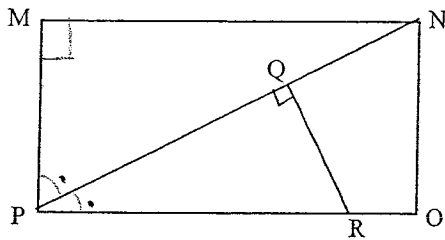




MORIAH COLLEGE MATHEMATICS DEPARTMENT
Year 11 - Geometry Revision :
Similar Triangles, Congruent Triangles and Circle Geometry

1)

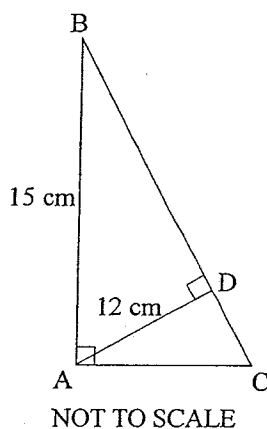


PN is a diagonal of the rectangle MNOP. R is the point on PO and $\angle PQR = 90^\circ$.

- i. Prove that $\triangle PQR$ is similar to $\triangle NMP$.
- ii. Given $MP = 5$ cm, $MN = 10$ cm and $QR = 2$ cm, find the length of PQ.

2)

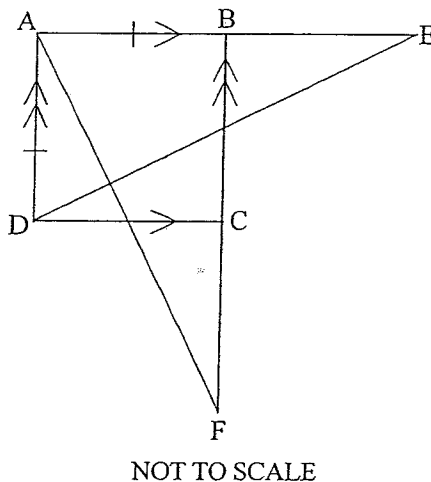
$\triangle ABC$ is right-angled at A and AD is drawn perpendicular to BC. $AB = 15$ cm and $AD = 12$ cm. Copy the given diagram onto your answer sheet.



- i. Show that $BD = 9$ cm.
- ii. Prove that $\triangle ABC$ is similar to $\triangle DBA$.
- iii. Hence find the length of AC.

3)

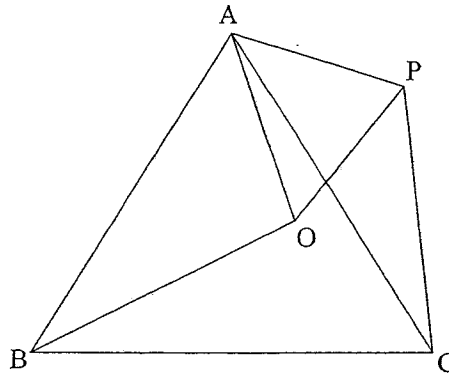
In the diagram ABCD is a square. AB is produced to E so that $AB = BE$ and BC is produced to F so that $BC = CF$.



- i. Copy the diagram.
- ii. Prove $\triangle AED \cong \triangle BFA$.
- iii. Hence prove $\angle AED = \angle BFA$.

4)

In the figure triangles ACB and APO are equilateral.



NOT TO SCALE

- i. Copy this diagram and include all the given information.
- ii. Explain why $\angle BAO = \angle PAC$.
- iii. Prove $\triangle AOB \cong \triangle APC$.
- iv. Hence prove $OB = CP$.

5)

In the diagram CT bisects $\angle ACB$, AE is perpendicular to CT and M is the midpoint of AB. AE produced meets BC at the point P.

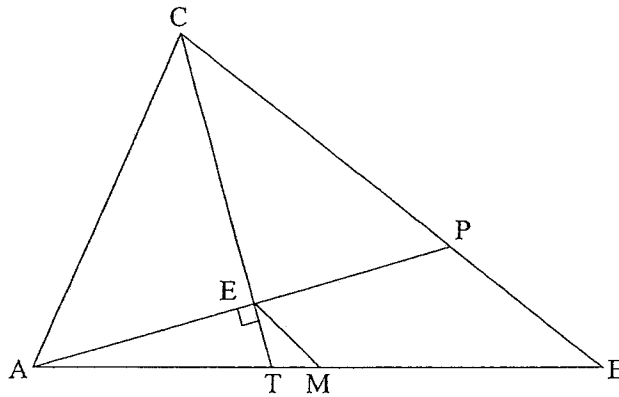
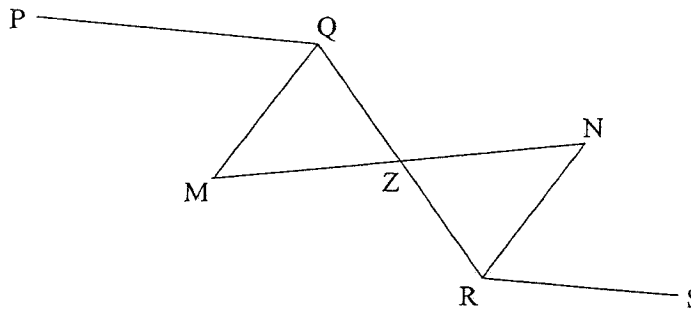


FIGURE NOT TO SCALE

- i. Copy this diagram and mark in all the given information.
- ii. Prove that $\triangle ACE$ is congruent to $\triangle PCE$.
- iii. Explain why $AE = EP$.
- iv. Hence prove that EM is parallel to PB.

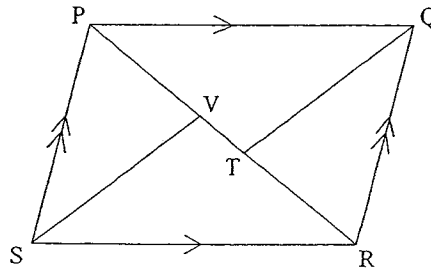
6)



In the given diagram $PQ \parallel RS$. MQ bisects $\angle PQR$, NR bisects $\angle QRS$ and $MQ = NR$.

- i. Copy this diagram and mark on it all the given information.
- ii. Explain how you know that $\angle MQZ = \angle NRZ$.
- iii. Prove that $\triangle QMZ \cong \triangle RNZ$.
- iv. Hence prove that the intervals QR and MN bisect each other.

7)

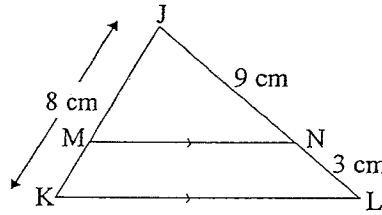


NOT TO SCALE

PQRS is a parallelogram. TQ bisects $\angle PQR$ and VS bisects $\angle PSR$.

- i. Copy this diagram
- ii. State why $\angle PQR = \angle PSR$.
- iii. Prove that $\triangle PVS$ and $\triangle RTQ$ are congruent.
- iv. Hence find the length of TV if $PR = 20$ cm and $TR = 8$ cm.

8)

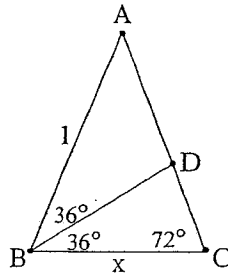


NOT TO SCALE

The diagram shows a triangle JKL. $MN \parallel KL$, $JK = 8$ cm, $JN = 9$ cm, and $NL = 3$ cm.

- i. Prove that $\triangle JMN$ is similar to $\triangle JKL$.
- ii. Find the length of MK. \square

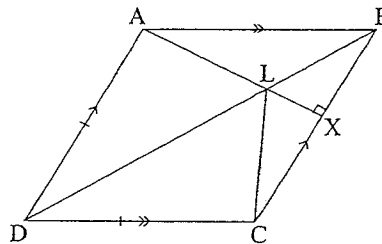
9)



In the diagram ABC is an isosceles triangle where $\angle ABC = \angle BCA = 72^\circ$ and $AB = AC = 1$. Angle ABC is bisected by BD, and $BC = x$.

- i. Copy the diagram.
- ii. Show that triangles ABC and BCD are similar.
- iii. By using (ii) find the exact value of x . \square

10)



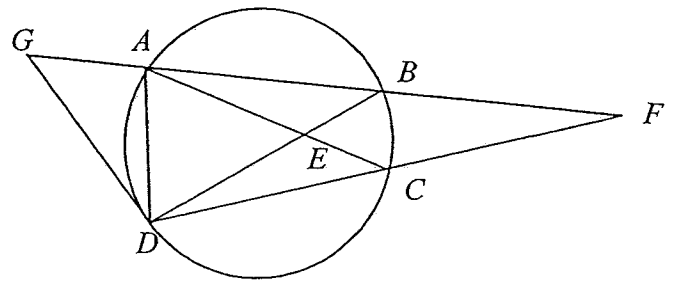
(FIGURE NOT TO SCALE)

ABCD is a rhombus, AX is perpendicular to BC and intersects BD at L.

- i. Copy the diagram and state why $\angle ADB = \angle CDB$.
- ii. Prove that the triangles ALD and CLD are congruent.
- iii. Show that $\angle DAL$ is a right angle.
- iv. Hence or otherwise find the size of $\angle LCD$. \square

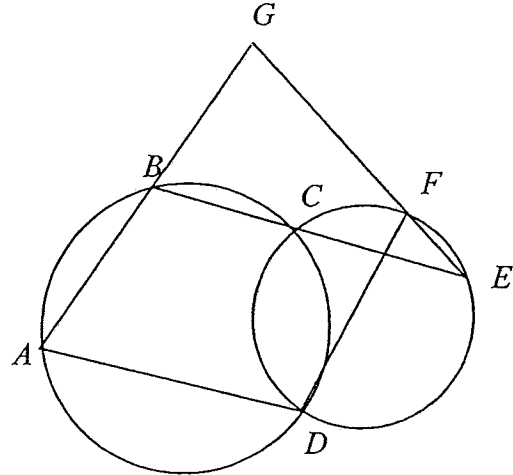
- 11) In the figure, DG is a tangent to the circle at D. GABF and DCF are straight lines.

Prove that $2\angle ADG = \angle BEC + \angle BFC$



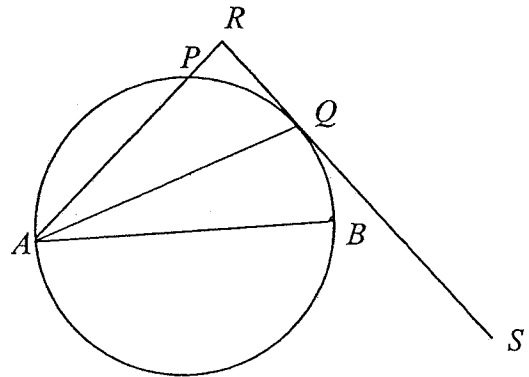
- 12) ABG, BCE and EFG are straight lines.

Prove that GFDA is a cyclic quadrilateral.



- 13) AB is a diameter and AP is a chord. QA is a chord which bisects $\angle BAP$. The tangent at Q cuts AP produced at R.

Prove that AR is perpendicular to RQ.



- 14) In the diagram, $\angle DXB = 36^\circ$ and $\angle BDX = 86^\circ$.

Find the size of $\angle YZB$, giving reasons.

