MATHS

BOOKS - PSEB

TRIANGLES

Exercise

1. In quadrilateral ACBD, AC = AD and AB bisects $\angle A$ (see Fig. 7.16). Show that

$\triangle ABC \cong \triangle ABD$. What can you say about BC and BD?

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2. ABCD is a quadrilateral in which AD = BC and $\angle DAB = \angle CBA$ (see Fig. 7.17). Prove that (i) $\triangle ABD \cong \triangle BAC$ (ii) BD = AC (iii) $\angle ABD = \angle BAC$.

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3. AD and BC are equal perpendiculars to a line segment AB (see Fig. 7.18). Show that CD bisects AB.

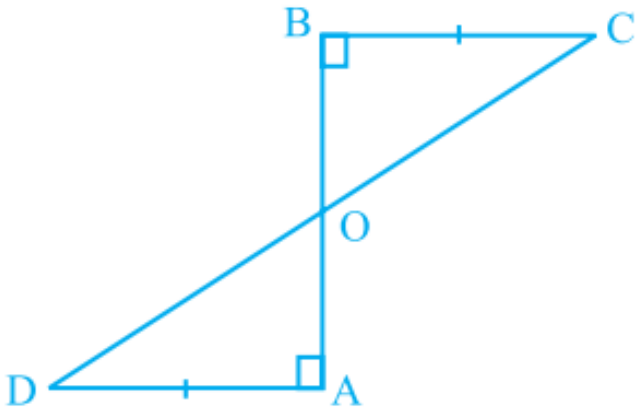

Fig. 7.18

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4. l and m are two parallel lines intersected by another pair of parallel lines p and q (see Fig. 7.19). Show that $\triangle ABC \cong \triangle CDA$

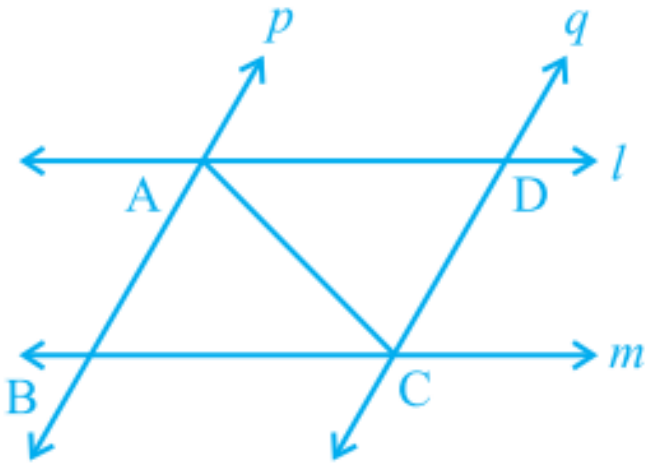

Fig. 7.19

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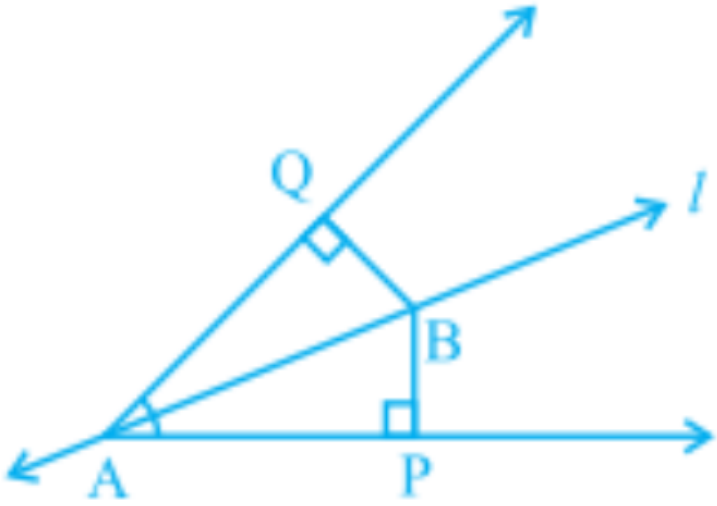
5. Line l is the bisector of an angle $\angle A$ and B is any point on l. BP and BQ are perpendiculars from B to the arms of $\angle A$ (see Fig. 7.20). Show that: (i) $\triangle APB \cong \triangle AQB$ (ii) BP = BQ or B is equidistant from the arms of $\angle A$.



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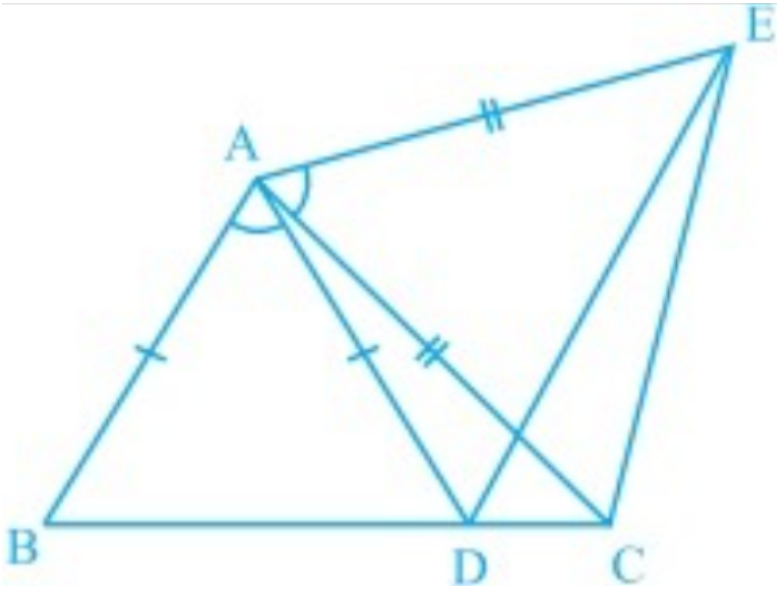
6. In Fig. 7.21, AC = AE, AB = AD and $\angle BAD = \angle EAC$. Show that BC =DE.



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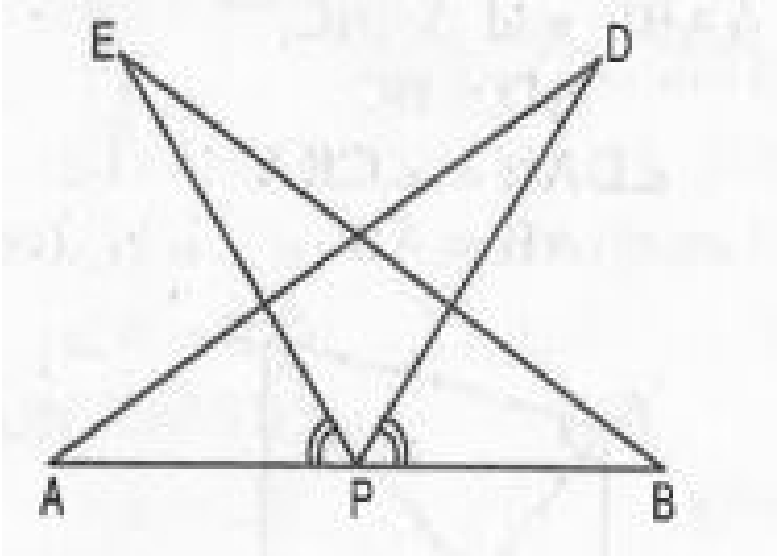
7. AB is a line segment and P is its midpoint. D and E are points on the same side of AB such that $\angle BAD = \angle ABE$ and $\angle EPA = \angle DPB$. Show that AD=BE.



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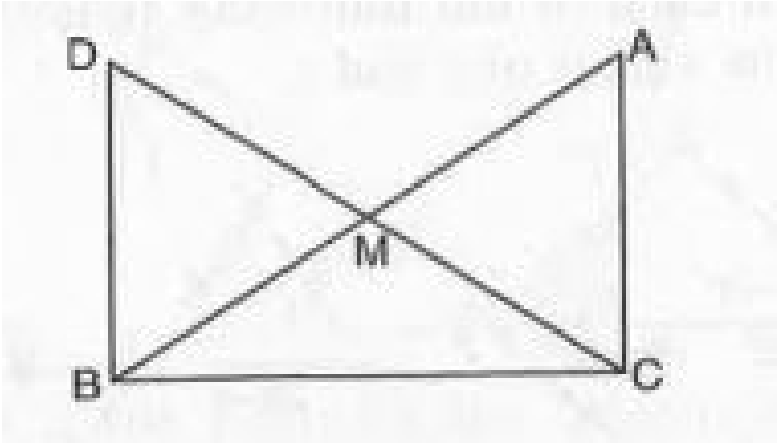
8. In right triangle ABC, right angled at C, M is the mid-point of hypotenuse AB. C is joined to M and produced to a point D such that DM = CM. Point D is joined to point B (See Fig.)



Show that : $CM = \frac{1}{2}AB$.

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9. In an isosclees triangle ABC, with AB = AC, the bisectors of $\angle B$ and $\angle C$ intersect each other at O. Join A to O show that : OB=OC.

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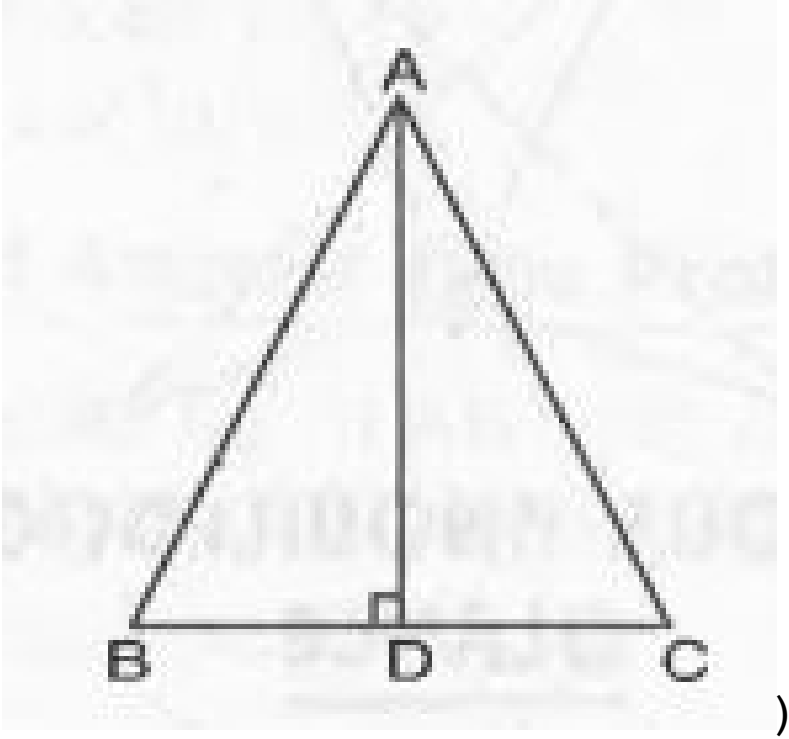
10. In ΔABC, AD is the perpendicular bisector of BC (See Fig.



). Show that ΔABC is an isosceles triangle in which AB = AC.

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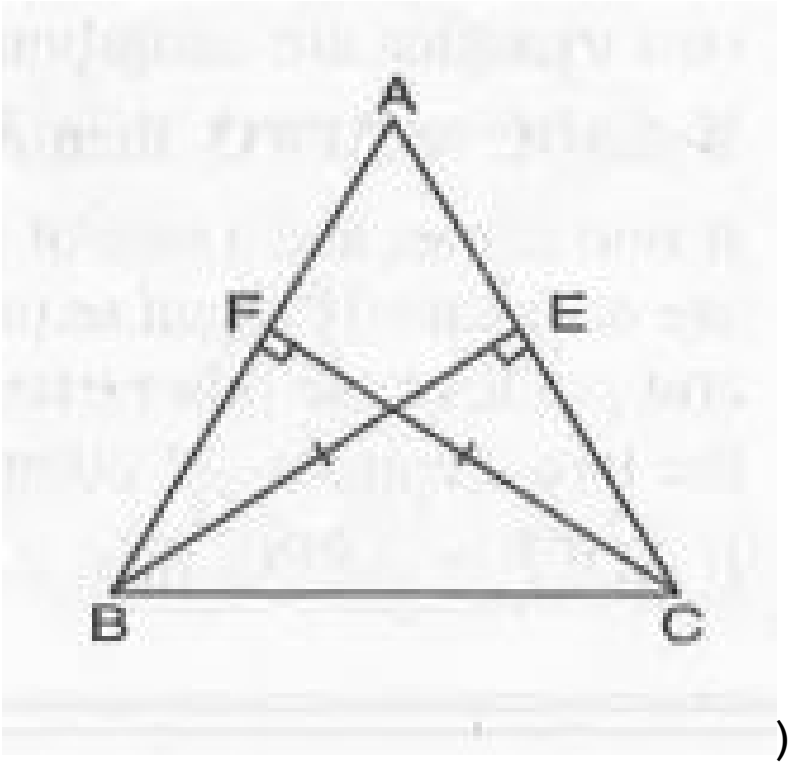
11. ABC is an isosceles triangle in which altitudes BE and CF are drawn to sides AC and AB respectively (See Fig.



). Show that these altitudes are equal.

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12. ABC is a triangle in which altitudes BE and CF to sides AC and AB are equal (See Fig. ). Show that $\Delta ABE \cong \Delta ACF$.

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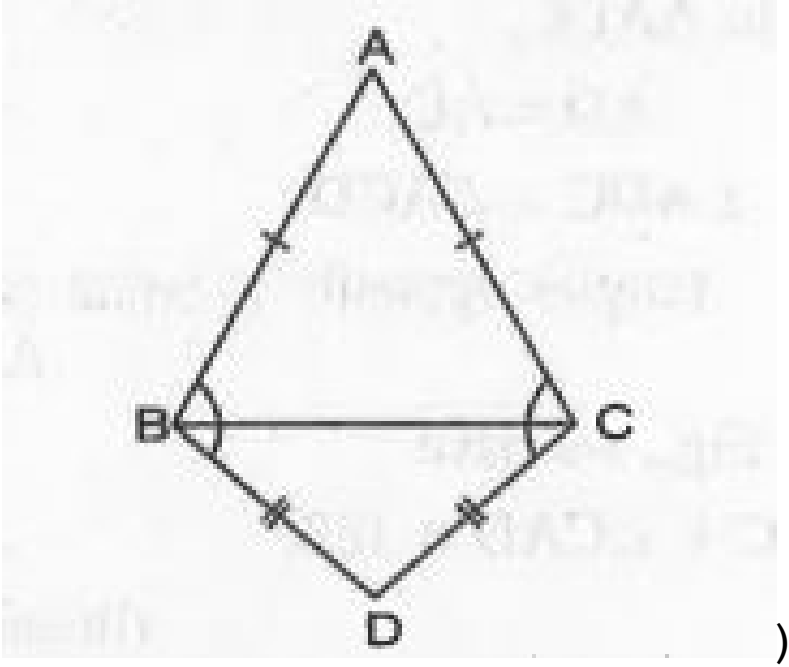
13. ABC and DBC are two isosceles triangles on the same base BC (See Fig.



). Show that $\angle ABD = \angle ACD$.

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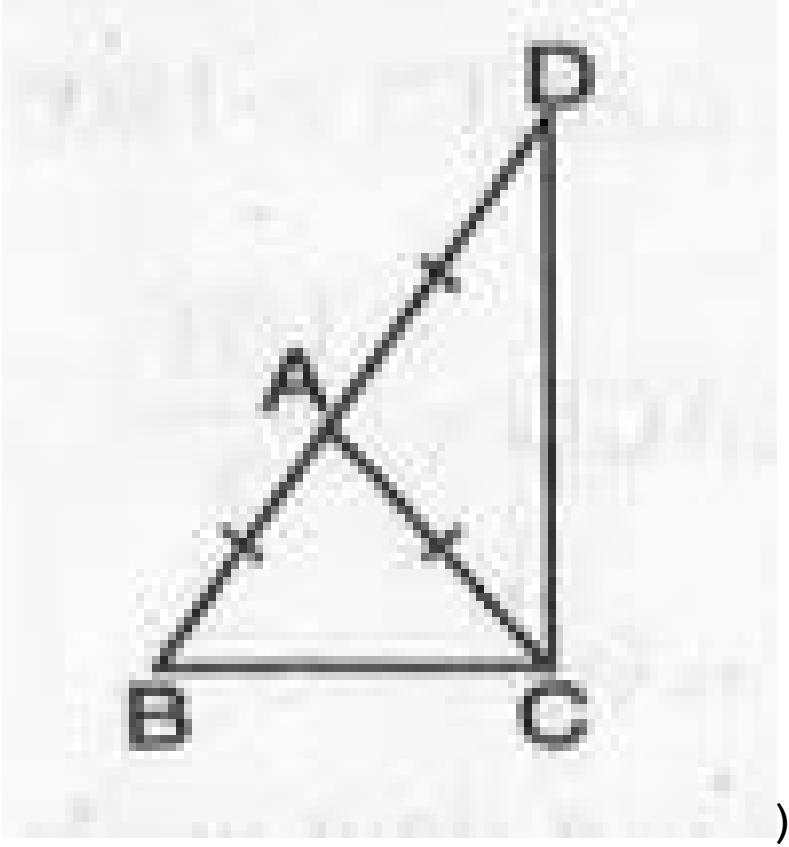
14. ΔABC is an isoscelestriangle in which AB = AC. Side BA is produced to D such that AD =

AB. Show that $\angle BCD$ is a right angle (see Fig.



).

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15. ABC is a right angled triangle in which $\angle A = 90^\circ$ and AB = AC. Find $\angle B$ and $\angle C$.

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16. Show that the angles of an equilateral triangle are60° each.

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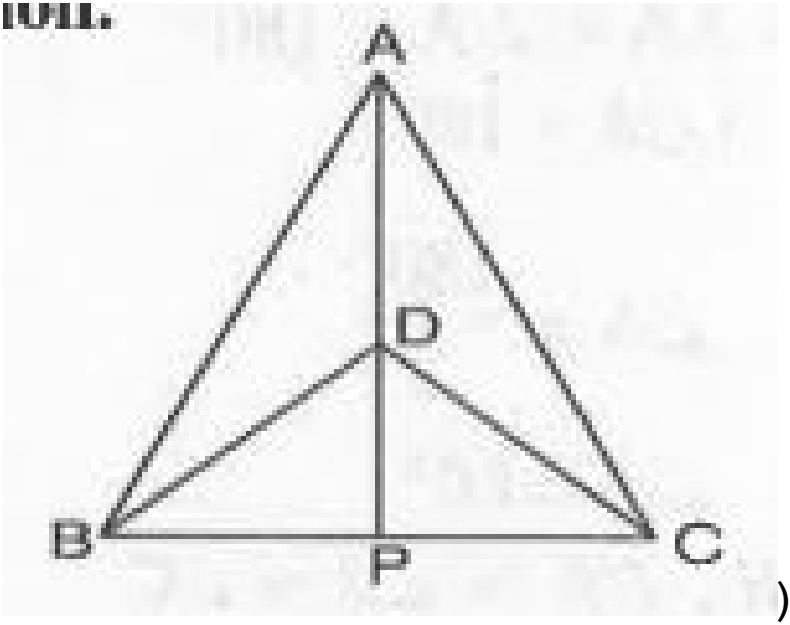
17. ΔABC and ΔDBC are two isosceles triangles on the same base BC and vertices A and D are on the same side of BC (See Fig.



).If AD is extended to intersect BC at P, show that $\Delta ABD \cong \Delta ACD$.

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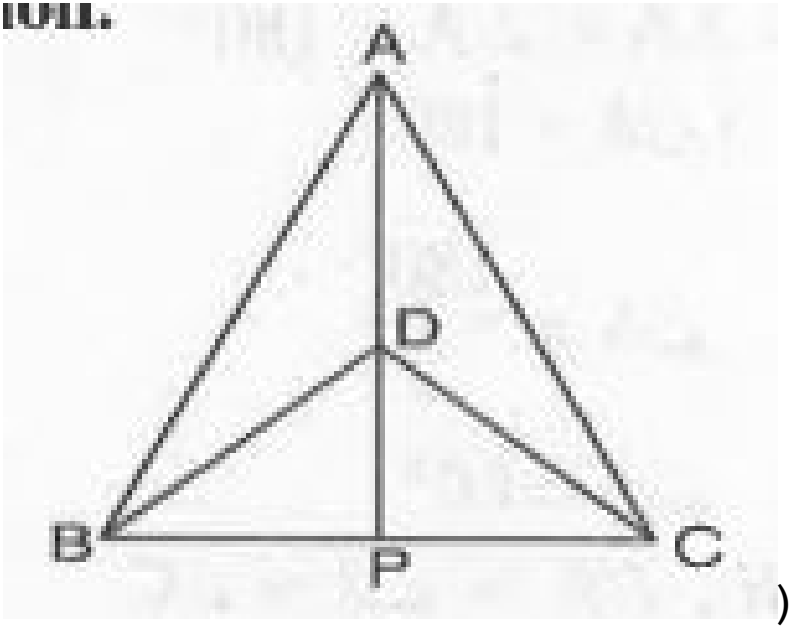
18. ΔABC and ΔDBC are two isosceles triangles on the same base BC and vertices A and D are on the same side of BC (See Fig.



).If AD is extended to intersect BC at P, show that $\Delta ABD \cong \Delta ACD$.

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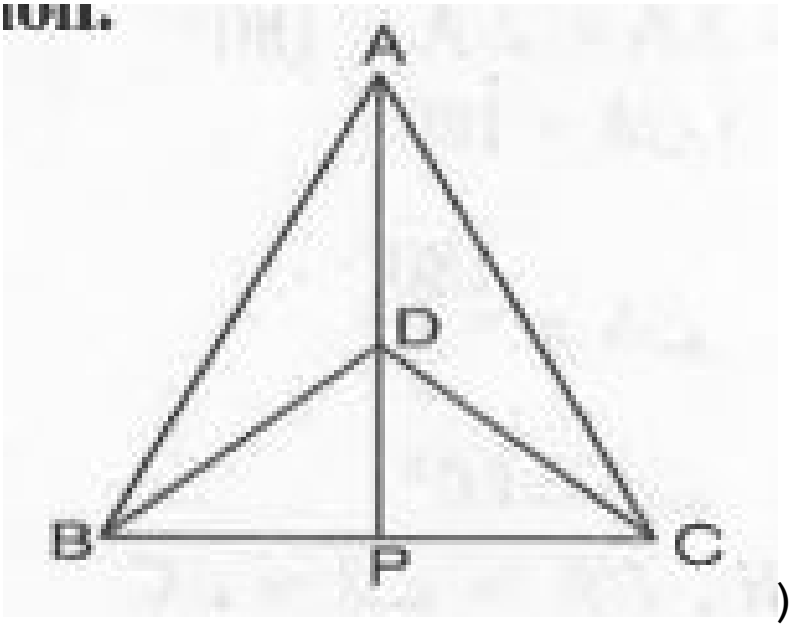
19. ΔABC and ΔDBC are two isosceles triangles on the same base BC and vertices A and D are on the same side of BC (See Fig.



).If AD is extended to intersect BC at P, show that AP bisects $\angle A$ as well as $\angle D$.

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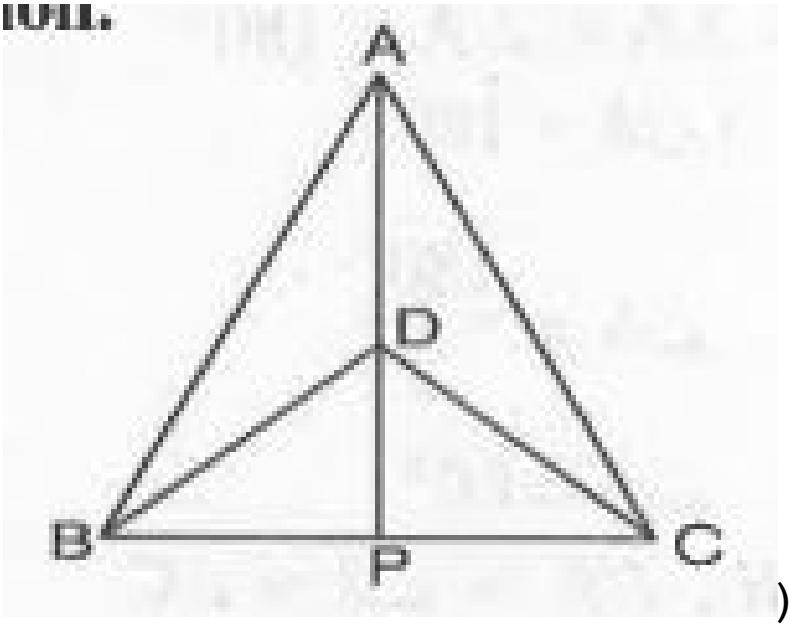
20. ΔABC and ΔDBC are two isosceles triangles on the same base BC and vertices A and D are on the same side of BC (See Fig.



).If AD is

extended to intersect BC at P, show that AP is the perpendicular bisector of BC.

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21. AD is an altitude of an isosceles triangle ABC in which AB = AC. Show that:- AD bisects BC

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22. AD is an altitude of an isosceles triangle ABC in which AB = AC. Show that:- AD bisects $\angle A$.

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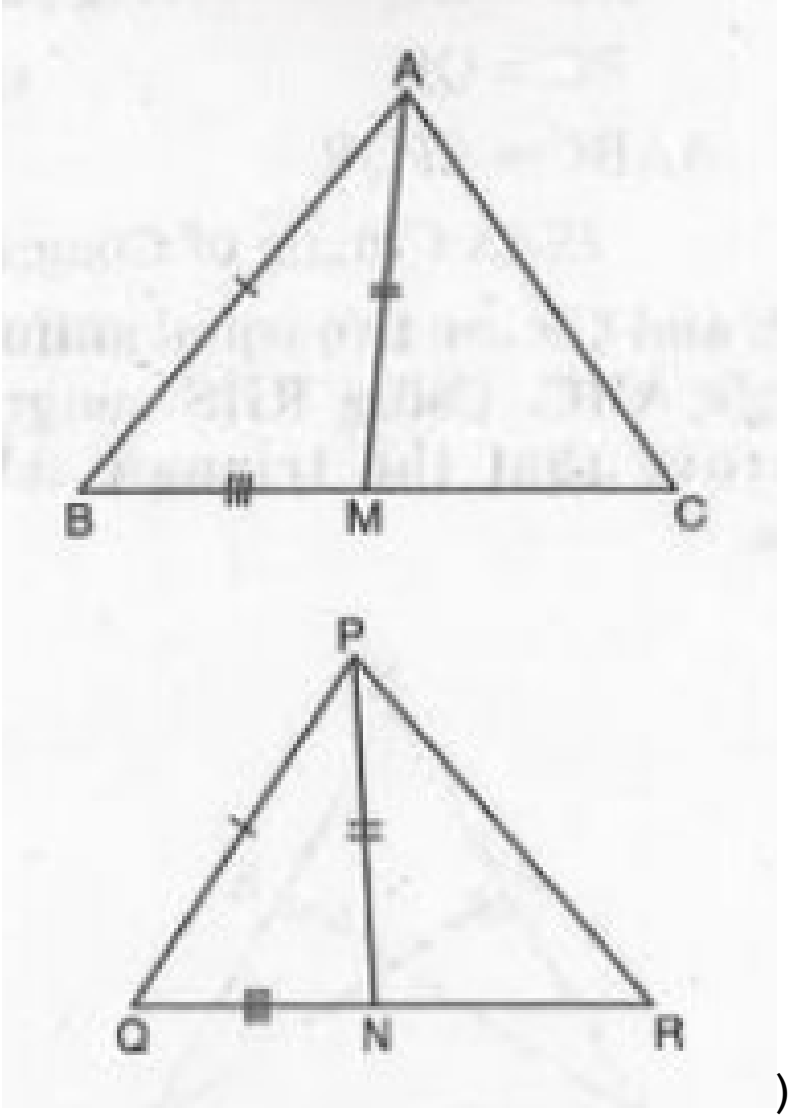
23. Two sides AB and BC and median AM of one triangle ABC are respectively equal to sides PQ and QR and median PN of ΔPQR (See Fig



). Show that : $\Delta ABM \cong \Delta PQN.$

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24. Two sides AB and BC and median AM of one triangle ABC are respectively equal to sides PQ and QR and median PN of ΔPQR (See Fig ). Show that : $\Delta ABC \cong \Delta PQR$.

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25. BE and CF are two equal altitudes of a triangle ABC. Using RHS congruence rule, prove that the triangle ABC is isosceles.

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26. ABC is an isosceles triangle with AB = AC. Draw $AP \perp BC$ to show that $\angle B = \angle C$.

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27. Show that in a right angled triangle, the hypotenuse is the longest side.

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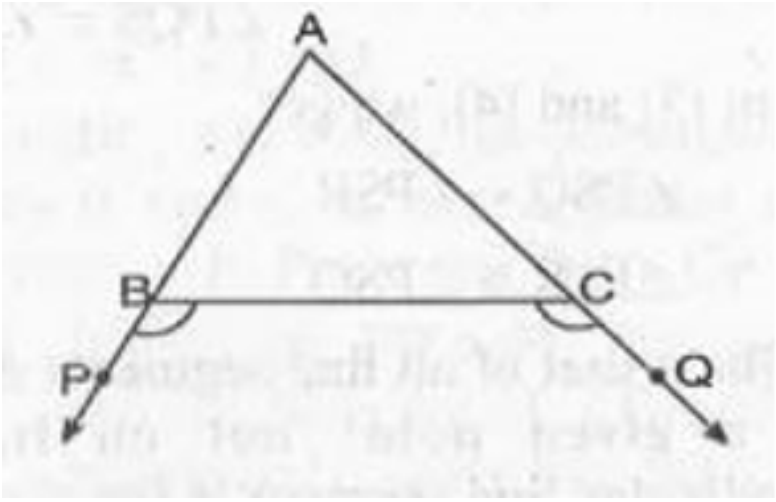
28. In Fig.



, sides AB and AC of ΔABC are extended to points P and Q respectively. Also $\angle PBC < \angle QCB$. Show that $AC > AB$.

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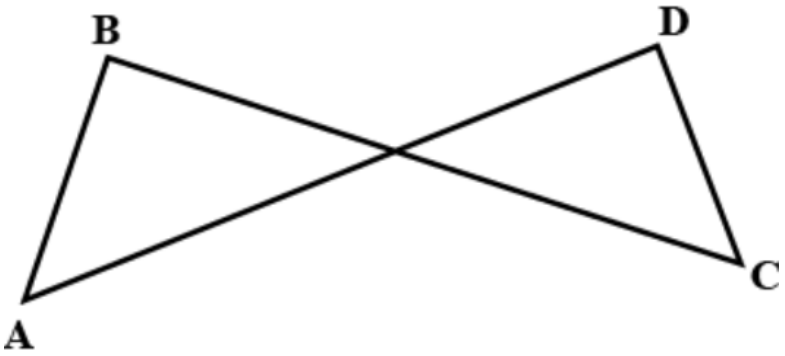
29. In Fig. 7.49, $\angle B < \angle A$ and $\angle C < \angle D$. Show that AD < BC.



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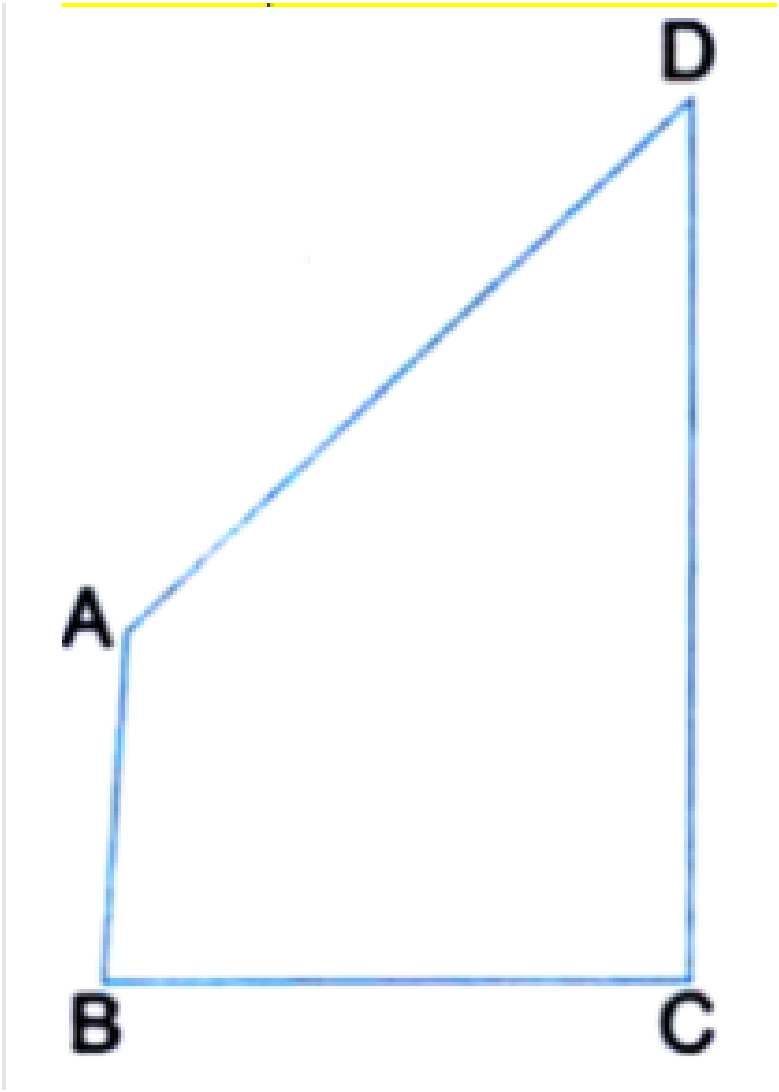
30. AB and CD are respectively the smallest and longest sides of a quadrilateral ABCD (see Fig. 7.50). Show that $\angle A > \angle C$ and

$\angle B > \angle D.$



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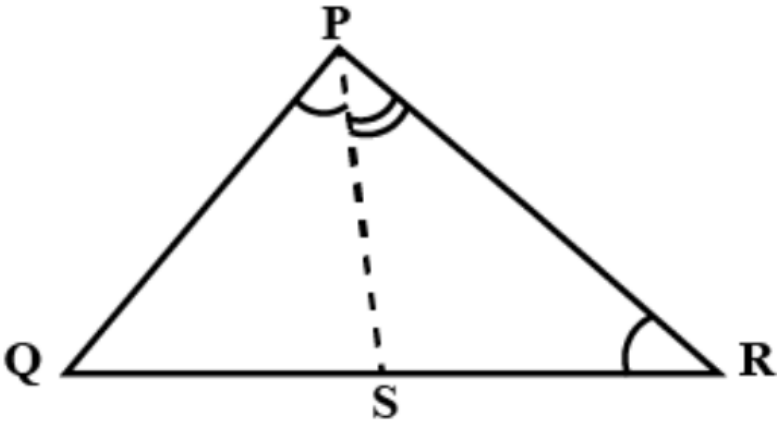
31. In Fig 7.51, PR > PQ and PS bisects $\angle QPR$.

Prove that $\angle PSR > \angle PSQ$.



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32. Show that of all line segments drawn from a given point not on it, the perpendicular line segment is the shortest.

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33. ABC is a triangle. Locate a point in the interior of ΔABC which is equidistant from all the vertices of ΔABC.

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34. In a triangle locate a point in its interior which is equidistant from all the sides of the triangle.

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35. In a huge park, people are concentrated at three points

A : where there are different slides and swings for children. B : near which a man-made lake is situated. C : which is near to a large parking and exit. Where should an icecream parlour be set up so that maximum number of persons can approach it ?

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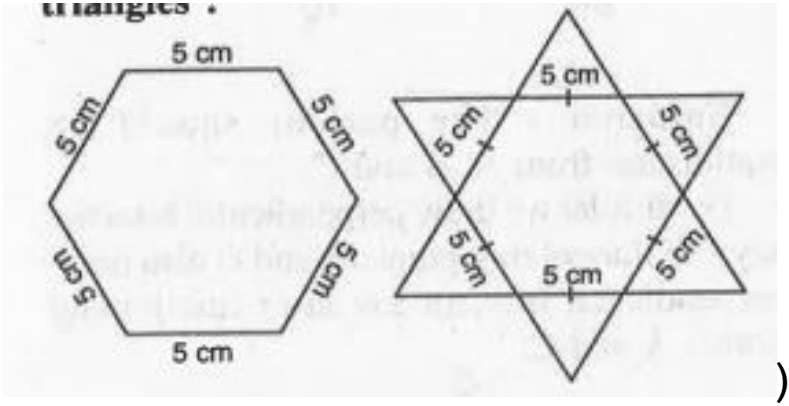
36. Complete the hexagonal rangoli and the star Rangolies (see Figs.



) by filling them with as many equilateral triangles of side 1 cm as you can. Count the number of triangles in each case. Which has more triangles ?

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Example

1. In Fig. 7.8, OA = OB and OD = OC. Show that

(i) $\Delta AOD \cong \Delta BOC$ and (ii) AD || BC.

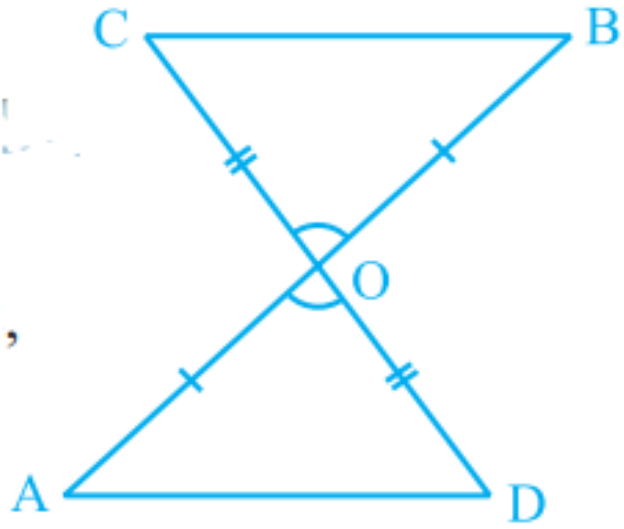

Fig. 7.8

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2. AB is a line segment and line l is its perpendicular bisector. If a point P lies on l, show that P is equidistant from A and B.

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3. Line-segment AB is parallel to another line-segment CD. O is the mid-point of AD (see Fig. 7.15). Show that (i) $\Delta AOB \cong \Delta DOC$ (ii) O is

also the mid-point of BC.

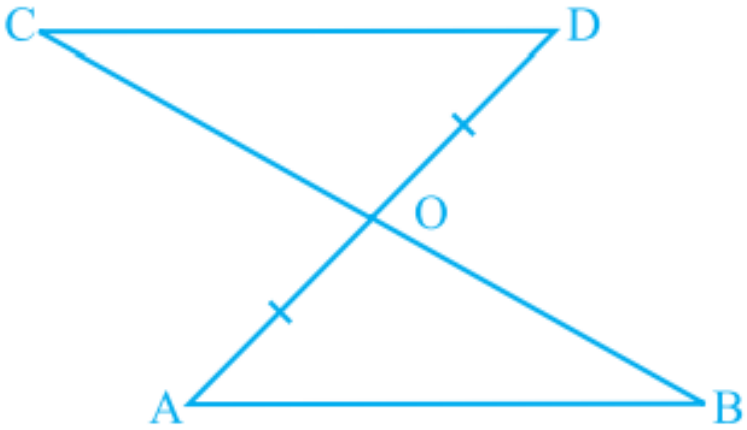

Fig. 7.15

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4. In ΔABC, the bisector AD of $\angle A$ is perpendicular to side BC (see Fig. 7.27). Show

that AB = AC and ΔABC is isosceles.

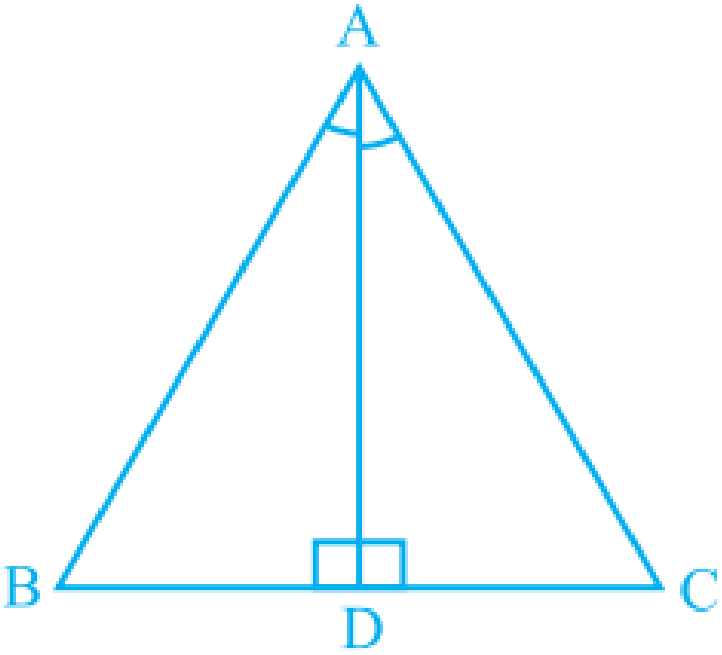

Fig. 7.27

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5. E and F are respectively the mid-points of equal sides AB and AC of ΔABC (see Fig. 7.28). Show that BF = CE.

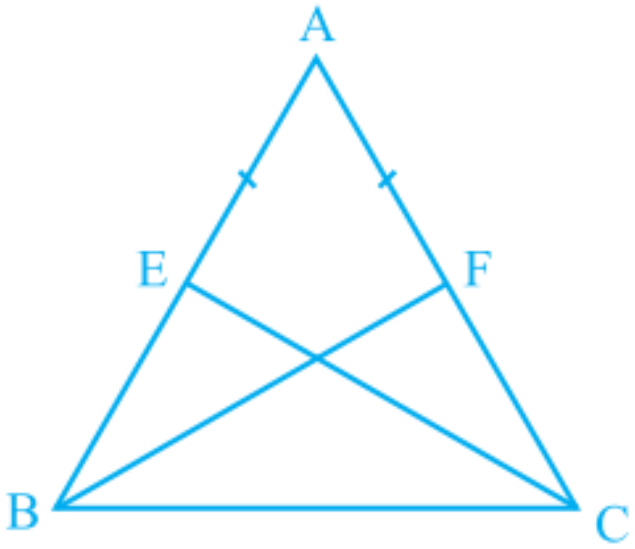

Fig. 7.28

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6. In an isosceles triangle ABC with AB = AC, D and E are points on BC such that BE = CD (see Fig. 7.29). Show that AD = AE.

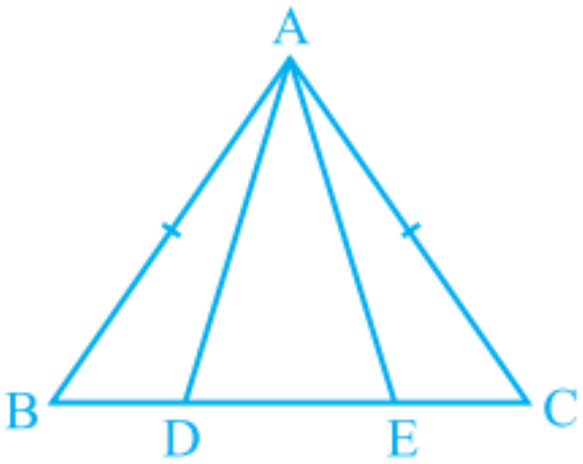

Fig. 7.29

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7. AB is a line-segment. P and Q are points on opposite sides of AB such that each of them is equidistant from the points A and B (see Fig. 7.37). Show that the line PQ is the

perpendicular bisector of AB.

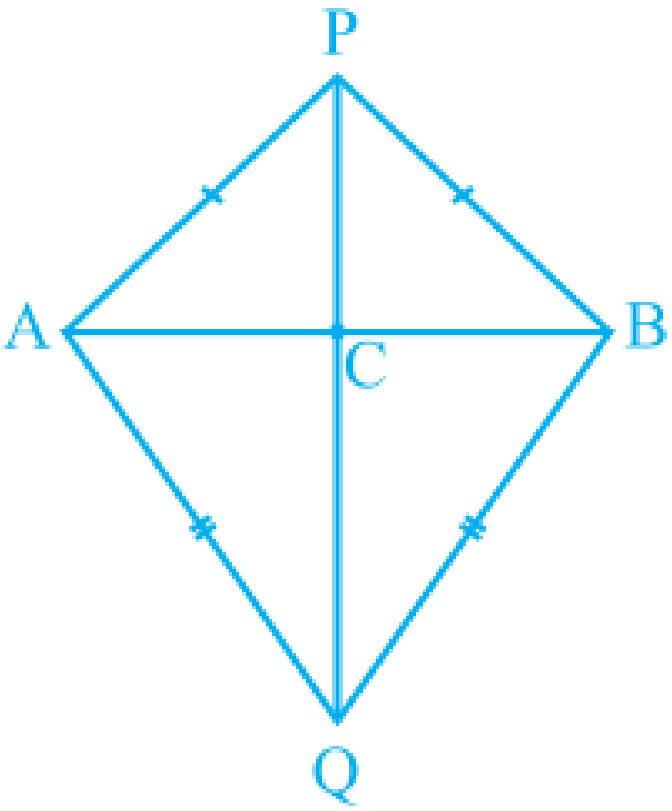

Fig. 7.37

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8. P is a point equidistant from two lines l and m intersecting at point A (see Fig. 7.38). Show that the line AP bisects the angle between them.

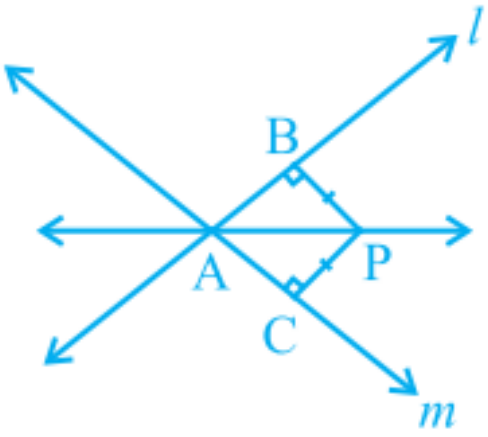

Fig. 7.38

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9. D is a point on side BC of ΔABC such that AD = AC (see Fig. 7.47). Show that AB > AD.

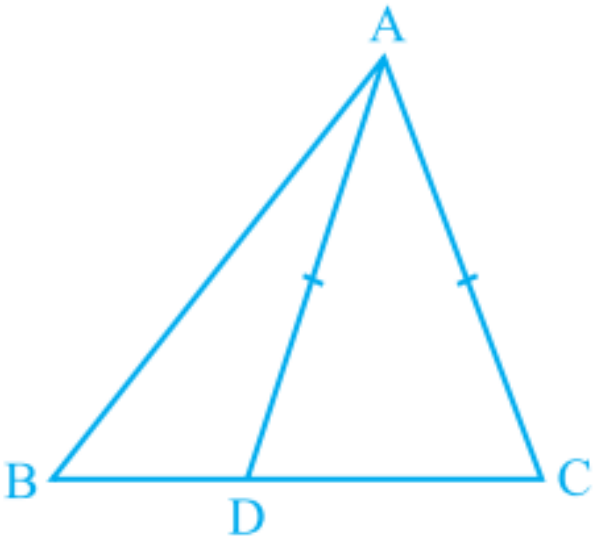

Fig. 7.47

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