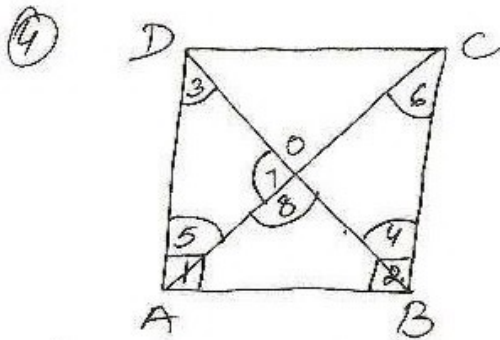


ex 8.1



To Prove $AC = BD$
 $OA = OC, OB = OD$
 $AC \perp BD$

Proof In $\triangle DAB$ and $\triangle CBA$

$DA = CB$ (Sides of Square)

$\angle 1 = \angle 2 = 90^\circ$

$AB = BA$ (Common)

$\therefore \triangle DAB \cong \triangle CBA$ by SAS prop.

$BD = AC$ (Cpct)

In $\triangle AOD$ and $\triangle COB$

$\angle 3 = \angle 4$ [alternate in. angles, $AD \parallel BC$]

$AD = CB$ (Sides of Square)

$\angle 5 = \angle 6$ [alternate in. angles, $AD \parallel BC$]

$\therefore \triangle AOD \cong \triangle COB$ by ASA prop.

$OA = OC$ (Cpct)

$OD = OB$ (Cpct)

In $\triangle AOD$ and $\triangle AOB$

$OA = OA$ (Common)

$OD = OB$ (proved)

$AD = AB$ (Sides of Square)

$\therefore \triangle AOD \cong \triangle AOB$ by SSS prop.

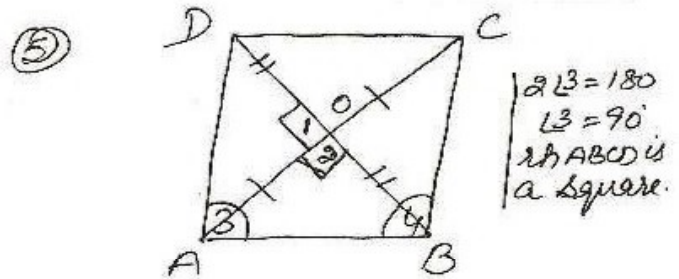
$\angle 7 = \angle 8$ (Cpct)

But $\angle 7 + \angle 8 = 180^\circ$ (Linear pair axiom)

$2\angle 7 = 180$

$\Rightarrow \angle 7 = 90^\circ$

$\Rightarrow AC \perp BD$



To Prove - $\square ABCD$ is a square.

Proof - In $\triangle AOD$ and $\triangle AOB$

$OA = OA$ (Common)

$\angle 1 = \angle 2 = 90^\circ$

$OD = OB$ (given)

$\therefore \triangle AOD \cong \triangle AOB$ by SAS prop.

$AD = AB$ (Cpct)

Similarly

$AB = BC$... (ii)

$BC = CD$... (iii)

From (i), (ii), (iii)

$AB = BC = CD = DA$

$\Rightarrow \square ABCD$ is a rhombus

In $\triangle DAB$ and $\triangle CBA$

$DA = CB$ (Proved)

$AB = BA$ (Common)

$BD = AC$ (given)

$\therefore \triangle DAB \cong \triangle CBA$ by SSS prop.

But $\angle 3 + \angle 4 = 180^\circ$ (Cpct)