

VIDYA BHAWAN BALIKA VIDYA PITH

शक्तिउत्थानआश्रमलखीसरायबिहार

Class 09. Sub-.Maths

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Teacher Name –Krishna Kanhaiya

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 ?

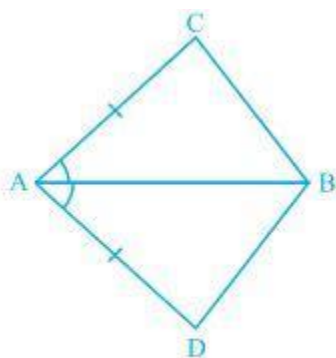


Fig. 7.16

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 2nd 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) $\angle ABD = \angle BAC$.

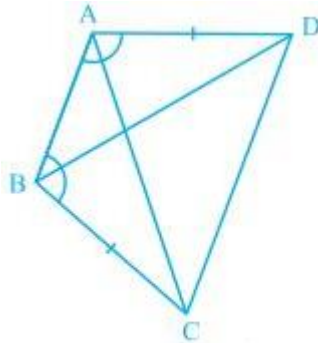


Fig. 7.17

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.

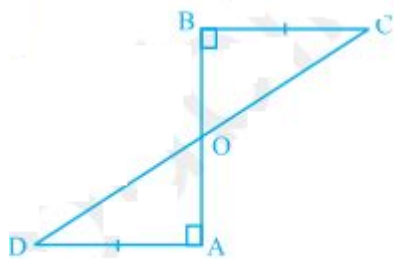


Fig. 7.18

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).