



MATHS

NCERT - NCERT MATHEMATICS(BENGALI ENGLISH)

TRIANGLES

Examples

1. Line AB and CD are intersecting at 'O', $OA = OB$ and $OD = OC$. Show that (i) $\triangle AOD \cong \triangle BOC$ and (ii) $AD \parallel BC$.



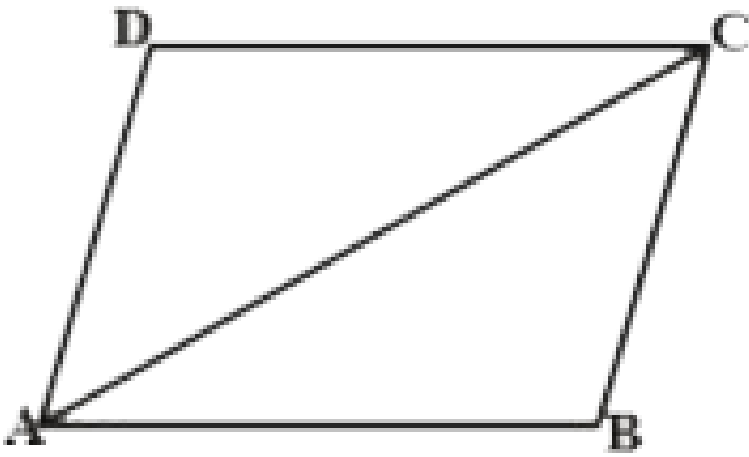
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2. AB is a line segment and line l is its perpendicular bisector. If a point P lies on l , show that P is equidistant from A and B .



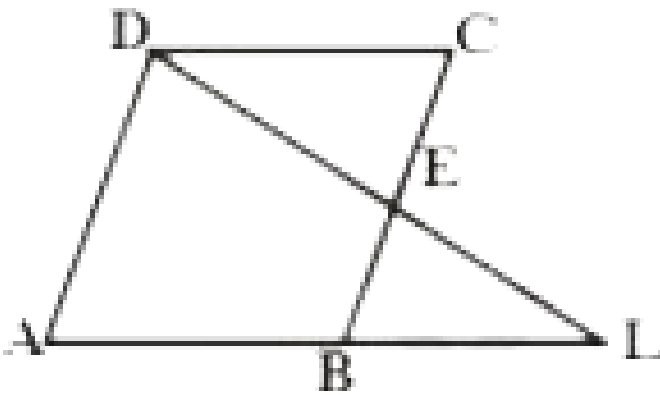
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3. In the given figure, $AB \parallel DC$ and $AD \parallel BC$ show that $\triangle ABC \cong \triangle CDA$.



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4. In the given figure, $AL \parallel DC$, E is mid point of BC. Show that $\triangle EBL \cong \triangle ECD$.

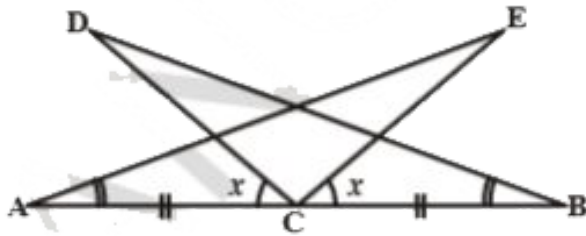


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5. Use the information given in the adjoining figure, to prove :

(i) $\triangle DBC \cong \triangle EAC$

(ii) $DC = EC$.

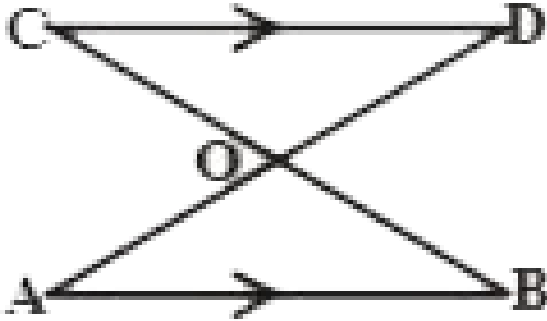


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6. Line-segment AB is parallel to another line-segment CD . O is the mid-point of AD .

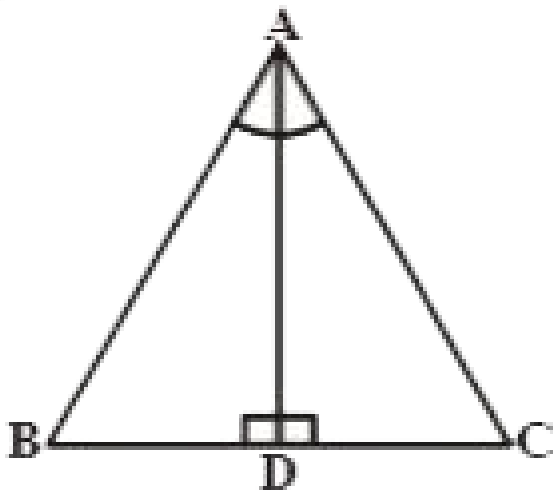
Show that (i) $\triangle AOB \cong \triangle DOC$ (ii) O is also the mid-

point of BC.



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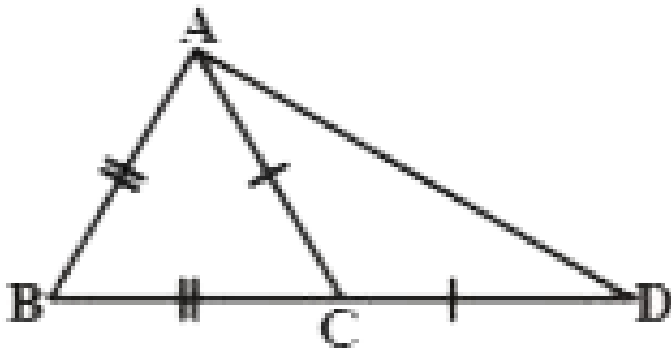
7. In $\triangle ABC$, the bisector AD of A is perpendicular to side BC . Show that $AB = AC$ and $\triangle ABC$ is isosceles.



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8. In the adjacent figure, $AB = BC$ and $AC = CD$.

Prove that : $\angle BAD : \angle ADB = 3 : 1$.

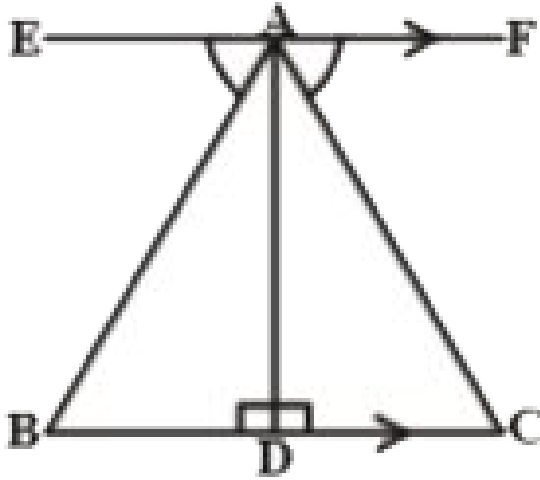


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9. In the given figure, AD is perpendicular to BC and $EF \parallel BC$, if $\angle EAB = \angle FAC$, show that triangles ABD and ACD are congruent.

Also, find the values of x and y if

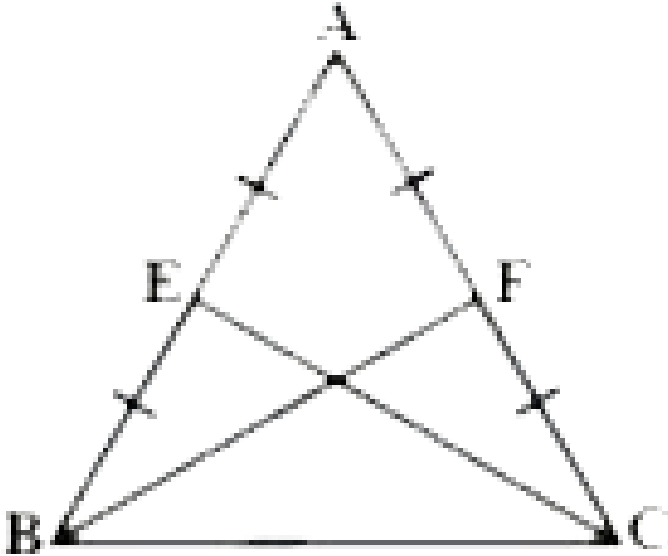
$$AB = 2x + 3, AC = 3y + 1, BD = x \text{ and } DC = y + 1.$$



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10. E and F are respectively the mid-points of equal sides AB and AC of $\triangle ABC$ (see figure)

Show that $BF = CE$.

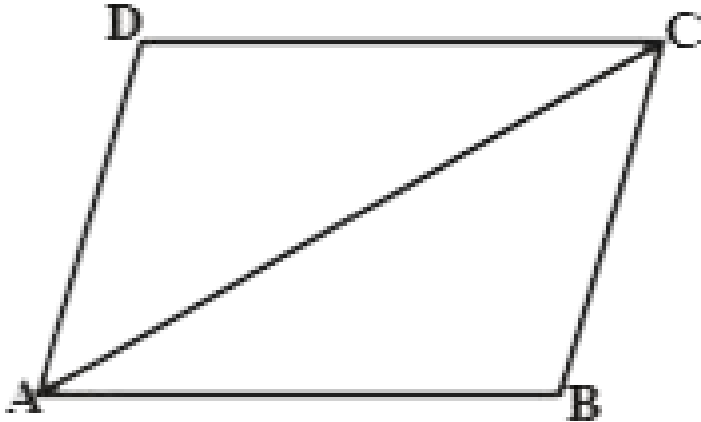


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11. In an isosceles triangle ABC with $AB = AC$, D and E are points on BC such that $BE = CD$. Show that $AD = AE$.

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12. In quadrilateral ABCD, $AB = CD$, $BC = AD$ show that $\triangle ABC \cong \triangle CDA$ Consider $\triangle ABC$ and $\triangle CDA$



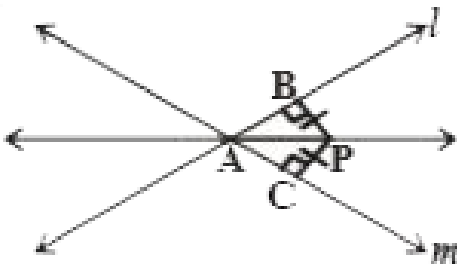
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13. AB is a line - segment. P and Q are points on either side of AB such that each of them is equidistant from the points A and B. Show that the line PQ is the perpendicular bisector of AB.



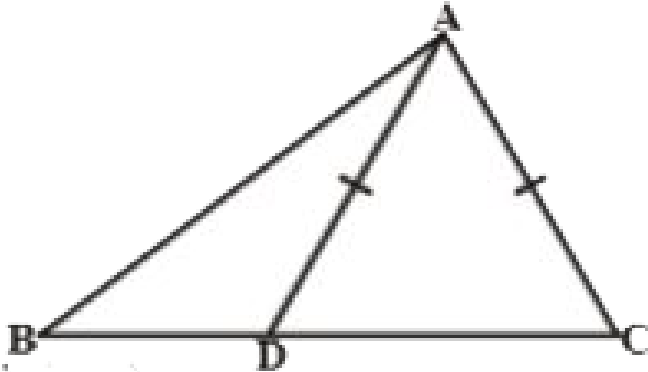
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14. P is a point equidistant from two lines l and m intersecting at point A (see figure). Show that the line AP bisects the angle between them.



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15. D is a point on side BC $\triangle ABC$ such that $AD = AC$ (see figure). Show that $AB > AD$.



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Do This

1. There are some statements given below. Write whether they are true or false :

Two circles are always congruent.



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2. There are some statements given below. Write whether they are true or false :

Two line segments of same length are always congruent.



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3. There are some statements given below. Write whether they are true or false :

Two right angle triangles are sometimes congruent.

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4. There are some statements given below. Write whether they are true or false :

Two equilateral triangles with their sides equal are always congruent.

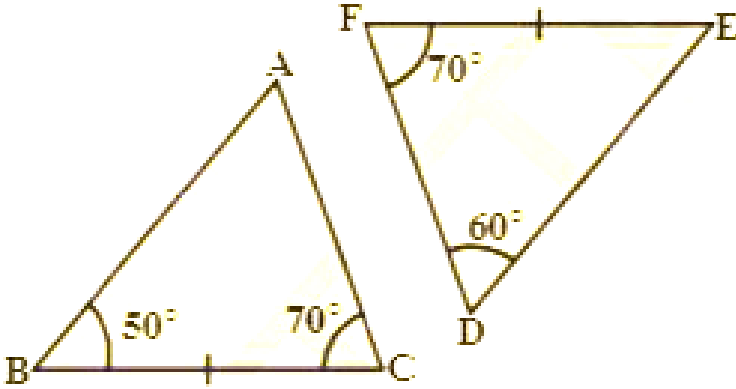
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5. Which minimum measurements do you require to check if the given figures are congruent:

i. Two rectangles ii. Two rhombuses.

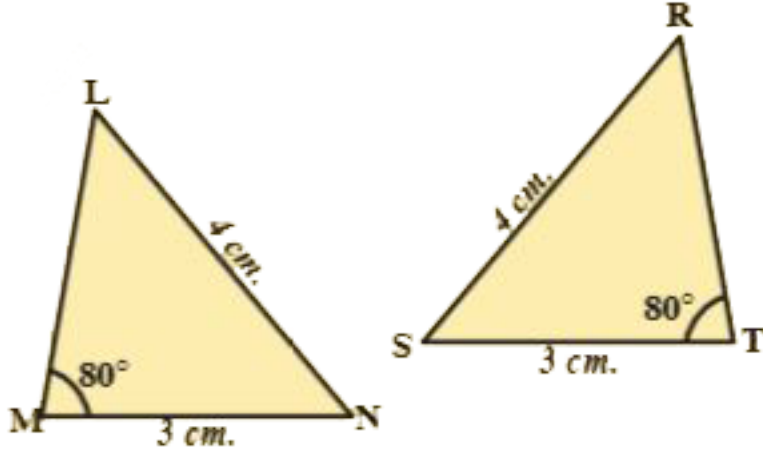
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6. State whether the following triangles are congruent or not? Give reasons for your answer.



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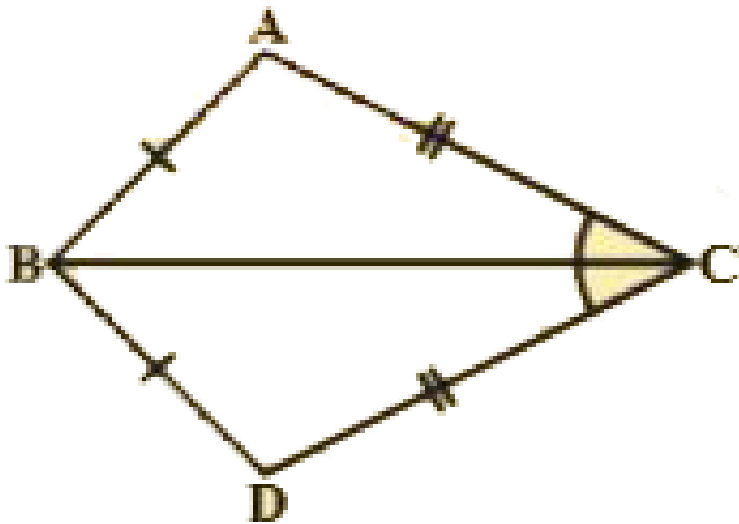
7. State whether the following triangles are congruent or not? Give reasons for your answer.



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8. In the adjacent figure $\triangle ABC$ and $\triangle DBC$ are two triangles such that $\overline{AB} = \overline{BD}$ and $\overline{AC} = \overline{CD}$. Show

that $\triangle ABC \cong \triangle DBC$.



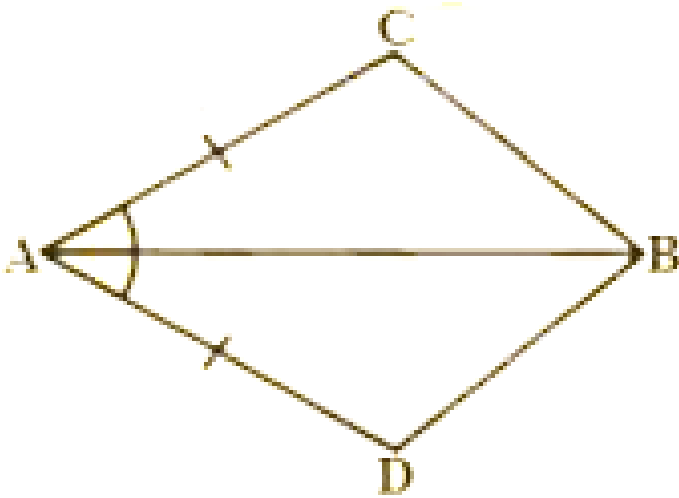
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9. Draw a triangle ABC and measure its sides.

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1. In quadrilateral $ACBD$, $AC = AD$ and AB bisects $\angle A$ Show that $\triangle ABC \cong \triangle ABD$.

What can you say about BC and BD ?



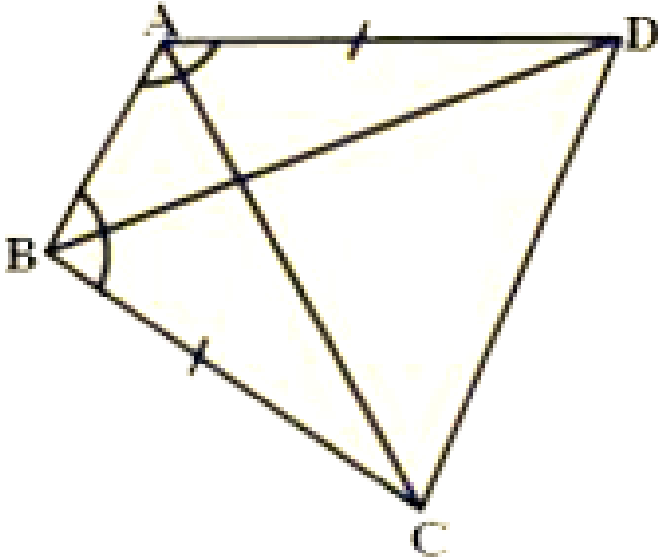
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2. $ABCD$ is a quadrilateral in which $AD = BC$ and $\angle DAB = \angle CBA$ Prove that

(i) $\triangle ABD \cong \triangle BAC$

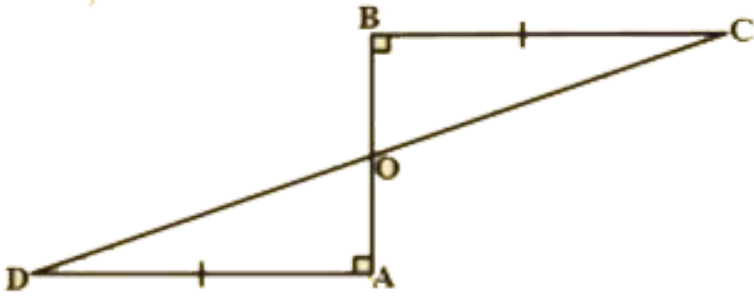
(ii) $BD = AC$

(iii) $\angle ABD = \angle BAC$



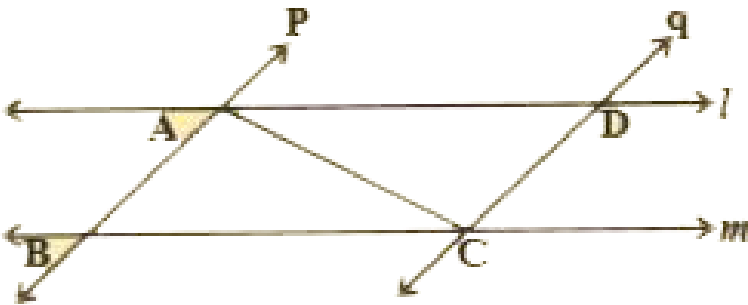
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3. AD and BC are equal and perpendiculars to a line segment AB. Show that CD bisects AB.



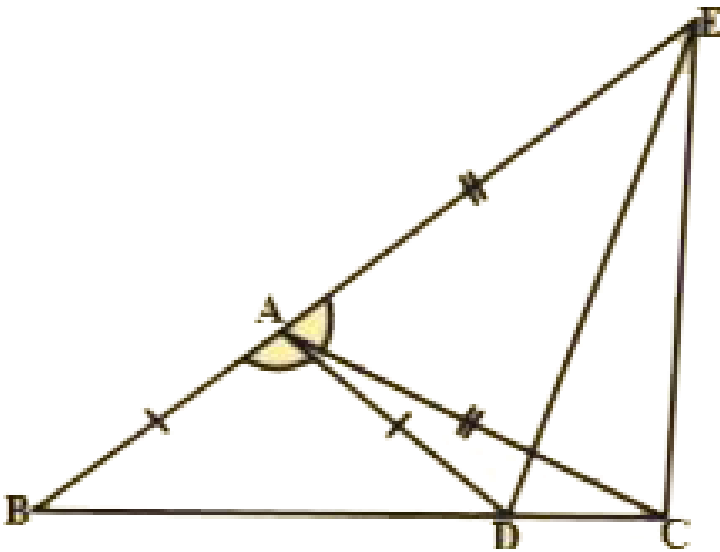
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4. l and m are two parallel lines intersected by another pair of parallel lines p and q . Show that $\triangle ABC \cong \triangle CDA$.



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5. In the adjacent figure, $AC = AE$, $AB = AD$ and $\angle BAD = \angle EAC$. Show that $BC = DE$.



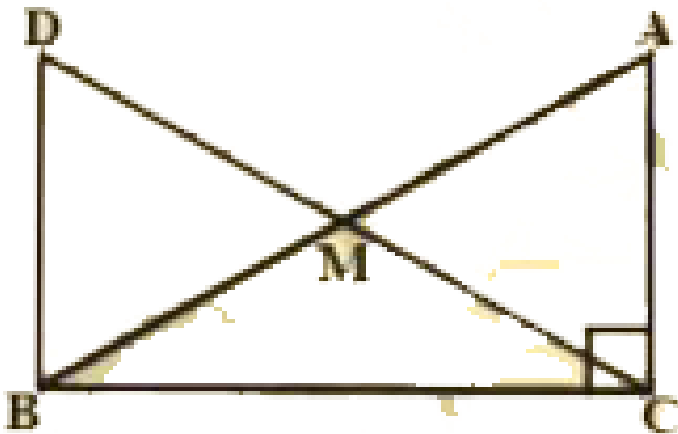
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6. In right triangle ABC , right angle is at C , M is the midpoint of hypotenuse AB . C is joined to M and produced to a point D such that $DM = CM$. Point D is joined to point B (see figure). Show that :

(i) $\triangle AMC \cong \triangle BMD$

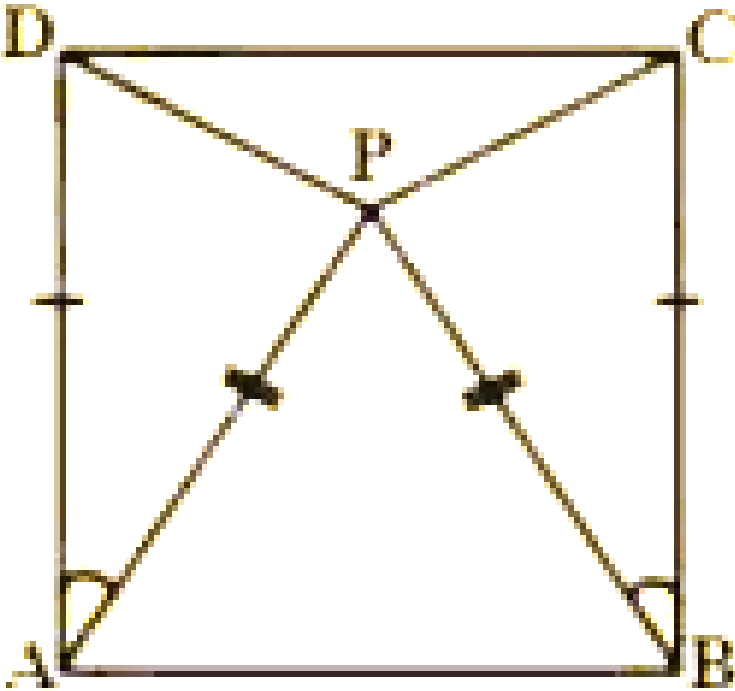
(ii) $\angle DBC$ is a right angle

(iii) $\triangle DBC \cong \triangle ACB$ (iv) $CM = \frac{1}{2} AB$.



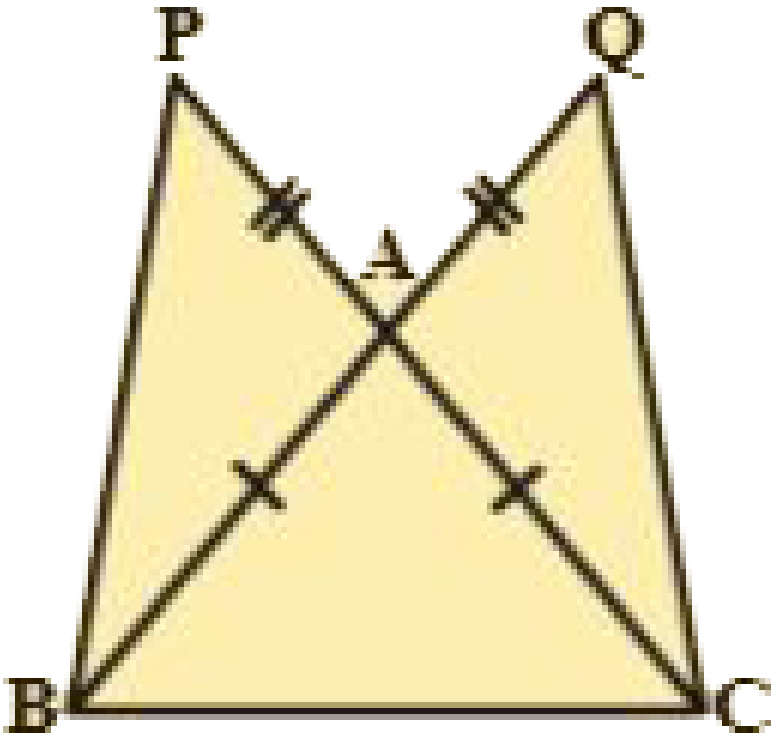
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7. In the adjacent figure ABCD is a square and $\triangle APB$ is an equilateral triangle. Prove that $\triangle APD \cong \triangle BPC$.



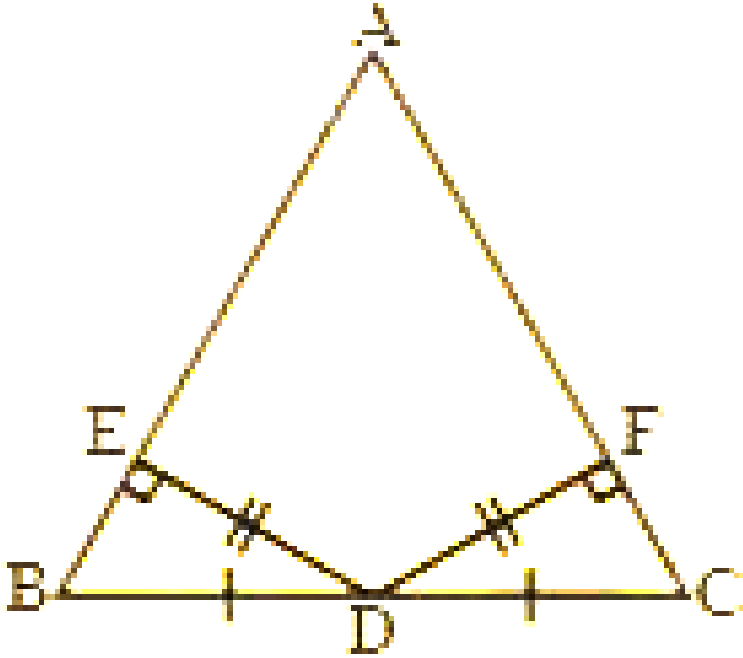
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8. In the adjacent figure $\triangle ABC$ is isosceles as $\overline{AB} = \overline{AC}$, \overline{BA} and \overline{CA} are produced to Q and P such that $\overline{AQ} = \overline{AP}$. Show that $\overline{PB} = \overline{QC}$.



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9. In the adjacent figure $\triangle ABC$, D is the midpoint of BC . $DE \perp AB$, $DF \perp AC$ and $DE = DF$. Show that $\triangle BED \cong \triangle CFD$.



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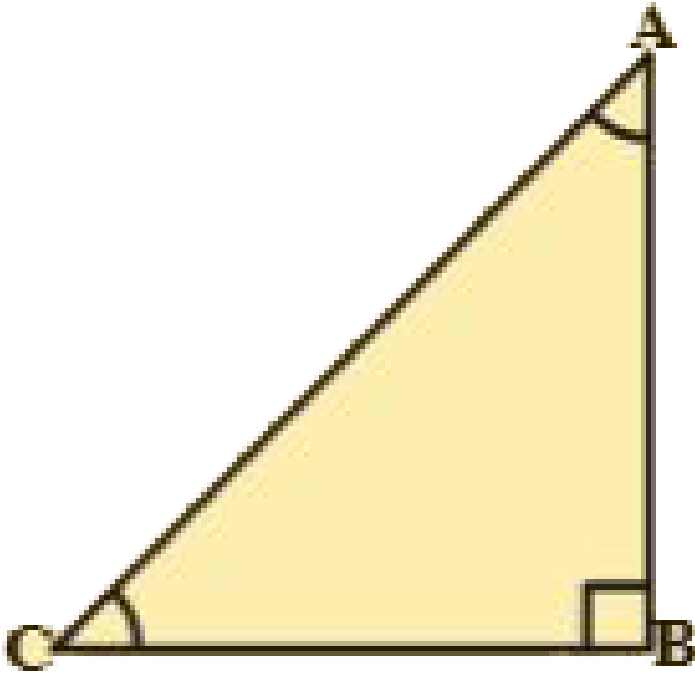
10. If the bisector of an angle of a triangle also bisects the opposite side, prove that the triangle is isosceles.



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11. In the given figure ABC is a right triangle and right angled at B such that $\angle BCA = 2\angle BAC$.

Show that hypotenuse $AC = 2BC$.

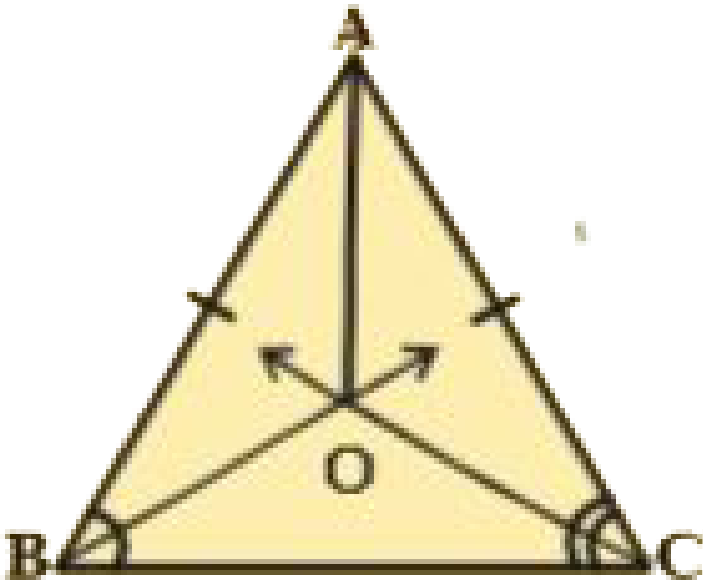


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Exercise 7 2

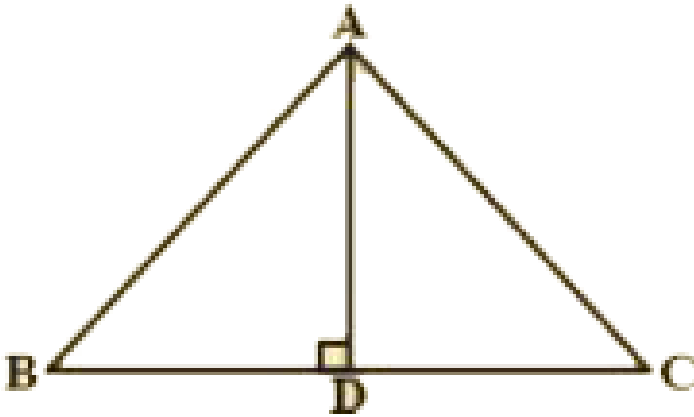
1. In an isosceles triangle ABC , with $AB = AC$, the bisectors of $\angle B$ and $\angle C$ intersect each other at O . Join A to O . Show that :

(i) $OB = OC$ (ii) AO bisects $\angle A$



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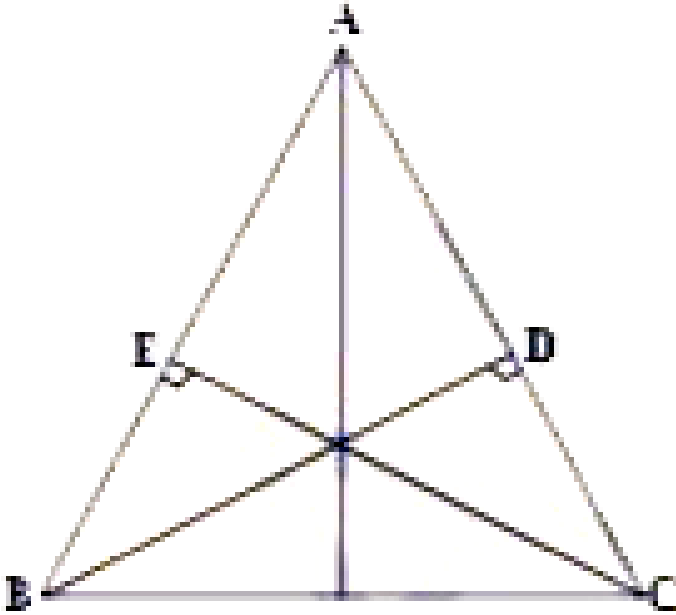
2. In $\triangle ABC$, AD is the perpendicular bisector of BC (See adjacent figure). Show that $\triangle ABC$ is an isosceles triangle in which $AB = AC$.



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3. ABC is an isosceles triangle in which altitudes BD and CE are drawn to equal sides AC and AB respectively (see

figure) Show that these altitudes are equal.

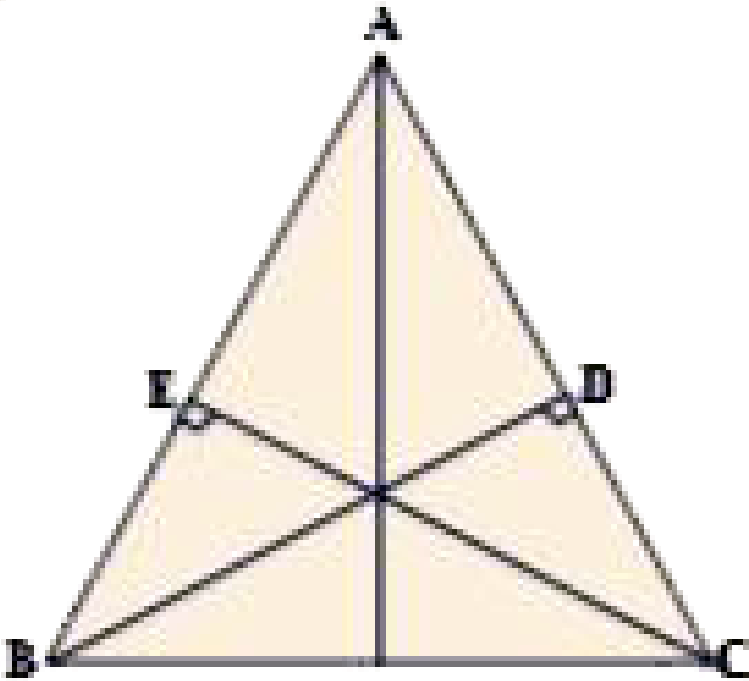


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4. ABC is a triangle in which altitudes BD and CE to sides AC and AB are equal (see figure) . Show that

(i) $\triangle ABD \cong \triangle ACE$

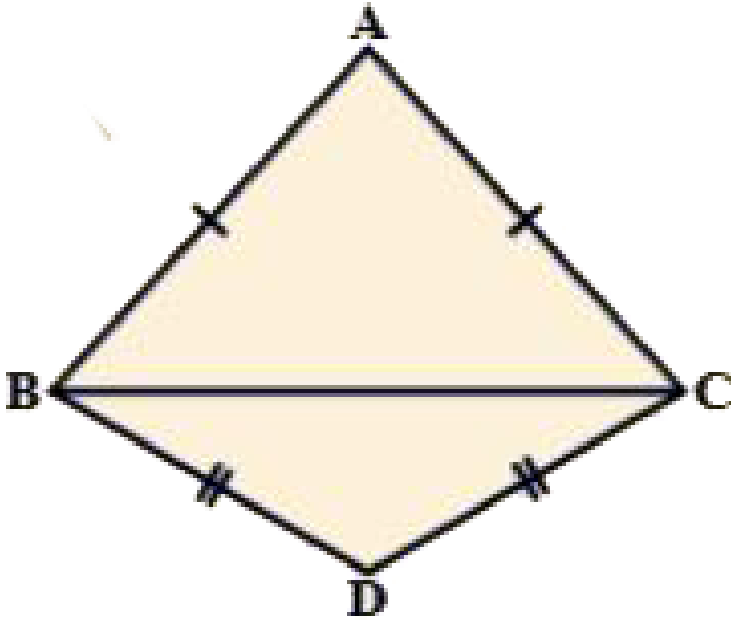
(ii) $AB = AC$ i.e., $\triangle ABC$ is an isosceles triangle.



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5. $\triangle ABC$ and $\triangle DBC$ are two isosceles triangles on the same base BC (see figure). Show that

$$\angle ABD = \angle ACD.$$



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Exercise 7 3

1. AD is an altitude of an isosceles triangle ABC in which $AB = AC$. Show that, (i) AD bisects BC (ii) AD bisects $\angle A$.



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2. Two sides AB, BC and median AM of one triangle ABC are respectively equal to sides PQ and QR and median PN of $\triangle PQR$. Show that:

(i) $\triangle ABM \cong \triangle PQN$

(ii) $\triangle ABC \cong \triangle PQR$



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3. 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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4. $\triangle ABC$ is an isosceles triangle in which $AB = AC$.

Show that $\angle B = \angle C$.

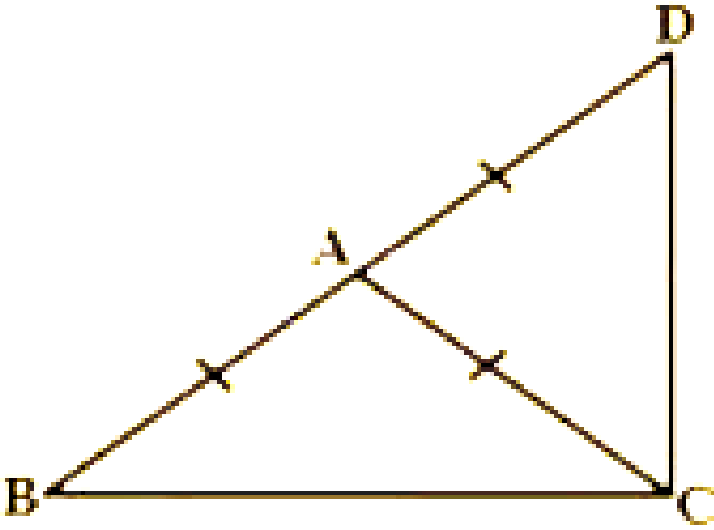


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5. $\triangle ABC$ is an isosceles triangle in which $AB = AC$. Side

BA is produced to D such that $AD = AB$ (see figure). Show

that $\angle BCD$ is a right angle.



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



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7. Show that the angles of an equilateral triangle are 60° each.



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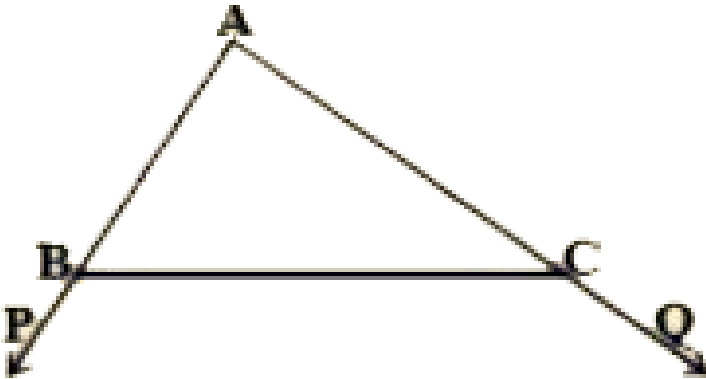
Exercise 7 4

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



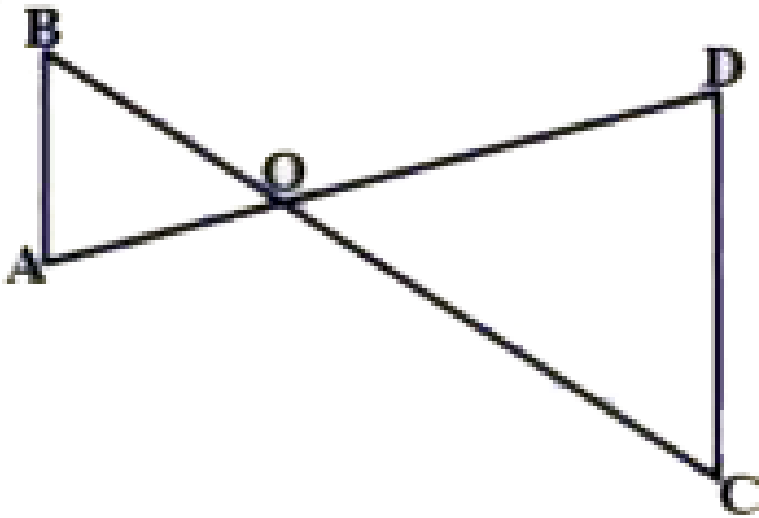
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2. In adjacent figure, sides AB and AC of $\triangle ABC$ are extended to points P and Q respectively. Also, $\angle PBC < \angle QCB$. Show that $AC > AB$.



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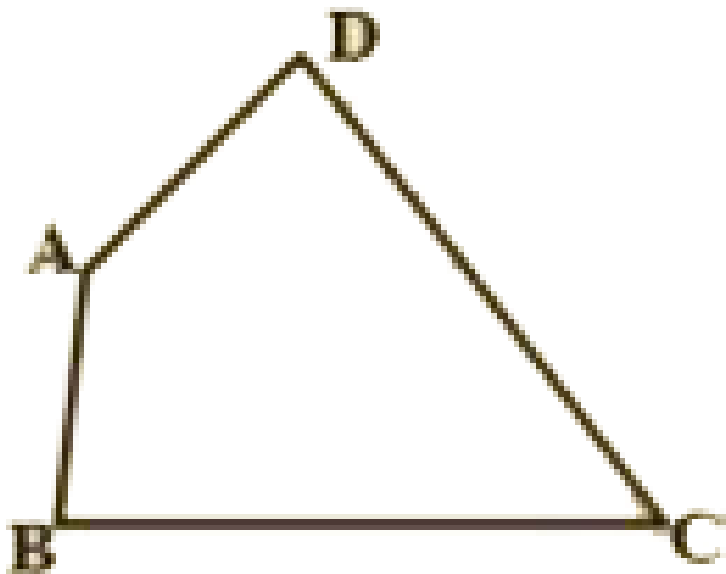
3. In adjacent figure, $\angle B < \angle A$ and $\angle C < \angle D$ Show that $AD < BC$.



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4. AB and CD are respectively the smallest and longest sides of quadrilateral ABCD (see adjacent figure). Show

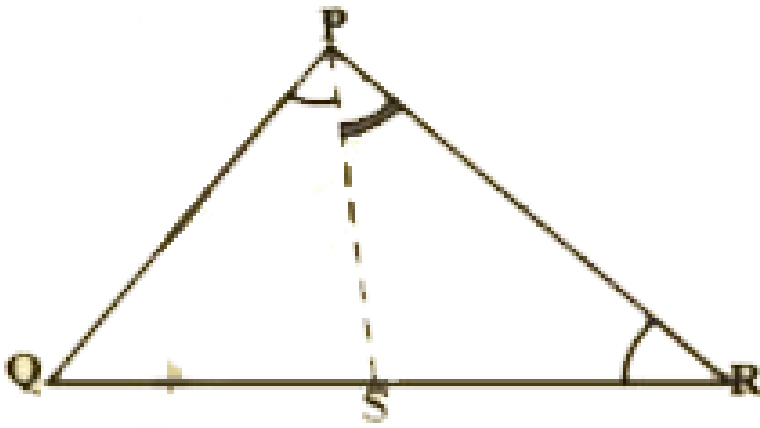
that $\angle A > \angle C$ and $\angle B > \angle D$.



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5. In adjacent figure, $PR > PQ$ and PS bisects $\angle QPR$.

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



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6. If two sides of a triangle measure 4 cm and 6 cm find all possible measurements (positive Integers) of the third side. How many distinct triangles can be obtained?



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7. Try to construct a triangle with 5 cm, 8 cm and 1 cm. Is it possible or not ? Why ? Give your justification?



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