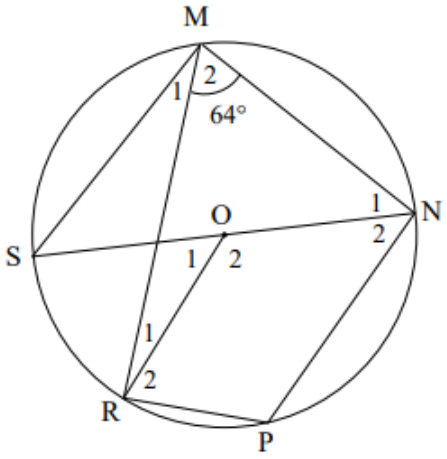
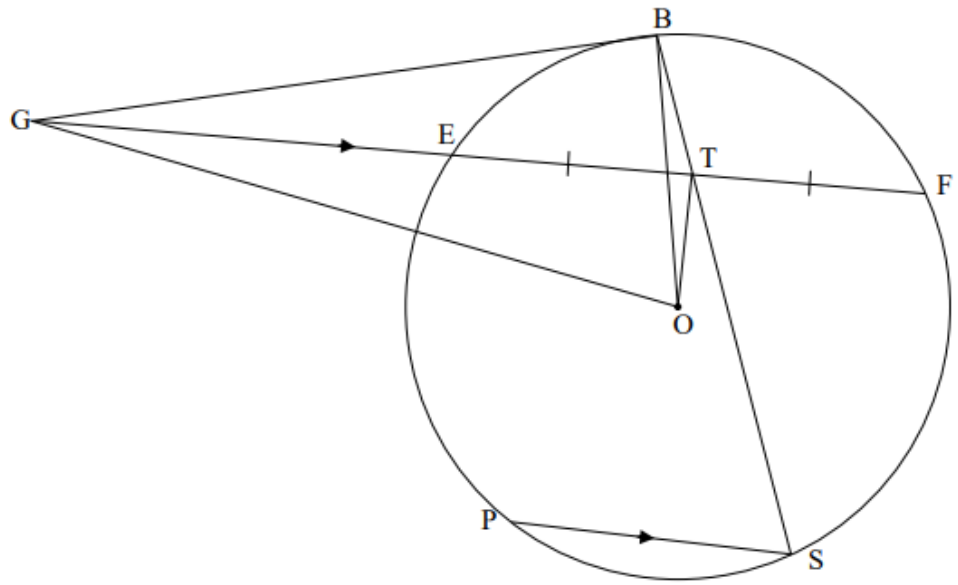
QUESTION/*VRAAG* 8

8.1



8.1.1	$\hat{P} = 116°$	[opp ∠s of cyclic quad/*teenoorst. ∠e van kvh*]	✓ S ✓ R (2)
8.1.2	$\hat{M}_1 + 64° = 90°$ $\hat{M}_1 = 26°$	[∠ in semi-circle/∠ *in halwe sirkel*]	✓ R ✓ S (2)
8.1.3	$\hat{O}_1 = 52°$	[∠ at centre = 2 x ∠ at circumference/*midpts. ∠ = 2 x omtreks. ∠*]	✓ S ✓R (2)

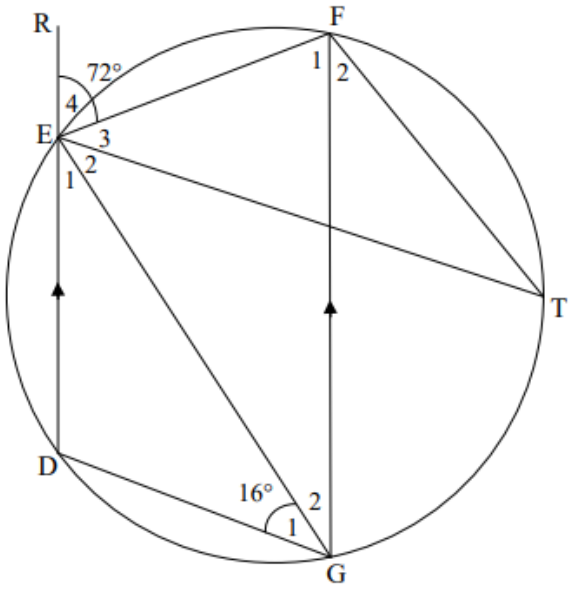
9.2



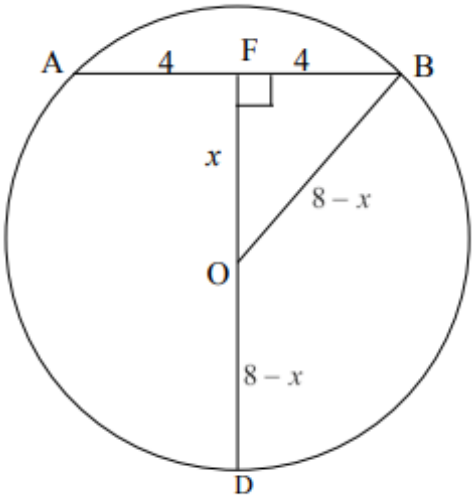
9.2.1	$O\hat{T}G = 90°$	[line from centre to midpt of chord/ *midpt. sirkel; midpt. koord*]	✓S ✓R
	$O\hat{B}G = 90°$	[tan ⊥ radius/*raaklyn ⊥ radius*]	✓S ✓R
	$\therefore O\hat{T}G = O\hat{B}G = 90°$		
	$\therefore$ OTBG is a cyclic quadrilateral	[line subtends equal ∠s **OR** converse ∠s in the same segment/ *lyn onderspan gelyke ∠e*]	✓R (5)
9.2.2	$\hat{S} = B\hat{T}G$	[corresp ∠s; GF ‖ PS / *ooreenk. ∠s; GF ‖ PS*]	✓S ✓R
	But $B\hat{T}G = G\hat{O}B$	[∠s in the same segment/*∠e in dies. sirkelsegment*]	✓S ✓R
	$G\hat{O}B = \hat{S}$		(4)
			[14]

QUESTION/*VRAAG* 9

9.1

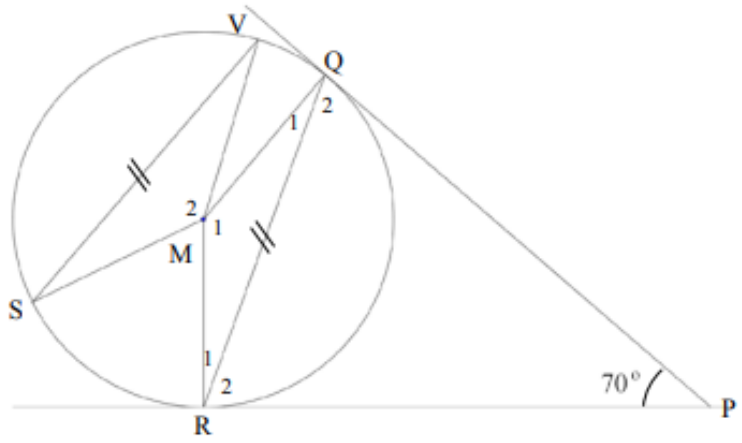


9.1.1	$D\hat{G}F = \hat{E}_4 = 72°$ [ext ∠ of cyclic quad/ *buite ∠ v kvh*]	✓ S ✓ R (2)
9.1.2	$\hat{G}_2 = 72° - 16° = 56°$ $\hat{T} = \hat{G}_2 = 56°$ [∠s in the same seg/ *∠e in dies.* ⊙ *segment*]	✓ S ✓ S / R (2)
9.1.3	$\hat{F}_1 = \hat{E}_4 = 72°$ [alt ∠s; DE ∥ GF / *verw. ∠e*; DE ∥ GF] $\therefore G\hat{E}F = 52°$ [sum of ∠s in Δ / *∠e van* Δ] **OR/*OF*** $\hat{E}_1 = 56°$ [alt ∠s; DE ∥ GF / *verw. ∠e*; DE ∥ GF] $\therefore G\hat{E}F = 52°$ [∠s on a str. line/ *∠e op 'n reguitlyn*]	✓ S / R ✓ S (2) ✓ S / R ✓ S (2)



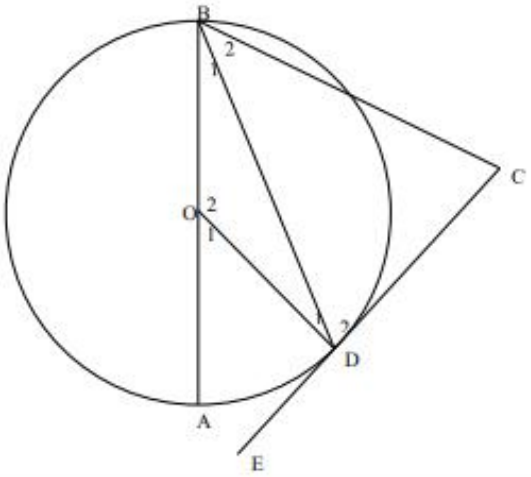
9.2	$AF = FB = 4cm$ [line from centre ⊥ to chord/ *lyn van mdpt ⊥ aan koord*] $\text{OD} = OB = 8 - x\,(radii)$ $OB^2 = OF^2 + FB^2\ (Pythagoras)$ $(8-x)^2 = x^2 + 4^2$ $64 - 16x + x^2 = x^2 + 4^2$ $48 = 16x$ $x = 3$ length of/ *lengte van radius* $= 8 - x$ $= 8 - 5$ $= 3\,units\ /\ eenh$	✓S/R ✓$8-x$ ✓$(8-x)^2 = x^2 + 4^2$ ✓$x = 3$ ✓Answer/*antw* (5) **[10]**

QUESTION/*VRAAG* 10



10.1	$\hat{Q}_2 = \hat{R}_2$ [tangents from common point/ *rk lne van selfde punt*] $\hat{Q}_2 + \hat{R}_2 + 70^\circ = 180^\circ$ [sum $\angle\Delta$] $2\hat{R}_2 = 110^\circ$ $\hat{R}_2 = 55^\circ$	✓ S ✓R ✓ S ✓ $\hat{R}_2 = 55^\circ$ (4)
10.2	$\hat{Q}_2 + \hat{Q}_1 = 90^\circ$ [tan/*rkl* $\perp$ rad] $\hat{Q}_1 = 35^\circ$ **OR/*OF*** $\hat{R}_1 + \hat{R}_2 = 90^\circ$ [tan/*rkl* $\perp$ rad] $\hat{R}_1 = 35^\circ$ $\hat{Q}_1 = \hat{R}_1 == 35^\circ$ [$OR = OQ$]	✓ R ✓ $\hat{Q}_1 = 35^\circ$ (2) ✓ R ✓ $\hat{Q}_1 = 35^\circ$ (2)
10.3	$\hat{O}_1 + \hat{R}_1 + \hat{Q}_1 = 180^\circ$ [sum $\angle\Delta$] $\hat{O}_1 = 180^\circ - 70^\circ = 110^\circ$ $\hat{O}_2 = 110^\circ$ [equal chords subtend = $\angle$ at the centre/ *gelyke koorde onrsp.* = $\angle$ *by mdpt*]	✓ $\hat{O}_1 = 110^\circ$ ✓ $\hat{O}_2 = 110^\circ$ ✓ R (3) **[9]**

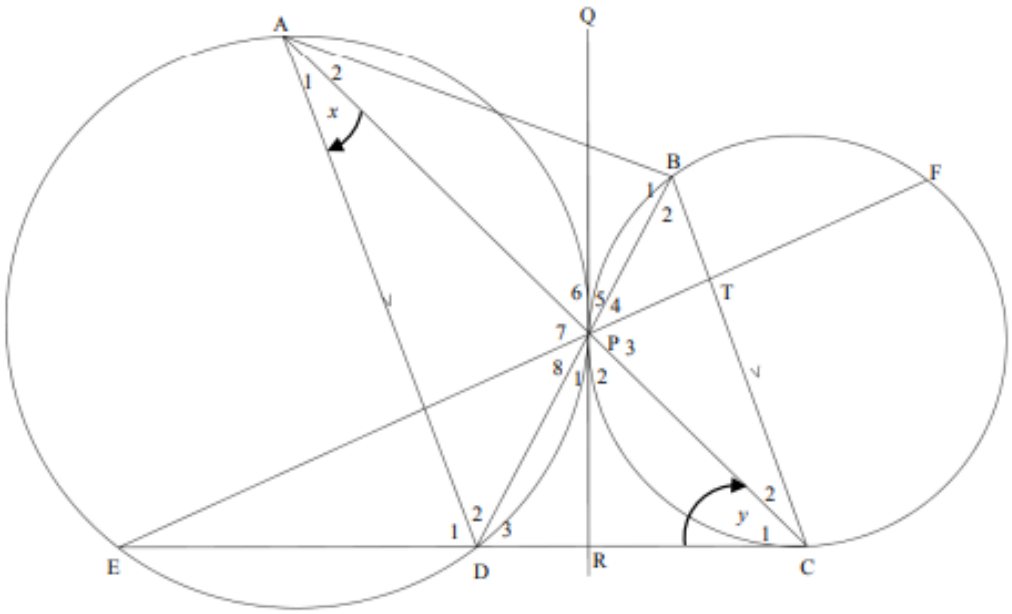
QUESTION/*VRAAG* 11



11.1	$\hat{B}_1 = \hat{B}_2 = x$ [BD bisect/*halveer* $\angle$ A$\hat{B}$C] $A\hat{B}C = 2x$ $\hat{O}_1 = 2x$ [$\angle$ at centre = 2 times $\angle$ at circumference/] [*midpts*$\angle$ = 2 × *omtreks*$\angle$] $\therefore$ BC $\|\|$ OD [corresponding $\angle$ are equal/*ooreenk.* $\angle$*is gelyk*] **OR/*OF*** $\hat{B}_1 = \hat{B}_2 = x$ [BD bisect/*halveer* $\angle$ A$\hat{B}$C] $\hat{D}_1 = x$ [angle opp = sides/$\angle$*e to gelyke sye*] $\hat{D}_1 = \hat{B}_2 = x$ $\therefore$ BC $\|\|$ OD [alternate angles are equal/*verw* $\angle$*e gelyk*] **OR/*OF*** $\hat{B}_1 = \hat{B}_2 = x$ [BD bisect/*halveer* $\angle$ A$\hat{B}$C] $A\hat{B}C = 2x$ $\hat{O}_1 = 2x$ [angle at centre = 2 times angle at circumference] [*midpts*$\angle$ = 2 × *omtreks*$\angle$] $\hat{O}_2 = 180^\circ - 2x$ [$\angle$ on a straight line/$\angle$*op reguit lyn*] $\hat{O}_2 + A\hat{B}C = 180^\circ - 2x + 2x = 180^\circ$ $\therefore$ BC $\|\|$ OD [co-int angles are suppl/*ko-binne* $\angle$*is suppl*]	✓ S ✓ S ✓ R ✓ R (4) ✓ S ✓ S ✓ R ✓ R (4) ✓ S ✓ S ✓ R ✓ R (4)

11.2	$O\hat{D}C = 90°$ [tan/*rkl* ⊥ rad] $\hat{C} = 90°$ [co – int / *ko-binne* ∠'s OD ∥ BC]	✓ S/R ✓ S ✓R (3)
	OR/*OF*	✓ S/R ✓ S ✓R (3)
	$\hat{D}_1 = x$ $\hat{D}_2 = 90° - x$ [tan/*rkl* ⊥ rad] $\hat{C} = 180° - (90° - x) - x$ [int ∠'s of / *van* Δ] $= 90°$	✓ S/R ✓ S ✓R (3) **[7]**
	OR/*OF*	
	$E\hat{D}C = 90°$ [tan/*rkl* ⊥ rad] $\hat{C} = 90°$ [*corresp.* / *ooreenk.* ∠'s OD ∥ BC]	

QUESTION/*VRAAG* 12



12.1	$\hat{P}_1 = x$ [tan – ch th/ *rkl-kdst*] $\hat{C}_2 = x$ [alt / *verw.*$\angle^s$ AD ∥ *BC*] $\hat{E} = x$ [$\angle^s$ in the same segment/*dieselfde segment*] $\hat{P}_5 = x$ [vert opp/ *reg oorst*]	✓ S ✓ R ✓ S ✓ R ✓ S ✓ R ✓ S/R (7)
12.2	$D\hat{C}B = x + y$ $E\hat{D}A = \hat{D}_1 = x + y$ [corresp / *ooreenk.* $\angle^s$ = , AD ∥ BC] $\therefore E\hat{P}A = x + y$ [$\angle^s$ in the same segment/*dieselfde segment*]	✓S✓ R ✓S ✓R (4)
12.3	$\hat{P}_2 = y$ [tan from a commom point/ *rklyne v dieselfde pt*] $D\hat{P}T = \hat{P}_1 + \hat{P}_2 + \hat{P}_3$ $= x + y + (x + y)$ $= 2x + 2y$ $\hat{C} = x + y$ $D\hat{P}T + \hat{C} = 180°$ [opp $\angle^s$ of a cyclic quad/ *teenoorst.* $\angle^s$ *van kvhk*] $2x + 2y + x + y = 180°$ $3x + 3y = 180°$ $\therefore x + y = 60°$	✓ S/R ✓ $\hat{C} = x + y$ ✓ Subst ✓ Answ/*antw* (4) **[15]**