alpha) \\ &= \sin \beta \cos \alpha + \cos \beta \sin \alpha \\ &= \left(-\frac{4}{5}\right)\left(-\frac{3}{5}\right) + \left(\frac{3}{5}\right)\left(-\frac{4}{5}\right) \\ &= \frac{12}{25} - \frac{12}{25} \\ &= 0 \end{aligned}$$



✓ expansion

✓ substitution

✓ simplification

(3)

6.2

$$\sin x (3 \sin x + 1) = 0$$

$$\sin x = 0$$

$$x = 0^\circ + 180^\circ k; k \in \mathbb{Z}$$

$$\text{or } \sin x = -\frac{1}{3}$$

$$\text{ref } \angle : 19,47^\circ$$

$$\text{III: } x = 199,47^\circ + 360^\circ k; k \in \mathbb{Z}$$

$$\text{IV: } x = 340,53^\circ + 360^\circ k; k \in \mathbb{Z}$$

✓ $\sin x = 0$ ✓ $x = 0^\circ + 180^\circ k$ ✓ $\sin x = -\frac{1}{3}$ ✓ $199,47^\circ;$
 $340,53^\circ$ ✓ $+360^\circ k; k \in \mathbb{Z}$

(5)

[10]**SA EXAM PAPERS**

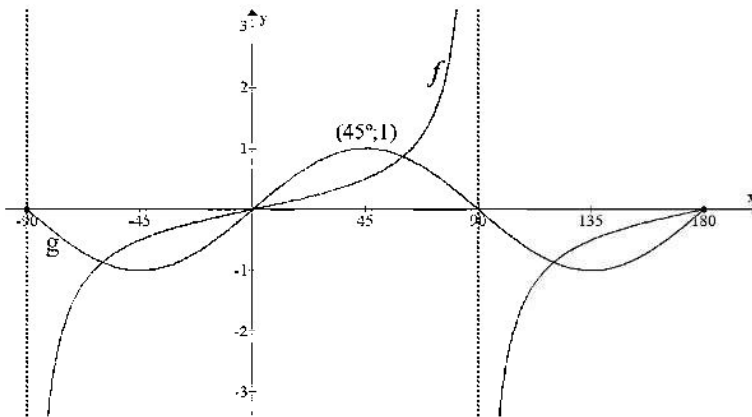
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QUESTION/VRAAG 77.1 $x = 0^\circ; x = 180^\circ$

✓ both answers

(1)

7.2

 $g(x) = \sin 2x$

✓ TP

✓ x – intercepts

✓ shape

(3)

7.3

$$\frac{1}{2} \tan x = \sin 2x$$

$$\frac{\sin x}{2 \cos x} = 2 \sin x \cos x$$

$$\sin x = 4 \sin x \cos^2 x$$

$$0 = 4 \sin x \cos^2 x - \sin x$$

$$0 = \sin x(4 \cos^2 x - 1)$$

$$\sin x = 0$$

$$x = 0^\circ + 180^\circ k; k \in \mathbb{Z}$$

$$\cos^2 x = \frac{1}{4}$$

$$\cos x = \pm \frac{1}{2} \quad \text{ref } \angle : 60^\circ$$

No $\pm$ No mark

$$I : x = 60^\circ + 360^\circ k; k \in \mathbb{Z}$$

$$IV : x = 300^\circ + 360^\circ k; k \in \mathbb{Z}$$

$$II : x = 120^\circ + 360^\circ k; k \in \mathbb{Z}$$

$$III : x = 240^\circ + 360^\circ k; k \in \mathbb{Z}$$

CA Quadrants

Answer Only

2 out of 7

$$-60^\circ \quad 0^\circ \quad 60^\circ \quad 120^\circ \quad 180^\circ$$

✓ tan identity

✓ sin double angle

✓ factors

✓

$$x = 0^\circ + 180^\circ k; k \in \mathbb{Z}$$

$$\checkmark \cos x = \pm \frac{1}{2}$$

✓ CA

$$60^\circ \quad 300^\circ \quad 120^\circ \quad 240^\circ$$

✓ answer

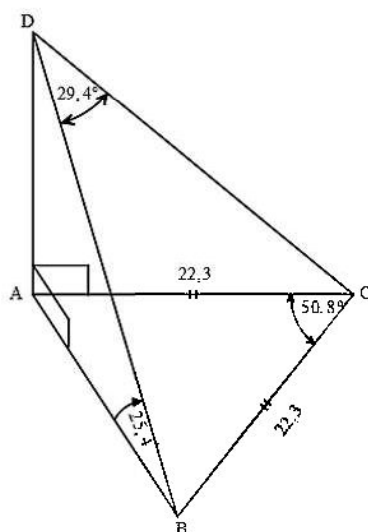
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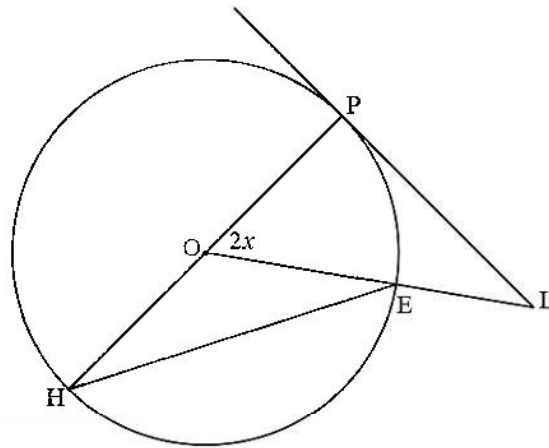
7.4	$\frac{1}{2} \tan x \geq \sin 2x$ $60^\circ \leq x < 90^\circ$	Inequality mark may ONLY be awarded if the critical values are correct.	✓ $\sin 2x$ ✓ critical values ✓ correct inequality (3)
			[14]

QUESTION/VRAAG 8

8.1	$\text{Area of } \triangle ABC = \frac{1}{2} (22,3)(22,3) \sin 50,8^\circ$ $= 192,69 \text{ units}^2$	✓ substitute in area rule ✓ answer (2)
8.2	In $\triangle ABC$: $AB^2 = 22,3^2 + (22,3)^2 - 2(22,3)(22,3) \cos 50,8^\circ$ $AB^2 = 365,976...$ $AB = 19,13$	✓ substitution in cos rule ✓ simplify ✓ answer (3)
8.3	In $\triangle BCD$: $\frac{CD}{\sin 43,6^\circ} = \frac{22,3}{\sin 29,4^\circ}$ $CD = \frac{22,3 \cdot \sin 43,6^\circ}{\sin 29,4^\circ}$ $CD = 31,32$	✓ substitution in sin rule ✓ answer (2)
		[7]



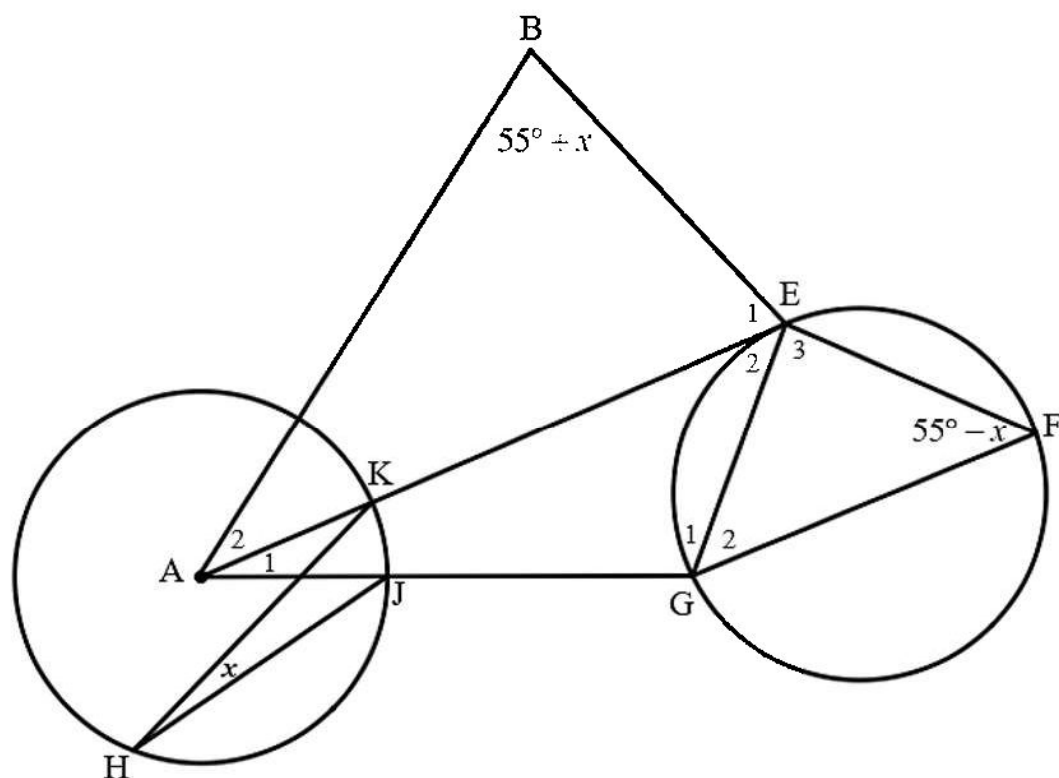
QUESTION/VRAAG 9



9.1	$\hat{H}\hat{O}\hat{E} = 180^\circ - 2x$ (Hoeke op 'n reguitlyn / Angles on a straight line) $OH = OE$ (Radiusse / Radii) $\hat{H} = \hat{O}\hat{E}H$ $\hat{O}\hat{E}H = x$ (Hoeke teenoor gelyke sye / Angles opp equal sides) OR $OH = OE$ (Radiusse / Radii) $\hat{H} = \hat{O}\hat{E}H$ (Hoeke teenoor gelyke sye / Angles opp equal sides) $\hat{O}\hat{E}H = x$ (Buite hoek van driehoek / Ext Angle of triangle) OR $\hat{H} = x$ (Mdpt $\angle = 2 \times$ omtrekshoek) $OH = OE$ (Radiusse / radii) $\hat{O}\hat{E}H = x$ (Hoeke teenoor gelyke sye / Angles opp equal sides)	$\checkmark$ S/R $\checkmark$ OH = OE $\checkmark$ S $\checkmark$ R $\checkmark$ OH = OE $\checkmark$ S $\checkmark$ R $\checkmark$ S/R $\checkmark$ OH = OE $\checkmark$ S $\checkmark$ R
9.2	$\hat{O}\hat{P}\hat{L} = 90^\circ$ (Radius $\perp$ Raaklyn / Radius $\perp$ tangent) $\hat{L} = 180^\circ - 90^\circ - 2x$ $= 90^\circ - 2x$ (Binnehoeke v driehoek / Angles of Triangle)	$\checkmark$ S $\checkmark$ R $\checkmark$ S
		[7]



QUESTION/VRAAG 10



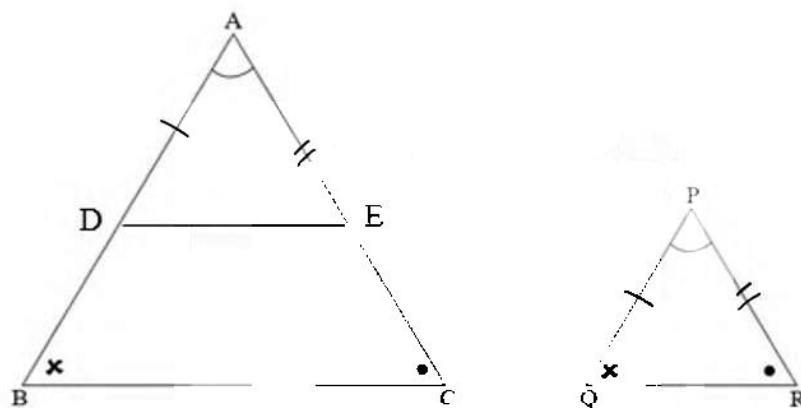
10.1	$\hat{E}_2 = 55^\circ - x$ (Raaklyn - koord st / Tan - chord th)	✓S ✓R (2)
10.2	$\hat{A}_1 = 2x$ (Mdptshoek = $2 \times$ omtrekshoek / Angle at centre = $2 \times$ angle at the centre) $\hat{G}_1 = 180^\circ - 2x - (55^\circ - x)$ (Binnehoek v driehoek / Angles of Triangle) $= 125^\circ - x$ $\hat{G}_1 + \hat{B} = 55^\circ + x + 125^\circ - x$ $= 180^\circ$ $\therefore ABEG$ a cyclic quad (Teenoorst hoeke v vierhoek supp / Opp angles of quad supp) OR (Omg teenoorst $\angle$ kvh / Conv opp angles cyclic quad)	✓S ✓R ✓S ✓S ✓R (5)
		[7]



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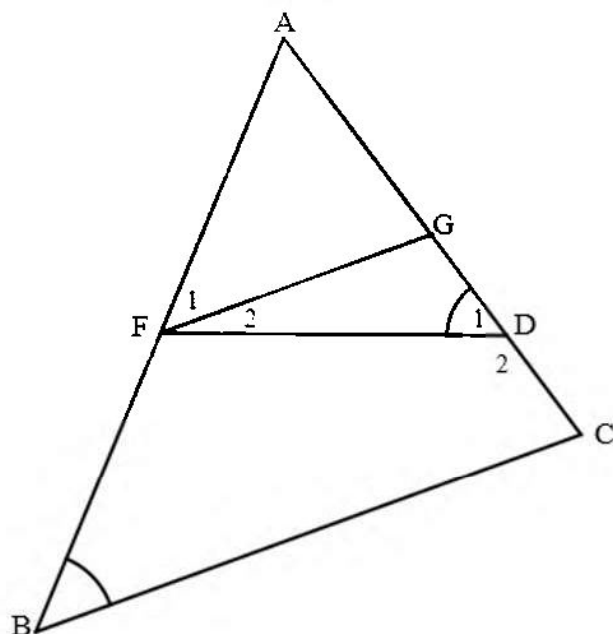
QUESTION/VRAAG 11



11.1	NO / INCOMPLETE CONSTRUCTION – BREAK DOWN (0 out of 6) Mark off D on AB and E on AC ,such that $AD = PQ$ and $AE = PR$. Draw DE. In $\triangle ADE$ and $\triangle PQR$: $\hat{A} = \hat{P}$ (Gegee/given) $PQ = AD$ (Konstruksie/Construction) $PR = AE$ (Konstruksie/Construction) $\therefore \triangle PQR \equiv \triangle ADE$ (SHS / SAS) $\hat{ADE} = \hat{Q}$ (Vanuit $\equiv$ / From $\equiv$) $\hat{Q} = \hat{B}$ (Gegee / Given) $\therefore \hat{ADE} = \hat{B}$ $DE \parallel BC$ (ooreenk$\angle^e$ = / corr$\angle^s$ =) $\frac{AB}{AD} = \frac{AC}{AE}$ (Lyn parallel een sy van driehoek) (Lyn parallel one side of triangle) but $AD = PQ$ and $AE = PR$ $\frac{AB}{PQ} = \frac{AC}{PR}$	✓Construction ✓S/R ✓S/R ✓S/R ✓S/R ✓S (6)
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11.2



11.2.1	$\hat{F}_1 = \hat{D}_1$ (Raaklyn - koord St / Tan chord Th) $\hat{D}_1 = \hat{B}$ $\therefore \hat{F}_1 = \hat{B}$ $FG \parallel BC$ (Ooreenk $\angle^e = /$ Corresponding $\angle^s =$)	$\checkmark$ S/R $\checkmark$ S $\hat{F}_1 = \hat{B}$ $\checkmark$ R (3)
11.2.2	$\frac{AC}{GC} = \frac{AB}{FB}$ (Lyn $\parallel$ een sy van driehoek / Line $\parallel$ one side of triangle) OR (Eweredigheid st $FG \parallel BC$ / Proportionality th $FG \parallel BC$) $\frac{2k-6}{k+9} = \frac{5}{3}$ $6k-18 = 5k+45$ $k = 63$ OR $\frac{AG}{AC} = \frac{AF}{AB}$ (Lyn $\parallel$ een sy van driehoek / Line $\parallel$ one side of triangle) OR (Eweredigheid st $FG \parallel BC$ / Proportionality th $FG \parallel BC$) $\frac{k-15}{2k-6} = \frac{2}{5}$ $4k-12 = 5k-75$ $k = 63$	$\checkmark$ S $\checkmark$ R $\checkmark$ Substitute lengths $\checkmark$ correct ratio $\checkmark$ Answer OR $\checkmark$ S $\checkmark$ R $\checkmark$ Substitute lengths $\checkmark$ correct ratio $\checkmark$ Answer (5)

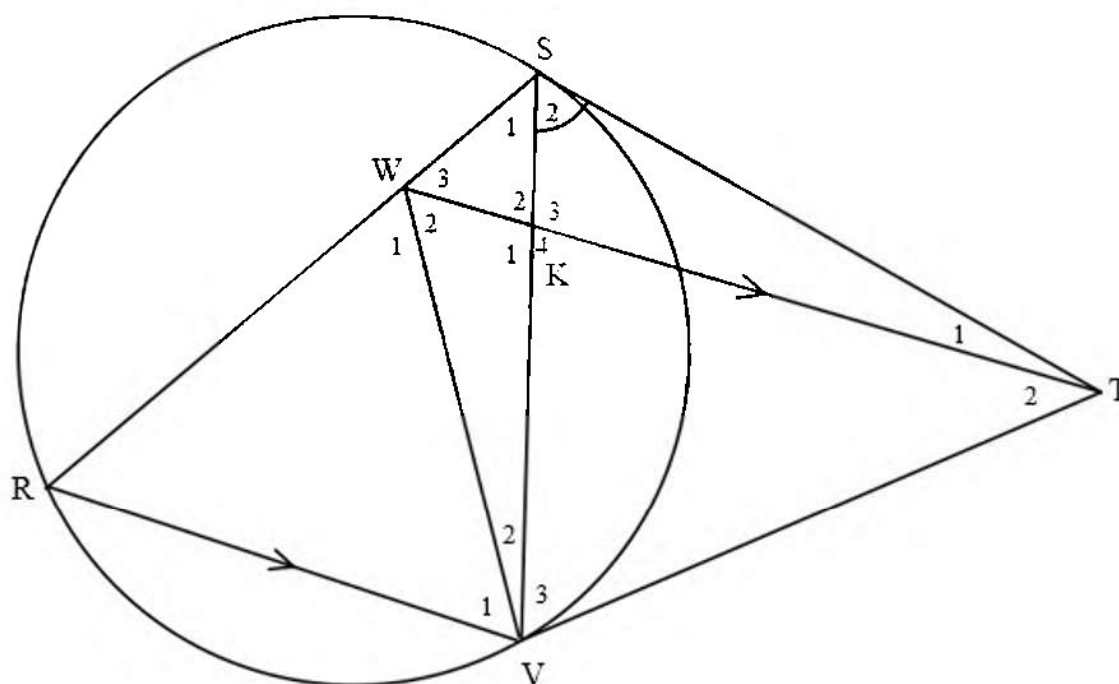


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11.2.3	$\frac{\text{AREA of } \triangle AFG}{\text{AREA of } \triangle ABC} = \frac{0,5(2k)(2p)\sin A}{0,5(5k)(2p)\sin A}$ $= \frac{4}{25}$ OR $\frac{\text{AREA of } \triangle AFG}{\text{AREA of } \triangle ABC} = \frac{0,5AF \cdot AG \sin A}{0,5AB \cdot AC \sin A}$ $= \left(\frac{AF}{AB} \times \frac{AG}{AC} \right) = \left(\frac{2}{5} \right)^2$ $= \frac{4}{25}$ OR $\frac{\text{AREA of } \triangle AFG}{\text{AREA of } \triangle ABC} = \left(\frac{AF}{AB} \right)^2$ $= \left(\frac{2}{5} \right)^2 \text{ (Gemeenskaplike hoek, parallelle lyne)}$ (Common Angle, parallel lines) $= \frac{4}{25}$	If no ratio indicated with variable – penalise 1 mark	✓ area rule with ratio on top ✓ area rule with ratio on bottom ✓ answer OR ✓ area rule ✓ substitute ratio ✓ answer ✓ ratio ✓ R ✓ answer (3)
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11.3.1	$\hat{V}_3 = x$ $\hat{R} = x$ $\hat{W}_3 = x$	$\checkmark$ S $\checkmark$ S $\checkmark$ S	(3)
11.3.2	$\hat{W}_3 = \hat{V}_3 = x$ (From 11.3.1) $\therefore$ WSTV a cyclic quad (lyn onderspan gelyke hoeke) (Line subtends equal angles) OR (Omg hoeke in dies sirkelsegment) (Conv angles in the same segment)	$\checkmark$ S $\checkmark$ R	(2)
11.3.3	$\hat{S}_2 = \hat{W}_2 = x$ (Hoeke in dies sirkelsegment) (Angles in the same segment) $\hat{W}_2 = \hat{V}_1 = x$ (verw $\angle^e$, WT $\parallel$ RV) (Alternate $\angle^s$, WT $\parallel$ RV) $\therefore WR = WV$ (Sye teenoor gelyke hoeke) (Sides opp equal angles)	$\checkmark$ S $\checkmark$ R $\checkmark$ S/R $\checkmark$ S/R	(4)



11.3.4	In ΔRVW en ΔSVT : $\hat{R} = \hat{S}_2 = x$ (from 11.3.1) $\hat{V}_1 = \hat{V}_3 = x$ $\Delta RVW \text{ /// } \Delta SVT$ (AAA)	$\checkmark$ S $\checkmark$ S $\checkmark$ R (3)
11.3.5	$\frac{RV}{SV} = \frac{VW}{VT} = \frac{RW}{ST}$ (Vanuit ///) (From ///)	$\checkmark$ S $\checkmark$ R (2)
		[31]
TOTAL/TOTAL:		150

