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:

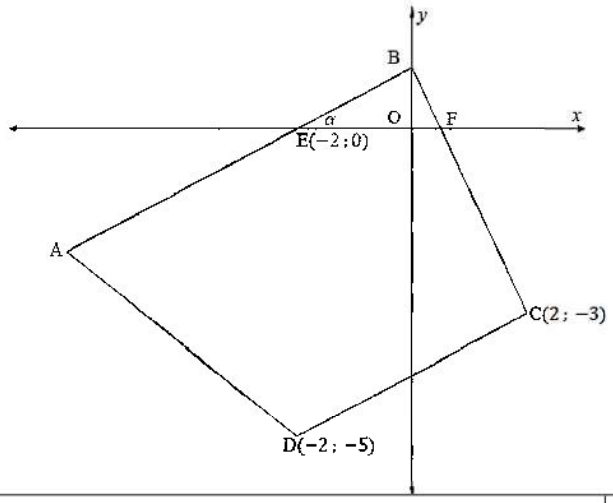
- If a candidate answers a question TWICE, only mark the FIRST attempt.
- If a candidate has crossed out an attempt of a question and not redone the question, mark the crossed-out version.
- Consistent accuracy applies in ALL aspects of the marking guidelines. Stop marking after the second calculation 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		✓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	$m_{AB} = m_{CD} = \frac{1}{2}$ $(AB \parallel CD)$ $y = \frac{1}{2}x + c$ $0 = \frac{1}{2}(-2) + c$ $c = 1$ $y = \frac{1}{2}x + 1$	✓gradient (3.1) ✓Substitute E $(-2;0)$ ✓ value of c /equation (3)
3.3	$\tan\alpha = \frac{1}{2}$ $\alpha = 26{,}57°$	✓ method (3.1) ✓ answer (2)
3.4	$BE = \sqrt{(0+2)^2 + (1-0)^2}$ $= \sqrt{5}$ **OR** *In* ΔEBO: $cos26{,}7° = \frac{2}{EB}$ $EB = 2{,}24\ units$ **OR** Any other correct method	✓substitution B (3.2) & E ✓ answer (2) ✓substitution cosα (3.3) ✓ answer

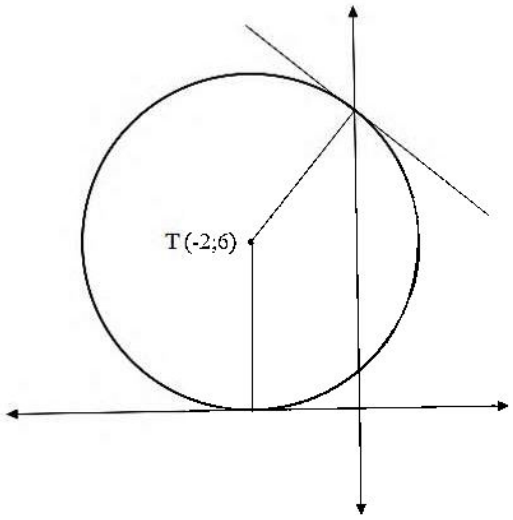
3.5	$m_{BC} \times m_{CD}$ $= -2 \times \frac{1}{2}$ $= -1$ $\therefore$ perpendicular / loodreg $\therefore A\hat{B}C = 90°$	✓method (3.1) ✓answer (2)
3.6	$D'(-4;-6)$ D *to* D' 2 units left, 1 unit down **OR** $D'(--4;--6)$ D *to* D' $(x-2\,;y-1)$	✓-4 ✓-6 ✓answer ✓answer (4) ✓-4 ✓-6 ✓answer ✓answer (4)
3.7	midpoint AC: $\left(\frac{-6+2}{2}\;;\;\frac{-2-3}{2}\right)$ $\left(-2\;;\;\frac{-5}{2}\right)$ Answer Only 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 $\Delta BEF = \frac{1}{2}EF.OB$ $= \frac{1}{2}(2,5)(1)$ $= 1,25$ units^2 **OR**	✓EF length ✓OB length (3.2) ✓answer

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

QUESTION/*VRAAG* 4

ERRATA: EQUATION AS GIVEN ON QUESTION PAPER:

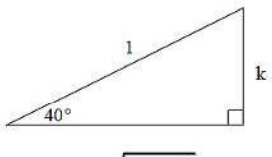
$x^2 + y^2 + 4x - 12y = 0$



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)

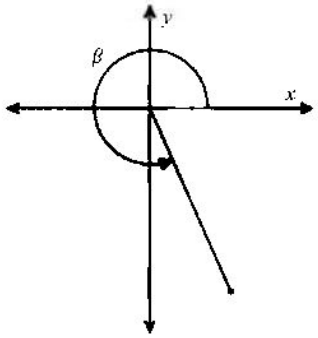
4.2	**OR** Put $y = 0$: $x^2 + y^2 + 4x - 12y = 0$ $\boldsymbol{x^2 + 4x = 0}$ $x(x + 4) = 0$ $\therefore x = 0 \text{ or } x = -4$ (0 ; 0) or (-4 ; 0)	**OR** ✓ $x^2 + 4x = 0$ (1)
4.3	Put $x = 0$: $x^2 + y^2 + 4x - 12y = 0$ $y^2 - 12y = 0$ $y(y - 12) = 0$ $y = 0 \text{ or } y = 12$	✓ $x = 0$ ✓ $y^2 - 12y = 0$ ✓factors ✓both answers (4)
4.3	**OR** $(0+2)^2 + (y-6)^2 = 36$ $4 + y^2 - 12y + 36 = 36$ $y^2 - 12y + 4 = 0$ $y = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $= \frac{-(-12) \pm \sqrt{(-12)^2 - 4(1)(4)}}{2(1)}$ $= \frac{12 \pm \sqrt{128}}{2}$ $= 6 \pm 4\sqrt{2}$ $(0;\ 6+4\sqrt{2})$ or $(0;\ 6-4\sqrt{2})$	✓ $x = 0$ ✓standard form ✓substitution in formula ✓both answers (4)

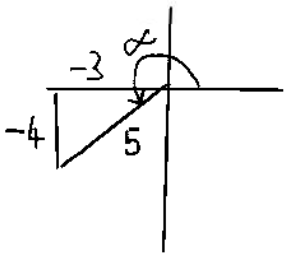
4.4	$m_{radius} = \frac{6-(6+4\sqrt{2})}{-2-0}$ $= \frac{-4\sqrt{2}}{-2}$ $= 2\sqrt{2}$ $m_{tangent} = -\frac{2}{2\sqrt{2}}$ or $\frac{-\sqrt{2}}{4}$ (rad $\perp$ tan) or $\frac{-1}{2\sqrt{2}}$ $y = -\frac{1}{2\sqrt{2}}x + 6 + 4\sqrt{2}$ **OR** $y = -0{,}35x + 11{,}66$	✓substitute T and $(0\,;6+4\sqrt{2})$ ✓ 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	$LHS: \dfrac{-1+\cos(180°-\theta).-\cos\theta}{\cos(-\theta).\cos\theta.\tan^2(540°+\theta)}$ $= \dfrac{-1-\boldsymbol{\cos\theta}.-\cos\theta}{\boldsymbol{\cos\theta}.\cos\theta.(\boldsymbol{\tan\theta})^2}$ $= \dfrac{-1+\cos^2\theta}{\cos^2\theta.\dfrac{\sin^2\theta}{\cos^2\theta}}$ $= \dfrac{-(1-\cos^2\theta)}{\sin^2\theta}$ $= \dfrac{-\sin^2\theta}{\sin^2\theta}$ $= -1$ $= RHS$	✓ $-\cos\theta$ ✓ $\cos\theta$ ✓ $tan\theta$ ✓$\frac{sin\theta}{cos\theta}$ ✓ $-(1-\cos^2\theta)$ ✓$\sin^2\theta$ identity (6)
5.2.1	$\sin 40^\circ = k$ $\dfrac{1}{\sin 140°} = \dfrac{1}{\sin 40°} = \dfrac{1}{k}$	✓ $\sin 40°$ ✓answer (2)
5.2.2	$\dfrac{1}{2}(2sin20^\circ.cos20°)$ $= \dfrac{1}{2}(\sin 40°) = \dfrac{1}{2}k$	✓half a double angle ✓answer (2)
5.2.3	$\sin(60°-40°)$ $= \sin 60°\cos 40° - \cos 60°\sin 40°$ $= \dfrac{\sqrt{3}}{2}.\sqrt{1-k^2} - \dfrac{1}{2}.k$ $= \dfrac{\sqrt{3}.\sqrt{1-k^2}-k}{2}$ **OR** $\sin(50°-30°)$ **OR** Any other valid solution NOTE: FORMULA OF $\sin(\alpha-\beta)$ omitted on formula sheet. Do not penalize incorrect $\sin(\alpha-\beta)$ expansion  $\sqrt{1-k^2}$	✓sketch/ $\sqrt{1-k^2}$ ✓ $\sin(60°-40°)$ ✓ expansion ✓substitution (4)

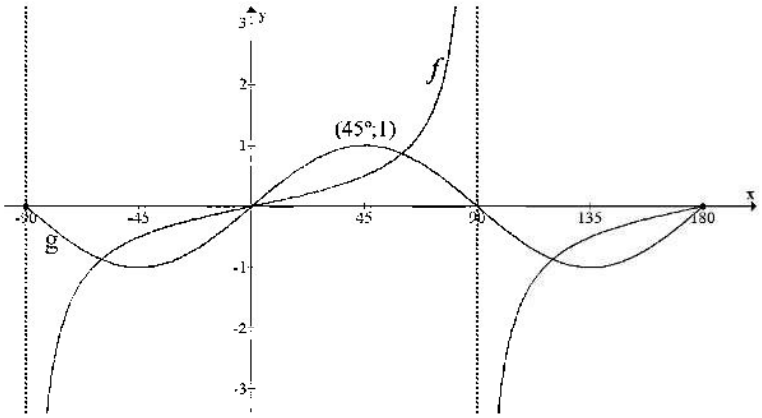
5.3	$\sin^2 76^\circ - \cos^2 76°$ $= -(\cos^2 76° - \sin^2 76^\circ)$ $= -\cos 152°$ $= -(-\cos 28°)$ $= \cos 28°$ **OR** $(sin76°)^2 - (cos76°)^2$ $=(cos14°)^2 - (sin14°)^2$ $=cos2(14°)$ $= cos28$	✓common factor ✓ $-\cos 152°$ cos double angle ✓ $-\cos 28°$ (3) ✓co-function ✓ co-function ✓cos double angle (3)
		[17]

QUESTION/*VRAAG* 6



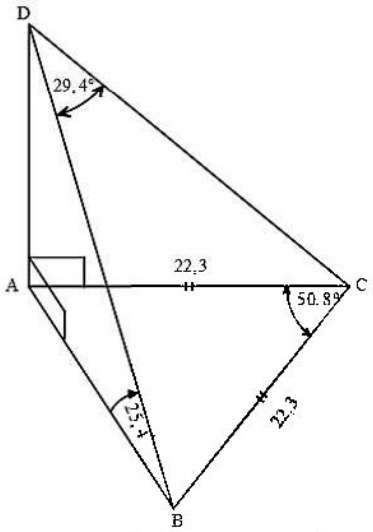
6.1.1	$r = 5$ (Pythagoras) $\sin\beta = -\frac{4}{5}$ Answer Only	✓ $r = 5$ ✓answer (2)
6.1.2	$\sin(\beta + \alpha)$ $= \sin\beta\cos\alpha + \cos\beta\sin\alpha$ $= \left(-\frac{4}{5}\right)\left(-\frac{3}{5}\right) + \left(\frac{3}{5}\right)\left(-\frac{4}{5}\right)$ $= \frac{12}{25} - \frac{12}{25}$ $= 0$ 	✓expansion ✓ substitution ✓ simplification (3)
6.2	$sinx(3\sin x + 1) = 0$ $sinx = 0$ $x = 0° + 180°k; k \in Z$ or $\sin x = -\frac{1}{3}$ $ref\angle: 19,47°$ III: $x = 199,47° + 360°k; k \in Z$ IV: $x = 340,53° + 360°k; k \in Z$	✓$sinx = 0$ ✓$x = 0° + 180°k$ ✓ $\sin x = -\frac{1}{3}$ ✓ $199,47°$; $340,53°$ ✓ $+360°k; k \in Z$ (5)
		[10]

QUESTION/*VRAAG* 7

7.1	$x = 0°;\ \ x = 180°$	✓both answers (1)
7.2		$g(x) = \sin 2x$ ✓TP ✓ x – intercepts ✓ shape (3)
7.3	$\frac{1}{2}\tan x = \sin 2x$ $\frac{\sin x}{2\cos x} = 2\sin x\cos x$ $\sin x = 4\sin x\cos^2 x$ $0 = 4\sin x\cos^2 x - \sin x$ $0 = \sin x(4\cos^2 x - 1)$ $\sin x = 0$ $x = 0° + 180°k; k \in Z$ $\cos^2 x = \frac{1}{4}$ $\cos x = \pm\frac{1}{2}$ $\quad ref \angle : 60°$ $I : x = 60° + 360°k; k \in Z$ $IV : x = 300° + 360°k; k \in Z$ $II : x = 120° + 360°k; k \in Z$ $III : x = 240° + 360°k; k \in Z$ $-60°\ \ 0°\ \ 60°\ \ 120°\ \ 180°$ No ± No mark CA Quadrants Answer Only 2 out of 7	✓tan identity ✓sin double angle ✓factors ✓ $x = 0° + 180°k; k \in Z$ ✓ $\cos x = \pm\frac{1}{2}$ ✓ CA $60°\ \ 300°\ \ 120°\ \ 240°$ ✓answer (7)

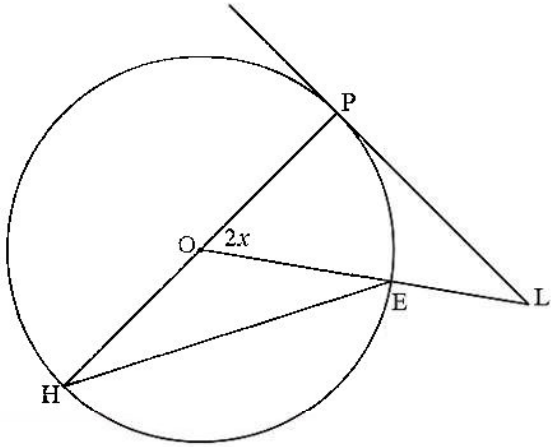
7.4	$\frac{1}{2}\tan x \geq \sin 2x$ $60° \leq x < 90°$	Inequality mark may ONLY be awarded if the critical values are correct.	✓$sin2x$ ✓critical values ✓correct inequality (3)
			[14]

QUESTION/*VRAAG* 8



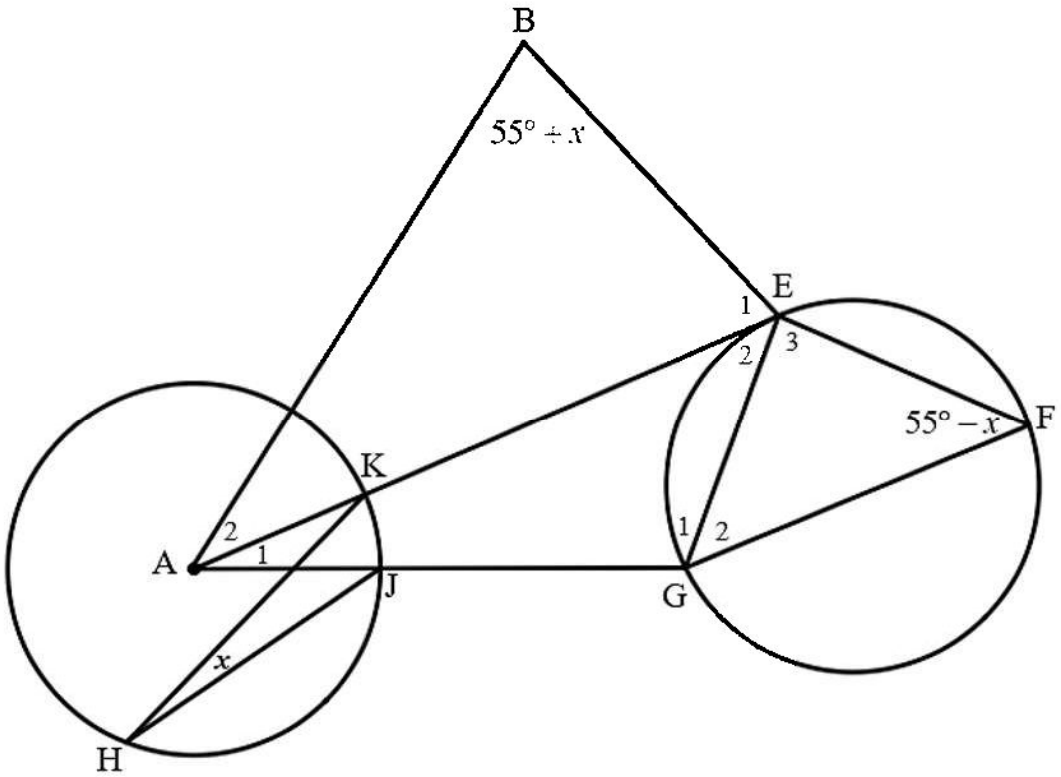
8.1	Area of $\Delta ABC = \frac{1}{2}(22,3)(22,3)\sin 50,8°$ $= 192,69\ units^2$	✓substitute in area rule ✓answer (2)
8.2	In ΔABC : $AB^2 = 22.3^2 + (22.3)^2 - 2(22.3)(22.3)\cos 50,8°$ $AB^2 = 365,976...$ $AB = 19,13$	✓substitution in cos rule ✓ simplify ✓ answer (3)
8.3	In ΔBCD: $\frac{CD}{\sin 43,6°} = \frac{22,3}{\sin 29,4°}$ $CD = \frac{22,3.\sin 43,6°}{\sin 29,4°}$ $CD = 31,32$	✓ substitution in sin rule ✓ answer (2)
		[7]

QUESTION/*VRAAG* 9



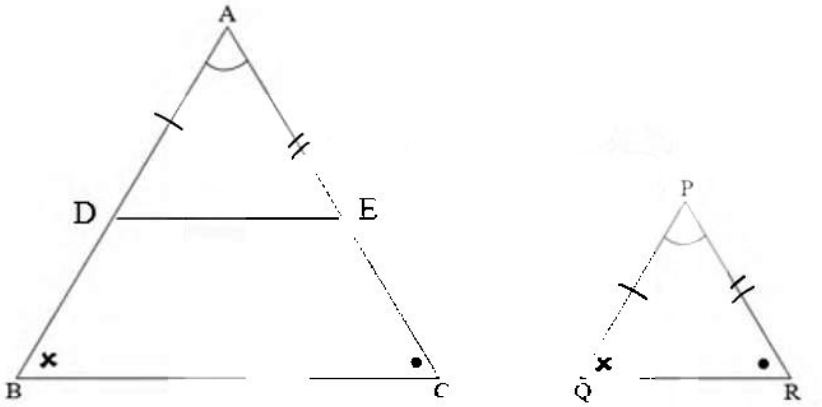
9.1	$H\hat{O}E = 180° - 2x$ (Hoeke op 'n reguitlyn / Angles on a straight line) OH = OE (Radiusse / Radii) $\hat{H} = O\hat{E}H$ $O\hat{E}H = x$ (Hoeke teenoor gelyke sye / Angles opp equal sides) **OR** OH = OE (Radiusse / Radii) $\hat{H} = O\hat{E}H$ (Hoeke teenoor gelyke sye / Angles opp equal sides) $O\hat{E}H = x$ (Buite hoek van driehoek / Ext Angle of triangle) **OR** $\hat{H} = x$ (Mdpt$\angle$ = 2 × omtrekshoek) OH = OE (Radiusse / radii) $O\hat{E}H = x$ (Hoeke teenoor gelyke sye / Angles opp equal sides)	✓S/R ✓ OH = OE ✓S ✓R ✓OH = OE ✓S ✓R ✓S/R ✓S/R ✓ OH = OE ✓S ✓ R (4)
9.2	$O\hat{P}L = 90°$ (Radius ⊥ Raaklyn / Radius ⊥ tangent) $\hat{L} = 180° - 90° - 2x$ $= 90° - 2x$ (Binnehoeke v driehoek / Angles of Triangle)	✓S ✓R ✓S (3)
		[7]

QUESTION/*VRAAG* 10	



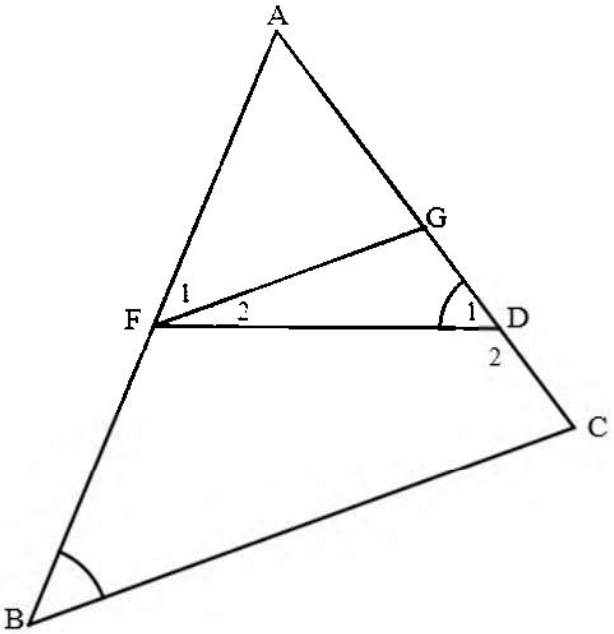
10.1	$\hat{E}_2 = 55° - x$ (Raaklyn - koord st / Tan - chord th)	✓S ✓R (2)
10.2	$\hat{A}_1 = 2x$ (Mdptshoek = 2 × omtrekshoek / Angle at centre = 2 × angle at the centre) $\hat{G}_1 = 180° - 2x - (55° - x)$ (Binnehoeke v driehoek / Angles of Triangle) $= 125° - x$ $\hat{G}_1 + \hat{B} = 55° + x + 125°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

QUESTION/*VRAAG* 11



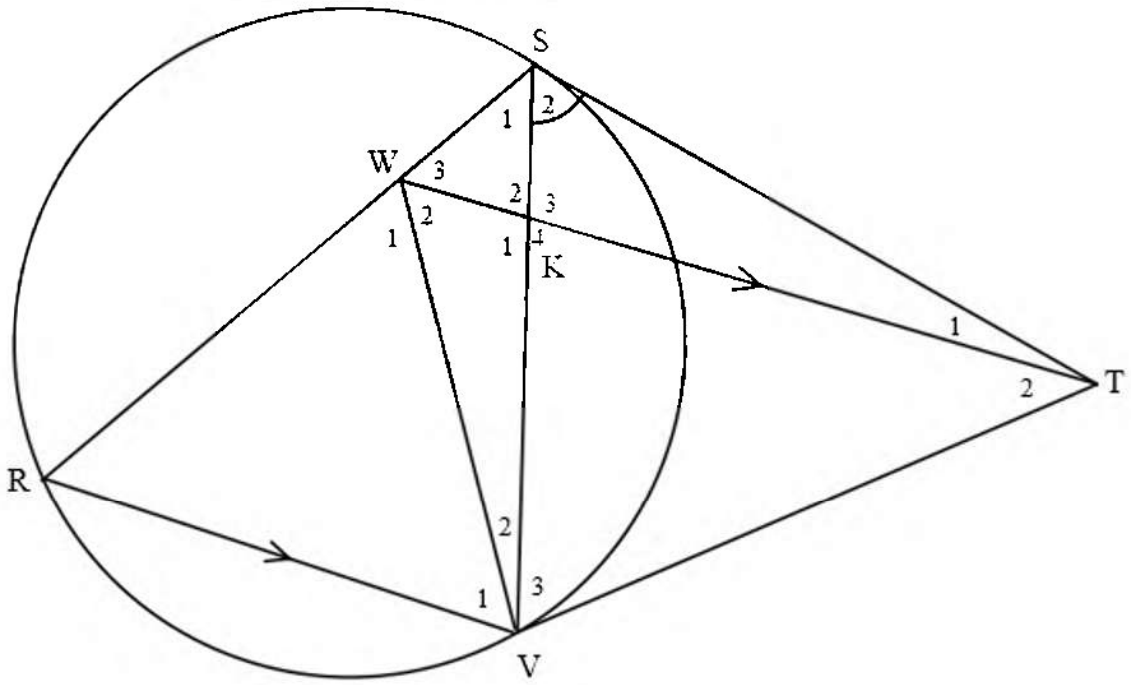
11.1	**NO / INCOMPLETE CONSTRUCTION – BREAK DOWN (0 out of 6)** Mark off D on AB and E on AC ,such that AD = PQ and AE = PR. Draw DE. In ΔADE and ΔPQR: $\hat{A} = \hat{P}$ (Gegee/given) PQ = AD (Konstruksie/Construction) PR = AC (Konstruksie/Construction) $\therefore \Delta PQR \equiv \Delta ADE$ (SHS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

11.2



11.2.1	$\hat{F}_1 = \widehat{D_1}$ (Raaklyn - koord St / Tan chord Th) $\hat{D}_1 = \hat{B}$ $\therefore \hat{F}_1 = \hat{B}$ $FG \parallel BC$ (Ooreenk $\angle^e$ = / Corresponding $\angle^s$ =)	✓S/R ✓S $\hat{F}_1 = \hat{B}$ ✓R (3)
11.2.2	$\frac{AC}{GC} = \frac{AB}{FB}$ (Lyn ‖ een sy van driehoek / Line ‖ one side of triangle) OR (Eweredigheid st FG ‖ BC / Proportionality th FG ‖ BC) $\frac{2k-6}{k+9} = \frac{5}{3}$ $6k - 18 = 5k + 45$ $k = 63$ **OR** $\frac{AG}{AC} = \frac{AF}{AB}$ (Lyn ‖ een sy van driehoek / Line ‖ one side of triangle) OR (Eweredigheid st FG ‖ BC / Proportionality th FG ‖ BC) $\frac{k-15}{2k-6} = \frac{2}{5}$ $4k - 12 = 5k - 75$ $k = 63$	✓S ✓R ✓Substitute lengths ✓correct ratio ✓Answer **OR** ✓S ✓R ✓Substitute lengths ✓correct ratio ✓Answer (5)

11.2.3	$\frac{\text{AREA of } \Delta AFG}{\text{AREA of } \Delta ABC} = \frac{0,5(2k)(2p)\sin A}{0,5(5k)(2p)\sin A}$ $= \frac{4}{25}$ If no ratio indicated with variable – penalise 1 mark **OR** $\frac{\text{AREA of } \Delta AFG}{\text{AREA of } \Delta ABC} = \frac{0,5AF.AG\sin A}{0,5AB.AC\sin A}$ $= \left(\frac{AF}{AB} \times \frac{AG}{AC}\right) = \left(\frac{2}{5}\right)^2$ $= \frac{4}{25}$ **OR** $\frac{\text{AREA of } \Delta AFG}{\text{AREA of } \Delta ABC} = \left(\frac{AF}{AB}\right)^2$ $= \left(\frac{2}{5}\right)^2$ (Gemeenskaplike hoek, paralelle lyne) (Common Angle, parallel lines) $= \frac{4}{25}$	✓area rule with ratio on top ✓area rule with ratio on bottom ✓answer **OR** ✓area rule ✓substitute ratio ✓answer ✓ratio ✓R ✓answer (3)



11.3.1	$\hat{V}_3 = x$ $\hat{R} = x$ $\hat{W}_3 = x$	✓S ✓S ✓S (3)
11.3.2	$\hat{W}_3 = \hat{V}_3 = x$ (From 11.3.1) ∴ WSTV a cyclic quad (lyn onderspan gelyke hoeke) (Line subtends equal angles) OR (Omg hoeke in dies sirkelsegment) (Conv angles in the same segment)	✓S ✓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 ∥ RV) (Alternate $\angle^s$,WT ∥ RV) ∴ $WR = WV$ (Sye teenoor gelyke hoeke) (Sides opp equal angles)	✓S ✓R ✓S/R ✓S/R (4)

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