Exercise 13.2
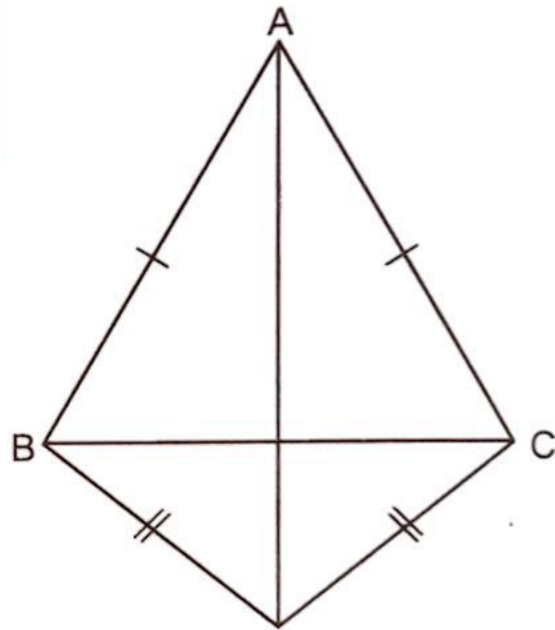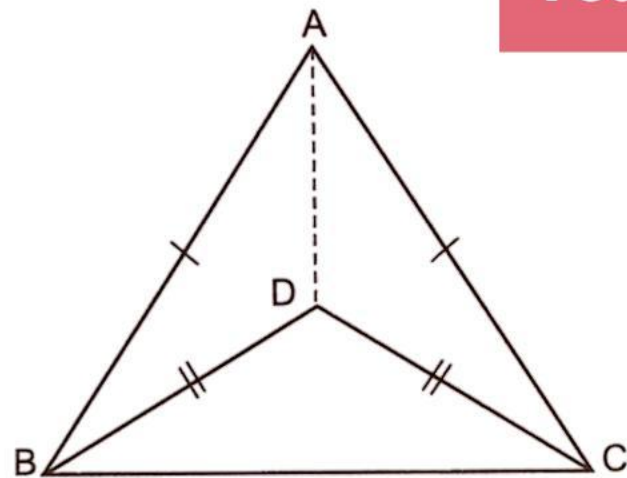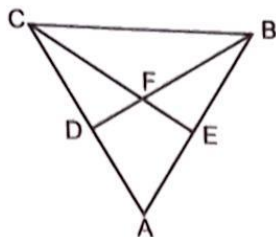
1. In the given figure, ABCD is a quadrilateral in which AB = AD and BC = DC. Prove that AC is the bisector of ∠BAD and ∠BCD.

2. In the given figure, AB = AC and DB = DC, i.e., ∠DBC = ∠DCB. Prove that ∠ABD = ∠ACD and ∠BAD = ∠CAD, i.e., AD bisects ∠BAC of a △ABC. [*CBSE* 2010]
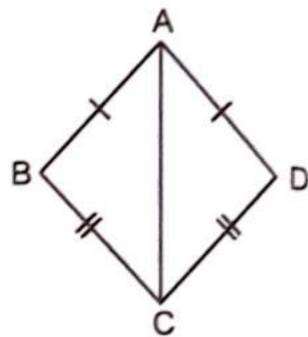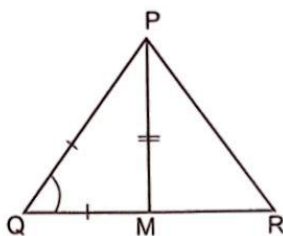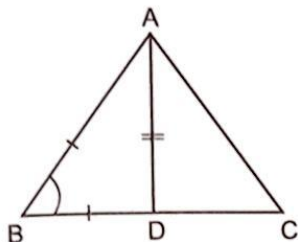
Teach san ban

**3.** In the given figure, $CD = BE$ and $BD = CE$. Prove that $AB = AC$.

4. In the given figure, two sides AB and BC and the median AD of $\triangle ABC$ are equal respectively to the two sides PQ and QR and the median PM of the other triangle PQR. **[NCERT]**
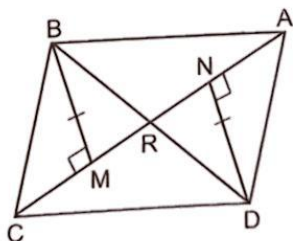

Prove that
   (i) $\triangle ABD \cong \triangle PQM$
   (ii) $\triangle ABC \cong \triangle PQR$ **[CBSE 2011]**

5. ABCD is a parallelogram, if the two diagonals are equal, find the measure of $\angle ABC$.   **[Ans. $\angle ABC = 90°$]**

6. In $\triangle ABC$, $AB = BC = CA$ and $\angle OCB = \angle OBA$. Prove that AO bisects $\angle CAB$.
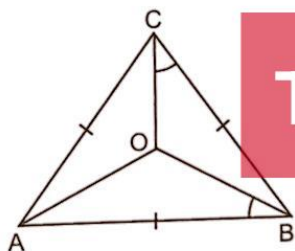

Teach san ban

7. ABC is an isosceles triangle with $AB = AC$. Draw $AP \perp BC$. Show that $\angle B = \angle C$ **[NCERT] [CBSE 2011]**

8. In the given figure, BM and DN are both perpendiculars to the segment AC and $BM = DN$. Prove that AC bisects BD.

**9.** In parallelogram ABCD, the angles A and C are obtuse. Points X and Y are taken on the diagonal BD such that the angles $\angle XAD$ and $\angle YCB$ are right angles. Prove that $XA = YC$.

10. ABC is an equilateral triangle. D, E, F are points on BC, CA, AB respectively such that BD = CE = AF. Prove that $\triangle$DEF is an equilateral triangle.

11. If the diagonals of a parallelogram are equal, prove that it is a rectangle.

12. Show that the diagonals of a rhombus bisect each other at right angles.

13. ABCD is a quadrilateral in which AB = CD. Also, there is a point O inside the quadrilateral such that OA = OD and OB = OC. Prove that BC is parallel to AD.

14. ABCDE is a regular pentagon and M is the mid-point of AB. Prove that DM $\perp$ AB.
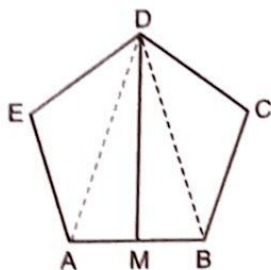
15. In a quadrilateral ABCD, AB = BC = CD = DA. P is a point such that BP = DP. Prove that A, P, C are collinear.
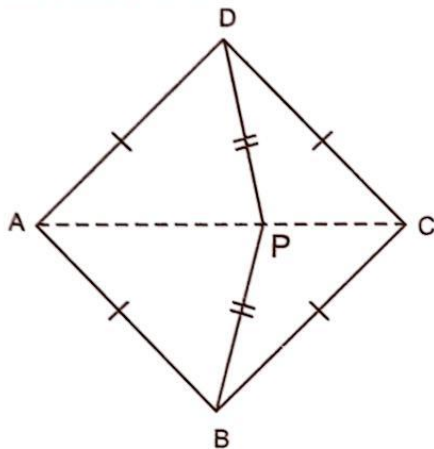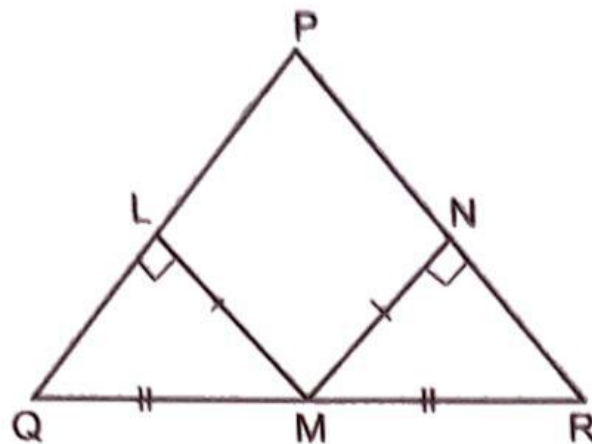

16. In a rhombus, prove that the opposite angles are equal.

17. In the given figure, $\triangle$ABC is right angled at B. ACDE and BCGF are squares. Prove that

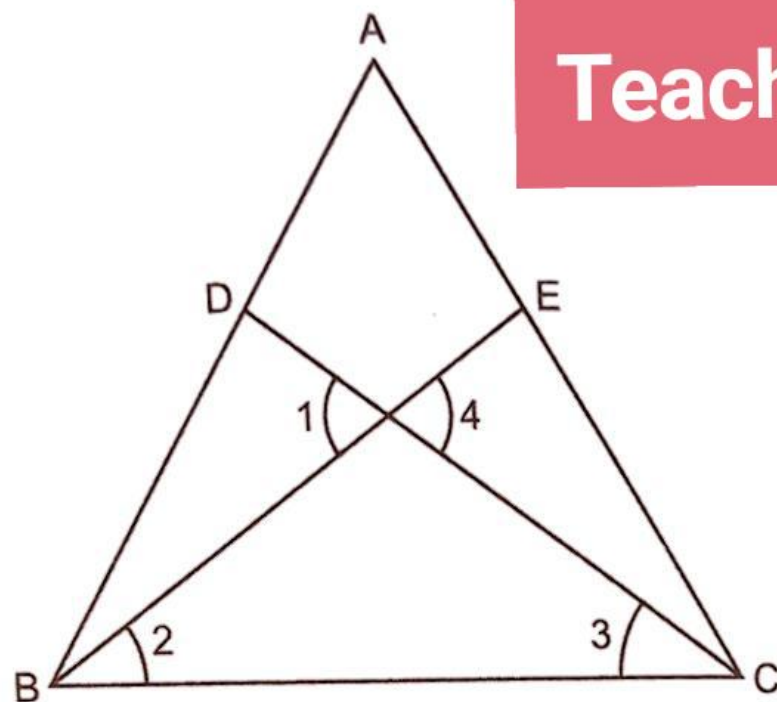   (i) $\triangle$BCD $\cong$ $\triangle$ACG

   (ii) AG = BD
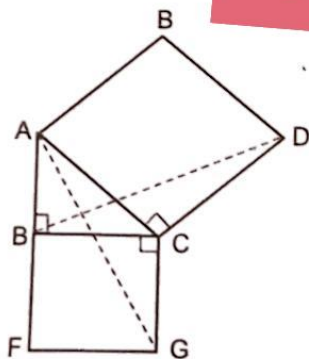
Teach san ban

18. In the given figure, if LM = MN, QM = MR and ∠MLQ = ∠MNR = 90°. Prove that PQ = PR.

19. In the given figure, AB = AC, ∠1 = 2∠2 and ∠4 = 2∠3. Prove that $\triangle BEA \cong \triangle CDA$.

20. (a) Prove that a diagonal of a rhombus bisects the angle through which it passes.

(b) If the diagonals of a quadrilateral with no angle equal to 90°, bisect each other at right angles, prove that the quadrilateral is a rhombus.