Date
Page

HW

22/07/2021 Chapter :- 8

Quadrilaterals

Exercise 8.1

4) Let ABCD be a square and its diagonal AC and ~~Bc~~ BD intersects each other ~~at~~ at O.

To show that,

$$AC = BD$$
$$AO = OC$$
$$\text{and } \angle AOB = 90^\circ$$

Proof,

In ΔABC and ΔBAD,

$AB = BA$ (Common)

$\angle ABC = \angle BAD = 90^\circ$

$BC = AD$ (Given)

$\Delta ABC \cong \Delta BAD$ (SAS congruency)

Thus,

$AC = BD$ (CPCT)

diagonals are equal.

Now,

~~It~~ In ΔAOB and ΔCOD,

$\angle BAO = \angle DCO$ (Alternate interior angles)

$\angle AOB = \angle COD$ (Vertically opposite)

Date
Page

$AB = CD$ (Given)
$\Delta AOB \cong \Delta COD$ (AAS congruency)
Thus,
$AO = CO$ (CPCT)
Diagonal bisect each other.
Now,
In ΔAOB and ΔCOD,
$OB = OB$ (Given)
$AO = CO$ (diagonals are bisected)
$AB = CB$ (Sides of the square)
$\Delta AOB \cong \Delta COB$ (SSS congruency)
Also,
$\angle AOB = \angle COB$
$\angle AOB + \angle COB = 180^\circ$ (linear pair)
Thus,
$\angle AOB = \angle COB = 90^\circ$

5) Let ABCD be a quadrilateral and its diagonals and its diagonals AC and BC bisect each other at right angle at O.

To prove that,
The Quadrilateral ABCD is a square.

Proof,

In ΔAOB and ΔCOD,

$AO = CO$ (Diagonals bisect each ~~other~~ other)

$\angle AOB = \angle COD$ (Vertically opposite)

$OB = OD$ (Diagonals bisect ~~each~~ each other)

$\Delta AOB \cong \Delta COD$ (SAS congruency)

Thus,

$AB = CD$ (CPCT) - (i)

Also,

$\angle OAB = \angle OCD$ (AIA)

$\Rightarrow AB \parallel CD$

Now,

In ΔAOD and ΔCOD,

$AO = CO$ (Diagonals bisects each other)

$\angle AOD = \angle COD$ (Vertically opposite)

$OD = OD$ (Common)

$\Delta AOD \cong \Delta COD$ (SAS congruency)

Thus,

$AD = CD$ (CPCT) - (ii)

Also,

~~AD = CD~~ ~~(CPC~~ $AD = BD$ and $AD = CD$

$\Rightarrow AD = BC = CD = AB$ - (iii)

Also,

$\angle ADC = \angle BCD$ (CPCT)

and

$\angle ADC + \angle BCD = 180^\circ$ (Co-interior angles)

$\Rightarrow 2\angle ADC = 180^\circ$

$\Rightarrow \angle ADC = 90^\circ$ - (iii)

One of the interior angles is right angle.

~~They~~, Thus, from (i), (ii) and (iii) given quadrilateral ABCD is a square.

Hence Proved.