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शक्तिउत्थानआश्रमलखीसरायबिहार

Class 09 Sub-.Maths

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1. In quadrilateral ACBD,  $AC = AD$  and  $AB$  bisect  $A$  (see Fig. 7.16). Show that  $\triangle ABC \cong \triangle ABD$ . What can you say about  $BC$  and  $BD$ ?

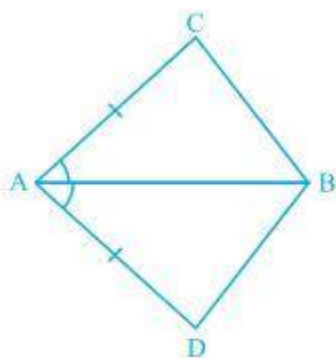


Fig. 7.16

**Solution:**

It is given that  $AC$  and  $AD$  are equal i.e.  $AC = AD$  and the line segment  $AB$  bisects  $A$ .

We will have to now prove that the two triangles  $ABC$  and  $ABD$  are similar i.e.  $\triangle ABC \cong \triangle ABD$

**Proof:**

Consider the triangles  $\triangle ABC$  and  $\triangle ABD$ ,

(i)  $AC = AD$  (It is given in the question)

(ii)  $AB = AB$  (Common)

(iii)  $\angle CAB = \angle DAB$  (Since  $AB$  is the bisector of angle  $A$ )

So, by **SAS congruency criterion**,  $\triangle ABC \cong \triangle ABD$ .

For the 2<sup>nd</sup> part of the question,  $BC$  and  $BD$  are of equal lengths by the rule of C.P.C.T.

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)  $\angle ABD = \angle BAC$ .

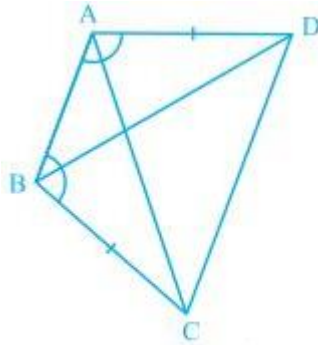


Fig. 7.17

**Solution:**

The given parameters from the questions are  $\angle DAB = \angle CBA$  and  $AD = BC$ .

(i)  $\triangle ABD$  and  $\triangle BAC$  are similar by SAS congruency as

$AB = BA$  (It is the common arm)

$\angle DAB = \angle CBA$  and  $AD = BC$  (These are given in the question)

So, triangles  $ABD$  and  $BAC$  are similar i.e.  $\triangle ABD \cong \triangle BAC$ . (Hence proved).

(ii) It is now known that  $\triangle ABD \cong \triangle BAC$  so,

$BD = AC$  (by the rule of CPCT).

(iii) Since  $\triangle ABD \cong \triangle BAC$  so,

Angles  $\angle ABD = \angle BAC$  (by the rule of CPCT).

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

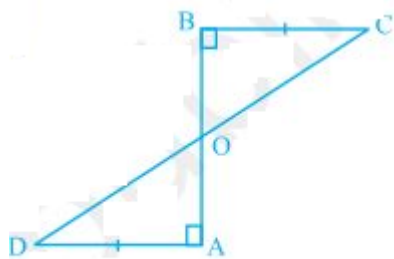


Fig. 7.18

**Solution:**

It is given that AD and BC are two equal perpendiculars to AB.

We will have to prove that **CD is the bisector of AB**

Now,

Triangles  $\triangle AOD$  and  $\triangle BOC$  are similar by AAS congruency since:

- (i)  $\angle A = \angle B$  (They are perpendiculars)
- (ii)  $AD = BC$  (As given in the question)
- (iii)  $\angle AOD = \angle BOC$  (They are vertically opposite angles)

$\therefore \triangle AOD \cong \triangle BOC$ .

So,  $AO = OB$  (by the rule of CPCT).

Thus, CD bisects AB (Hence proved).