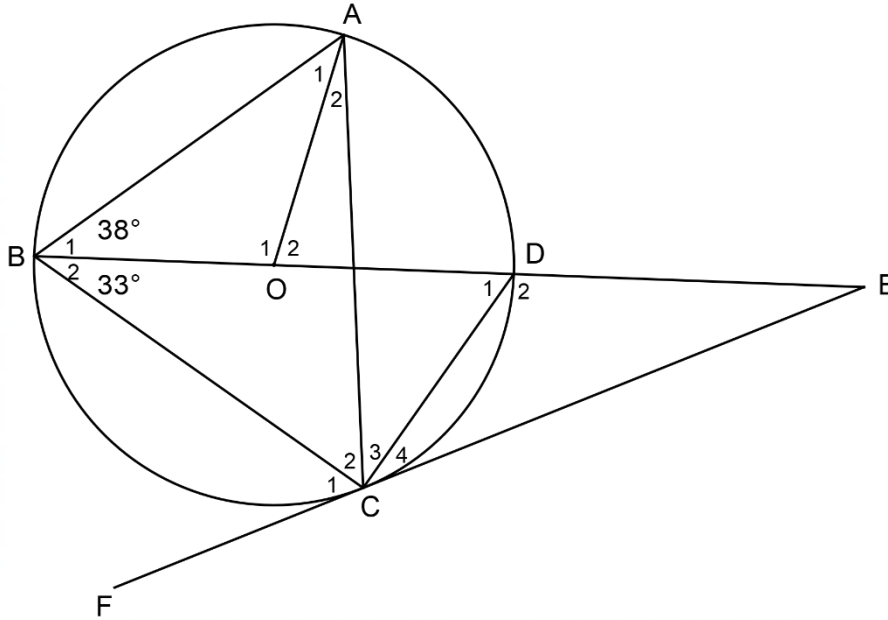


Resource for Day 8 – Euclidean Geometry – Monday 30 October

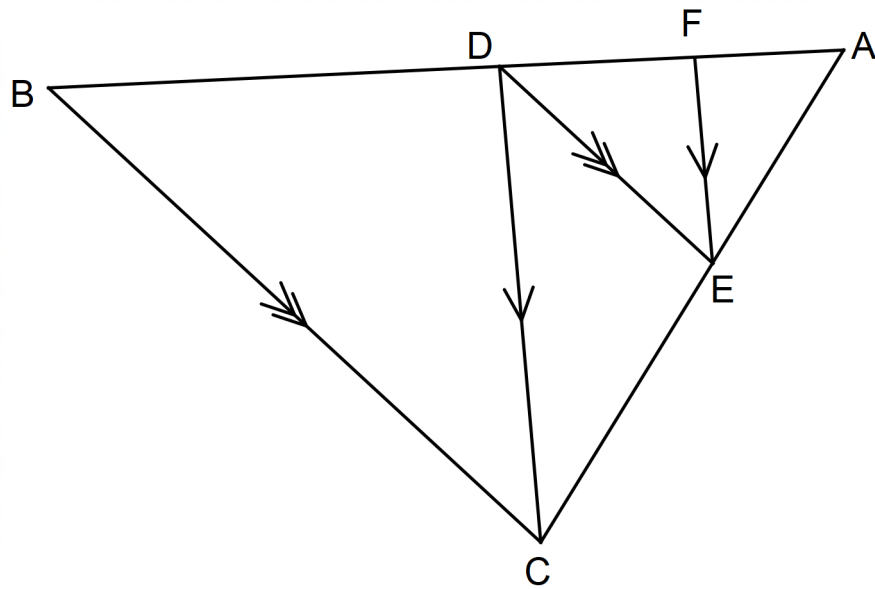
1. In the diagram below BOD is a diameter of the circle, centre O. BD is extended to E and FCE is a tangent to the circle at C. $\hat{B}_1 = 38^\circ$ and $\hat{B}_2 = 33^\circ$.



Determine, with reasons, the magnitude of:

- \hat{BCD}
- \hat{A}_1
- \hat{O}_2
- \hat{C}_4

2. $\frac{AF}{FD} = \frac{2}{3}$.

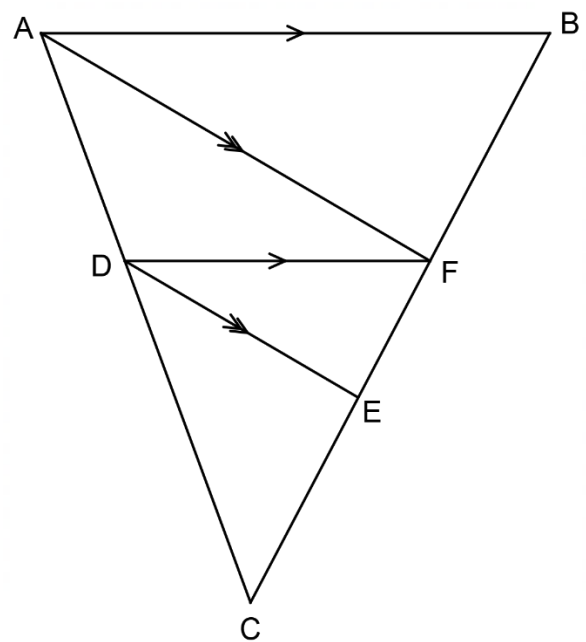


- Determine $\frac{AF}{DB}$ giving reasons
- Determine $\frac{\text{area } \triangle AFE}{\text{area } \triangle FED}$ with reasons
- Determine $\frac{\text{area } \triangle AFE}{\text{area } \triangle ABC}$ with reasons

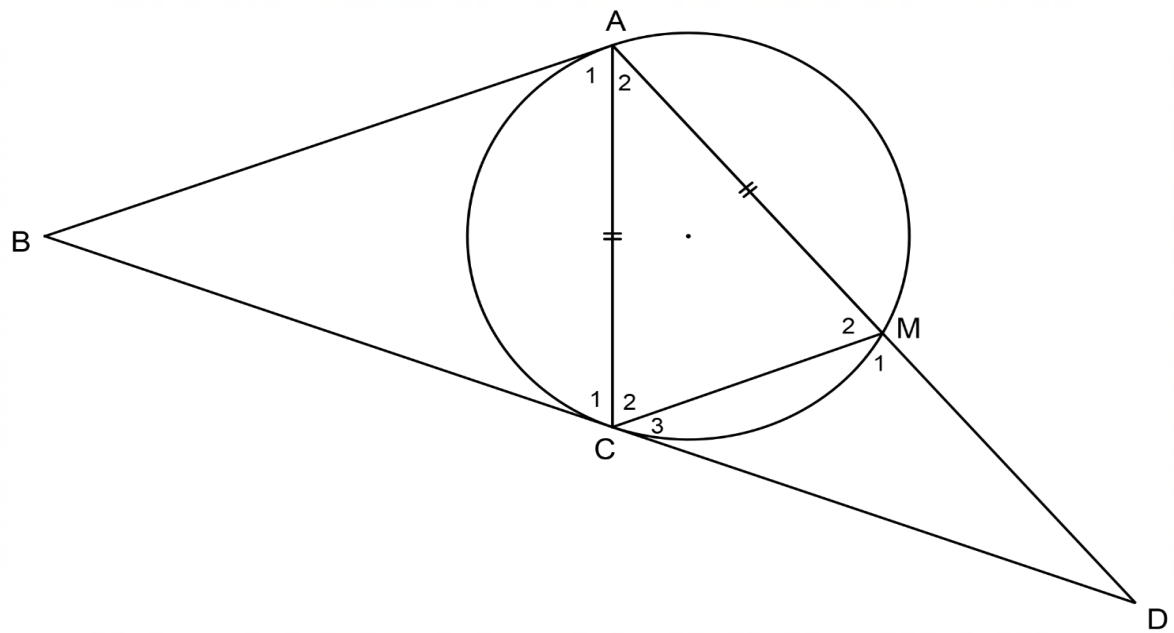
3. In the diagram below $AB \parallel DF$ and $AF \parallel DE$. $CF : FB = 3 : 2$

Determine, with reasons

- $AD : DC$
- $\text{area } \triangle AFD : \text{area } \triangle DFC$
- $EF : FB$

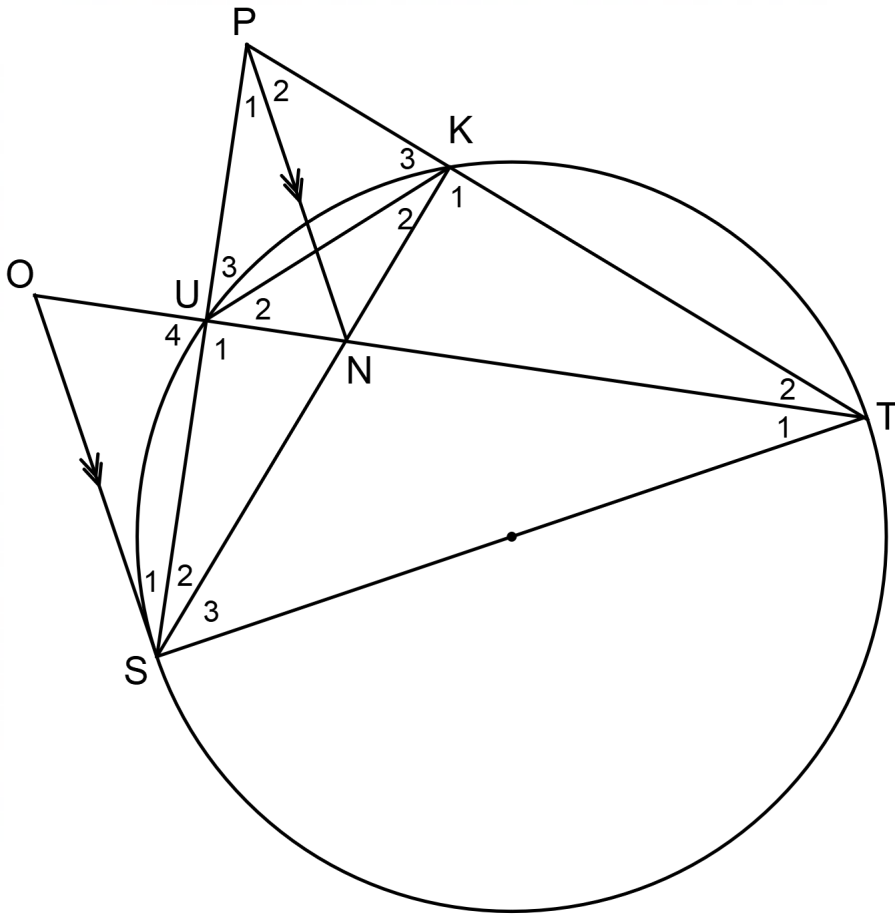


4. AB and BC are tangents. AC = AM.



- a) Prove that $CD^2 = DM \cdot AD$
- b) Prove that $\frac{DM}{MA} = \frac{DC}{CB}$

5. In the diagram below, ST is the diameter of the circle. $OS \parallel PN$.



- Prove that $PUNK$ is a cyclic quadrilateral.
- Prove that SO is a tangent to the given circle ($KUST$)

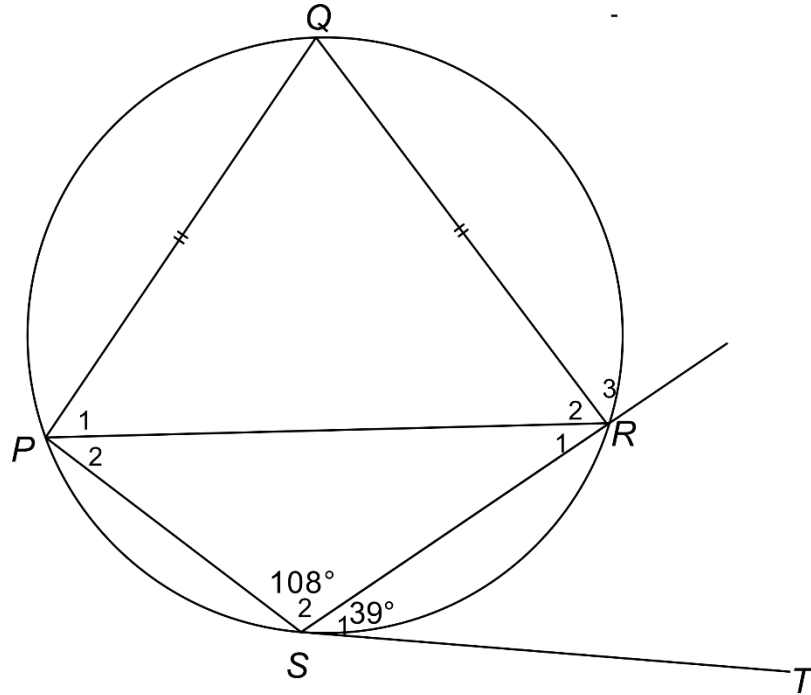
6. PQRS is a cyclic quadrilateral. ST is a tangent at S. $PQ = QR$ and $\hat{S}_1 = 42^\circ$ and $\hat{S}_2 = 108^\circ$. Determine, with reasons, the size of the following angles:

a) \hat{Q}

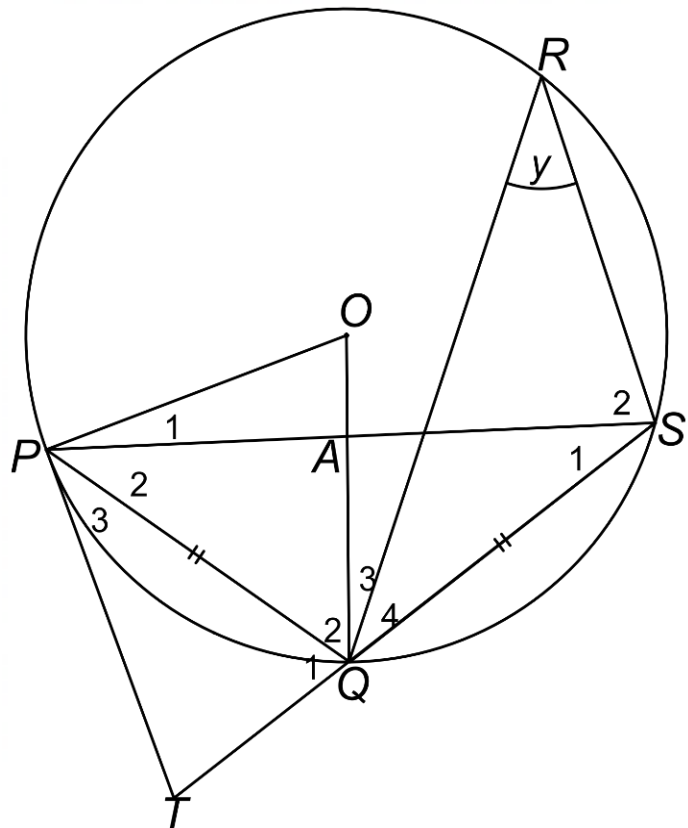
b) \hat{R}_2

c) \hat{P}_2

d) \hat{R}_3



7. O is the centre. $PQ = QS$ and $\hat{QRS} = y$. PT is a tangent at T.



a) Why is $\hat{P}_2 = y$?

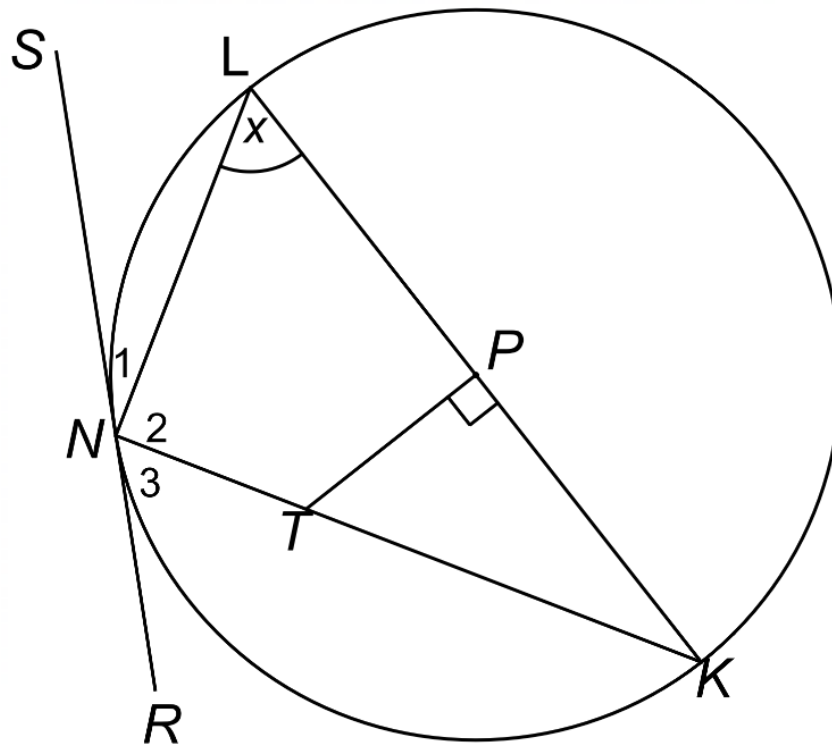
b) Prove that PQ bisects \hat{TPS}

c) Determine \hat{POQ} in terms of y

d) Prove that PT is a tangent to the circle through points P, O and A.

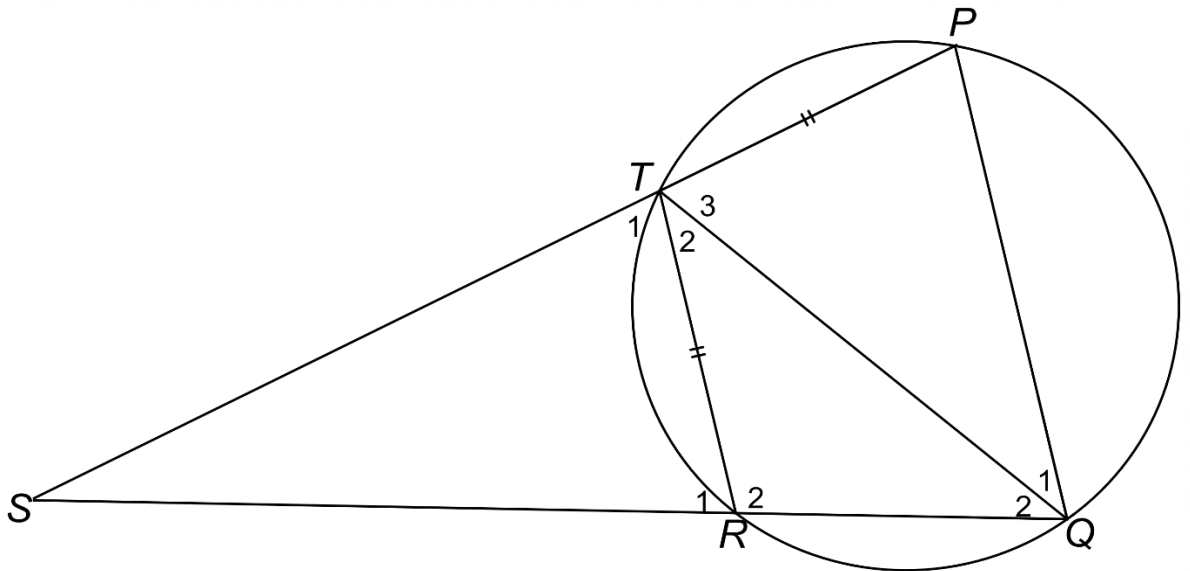
e) Prove that $\hat{OAP} = 90^\circ$

8. LK is a diameter. RNS is a tangent at N. $TP \perp KL$



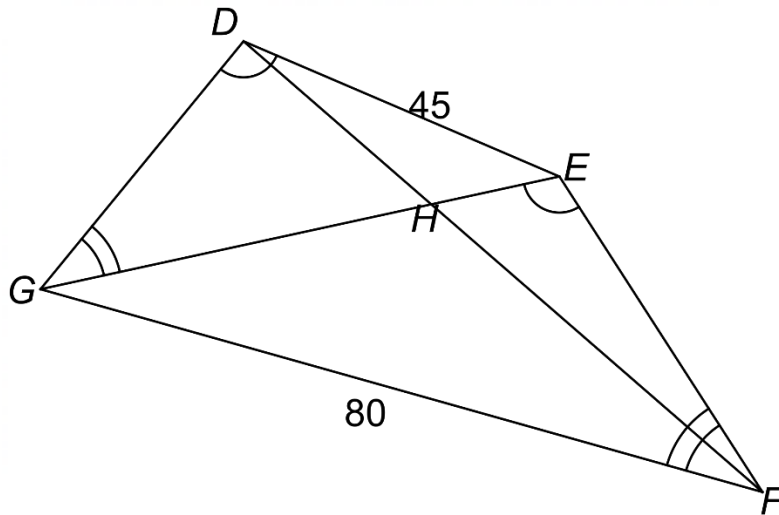
- Prove $TPLN$ is a cyclic quadrilateral
- Determine, with reasons, \hat{N}_1 in terms of x
- Prove that $\triangle KTP \sim \triangle KLN$
- Prove that $KT \cdot KN = 2KT^2 - 2TP^2$

9. PQRT is a cyclic quadrilateral and $PT = TR$. $\angle SQP = 70^\circ$



- a) Calculate \hat{T}_1 with reasons
- b) Calculate \hat{Q}_1 with reasons
- c) If it is now given that $PQ \parallel TR$:
 - i) Calculate \hat{T}_2 with reasons
 - ii) Prove that $\frac{TR}{TS} = \frac{RQ}{RS}$

10. In the diagram DEFG is a quadrilateral with $DE = 45$ and $GF = 80$.
 $\hat{GDE} = \hat{FEG}$ and $\hat{DGE} = \hat{EFG}$.



- Give a reason why $\triangle DEG \parallel \triangle EGF$
- Calculate the length of GE
- Prove that $\triangle DEH \parallel \triangle FGH$
- Hence, calculate the length of GH