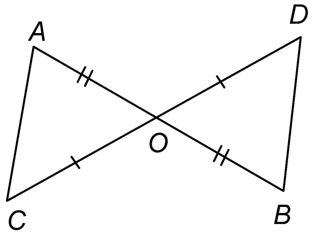
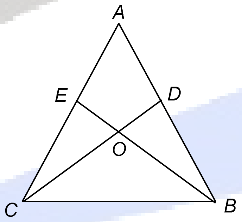
1. In figure O is the mid-point of AB and CD. Prove that



   (i) ΔAOC ≅ ΔBOD (ii) AC = BD and (iii) AC || BD

2. In figure it is given that AE = AD and BD = CE. Prove that ΔAEB ≅ ΔADC

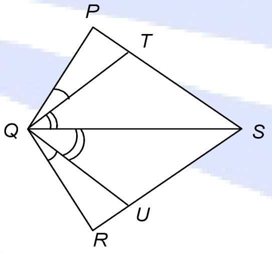


3. Suppose line segments AB and CD intersect at O in such a way that AO = OD and OB = OC. Prove that AC = BD but AC may not be parallel to BD.

4. If D is the mid-point of the hypotenuse AC of a right triangle ABC, prove that $BD = \frac{1}{2}AC$

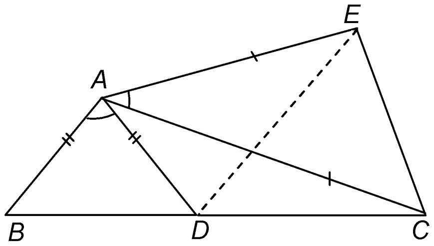
5. Prove that ΔABC is isosceles if any one of the following holds :
   (i) Altitude AD bisects BC
   (ii) Median AD is perpendicular to the base BC

6. In figure, PQRS is a quadrilateral and T and U are respectively points on PS and RS such that PQ = RQ, ∠PQT = ∠RQU and ∠TQS = ∠UQS. Prove that QT = QU.

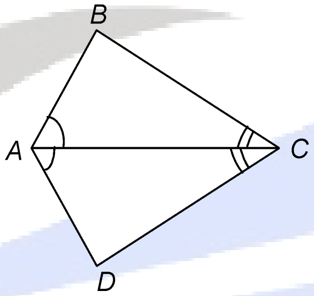


7. In right triangle ABC, right angle at C, M is the mid-point of the hypotenuse AB. C is the joined to M and produced to a point D such that DM = CM. Point D is joined to point B. Show that
   (i) ΔAMC ≅ ΔBMD (ii) ∠DBC = ∠ACB
   (iii) ΔDBC ≅ ΔACB (iv) $CM = \frac{1}{2}AB$

8. In figure, AC = AE, AB = AD and ∠BAD = ∠EAC. Prove that BC = DE.



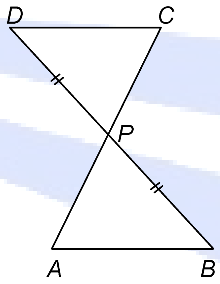
9. In figure, diagonal AC of a quadrilateral ABCD bisects the angles A and C. Prove that AB = AD and CB = CD.



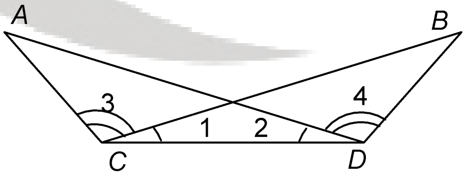
10. AB is a line segment, AX and BY are two equal segment drawn on opposite sides of line AB such that AX || BY. If AB and XY intersect each other at P, prove that
(i) ΔAPX ≅ ΔBPY (ii) AB and XY bisect each other

11. ✦ and m are two parallel lines intersected by another pair of parallel lines p and q as shown in figure. Show that ΔABC ≅ ΔCDA.

12. In figure, if AB || DC and P is the mid-point of BD, prove that P is also the mid-point of AC.



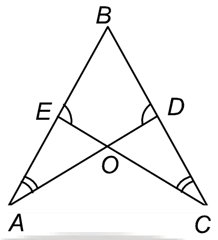
13. In figure, ∠BCD = ∠ADC and ∠ACB = ∠BDA. Prove that AD = BC and ∠A = ∠B



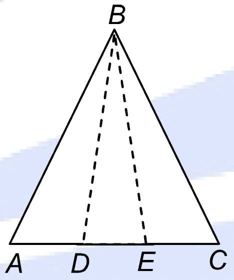
14. In two rights triangles, one side and an acute angle of one triangle are equal to one side and the corresponding acute angle of the other triangle. Prove that the two triangles are congruent.

15. Δ ABC is an isosceles triangle with AB = AC. Side BA is produced to D such that AB = AD. Prove that ∠BCD is a right angle.

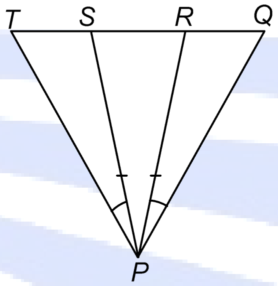
16. If ΔABC is an isosceles triangle with AB = AC. Prove that the perpendiculars from the vertices B and C to their opposite sides are equal.
17. In figure, it is given that ∠A = ∠C and AB = BC. Prove that ΔABD ≅ ΔCBE.



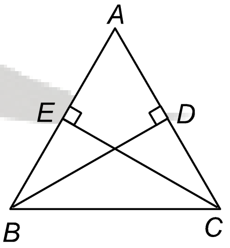
18. In figure, it is given that AB = BC and AD = EC. Prove that ΔABE ≅ ΔCBD.



19. In right angles triangle, one acute angle is double the other. Prove that the hypotenuse is double the smallest side.
20. In figure, PS = PR, ∠TPS = ∠QPR. Prove that PT = PQ.

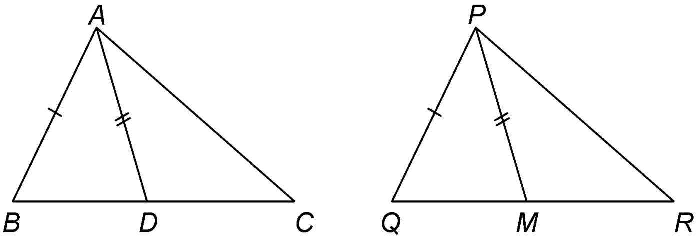


21. In figure, BD and CE are two altitudes of a ΔABC such that BD = CE. Prove that ΔABC is isosceles.



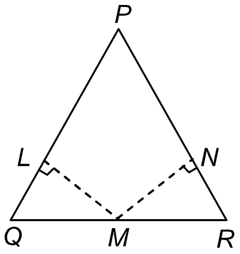
22. ABCD is a parallelogram, if the two diagonals are equal, find the measure of ∠ABC.
23. If two isosceles triangles have a common base, prove that the line joining their vertices bisects them at right angles.
24. In figure, two sides AB and BC and the median AD of ΔABC are equal respectively to the two sides PQ and QR and the median PM of the other triangle PQR. Prove that

(i) ΔABD ≅ ΔPQM (ii) ΔABC ≅ ΔPQR

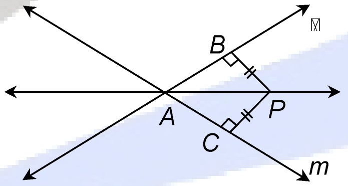


25. AD, BE and CE the altitudes of ΔABC are equal. Prove that ΔABC is an equilateral triangle.

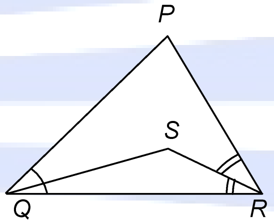
26. In figure, it is given that LM = MN, QM = MR, ML ⊥ PQ and MN ⊥ PR. Prove that PQ = PR.



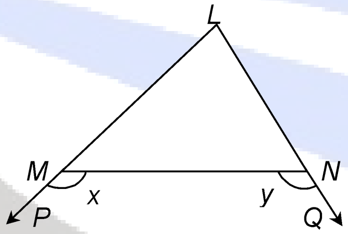
27. In figure P is a point equidistant from two lines ✦ and m intersecting at a point A. Show that AP bisects the angle between them.



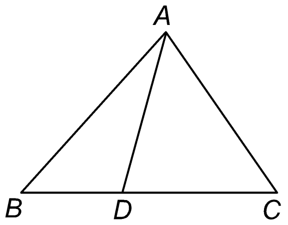
28. In figure, PQ > PR and RS are the bisectors of ∠Q and ∠R respectively. Prove that SQ > SR.



29. In figure, sides LM and LN of ΔLMN are extended to P and Q respectively.
If x > y, show that LM > LN.

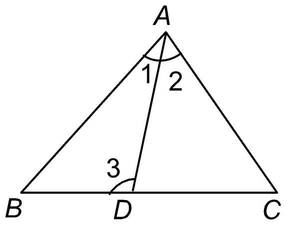


30. In figure, AB > AC. Show that AB > AD



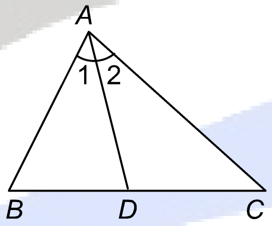
31. If D is any point on the base BC produced, of an isosceles triangle ABC, prove that AD > AB.

32. In figure, if AD is the bisector of ∠A, show that:

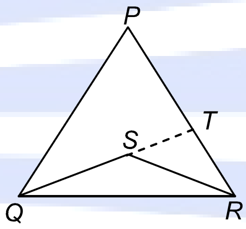


(i) AB > BD (ii) AC > CD

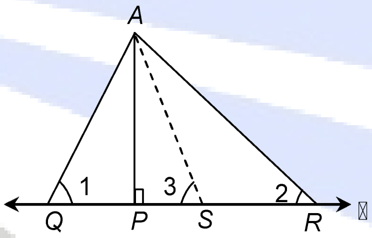
33. In figure, AC > AB and AD is the bisector of ∠A. Show that ∠ADC > ∠ADB.



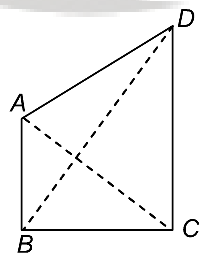
34. In figure, PQR is a triangle and S is any point in its interior, show that SQ + SR < PQ + PR.



35. In figure, AP ⊥ ✦ and PR > PQ. Show that AR > AQ.



36. In figure, AB and CD are respectively the smallest and longest sides of a quadrilateral ABCD. Show that ∠A > ∠C and ∠B > ∠D.



37. In figure, T is a point on side QR of ΔPQR and S is a point such that RT = ST. Prove that PQ + PR > QS.