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1. In quadrilateral ACBD, AC = AD and AB bisect A (see Fig. 7.16). Show that ΔABC ΔABD. What can you say about BC and BD?

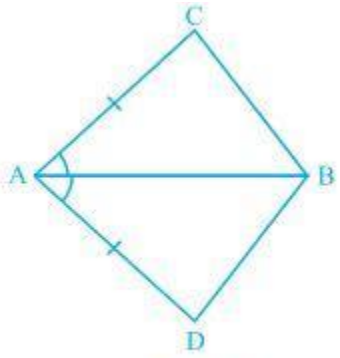

Fig. 7.16

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. **ΔABC ΔABD**

Proof:

Consider the triangles ΔABC and ΔABD,

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

(ii) AB = AB (Common)

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

So, by **SAS congruency criterion**, ΔABC ΔABD.

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 DAB = CBA (see Fig. 7.17). Prove that

(i) ΔABD ΔBAC

(ii) BD = AC

(iii) ABD = BAC.

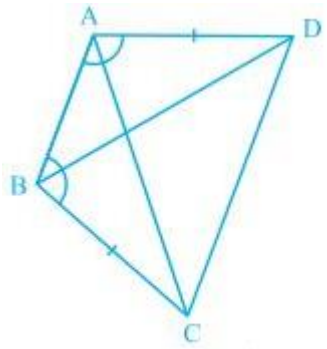

Fig. 7.17

Solution:

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

(i) ΔABD and ΔBAC are similar by SAS congruency as

AB = BA (It is the common arm)

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

So, triangles ABD and BAC are similar i.e. ΔABD ΔBAC. (Hence proved).

(ii) It is now known that ΔABD ΔBAC so,

BD = AC (by the rule of CPCT).

(iii) Since ΔABD ΔBAC so,

Angles ABD = 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.

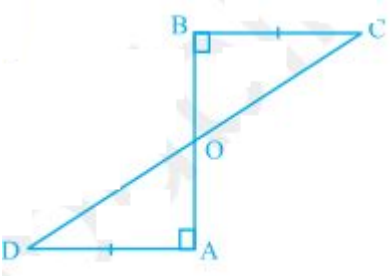

Fig. 7.18

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 ΔAOD and ΔBOC are similar by AAS congruency since:

(i) A = B (They are perpendiculars)

(ii) AD = BC (As given in the question)

(iii) AOD = BOC (They are vertically opposite angles)

∴ ΔAOD ΔBOC.

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

Thus, CD bisects AB (Hence proved).