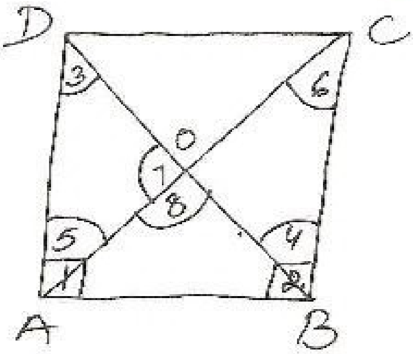
(4)



To Prove $AC = BD$

$OA = OC$, $OB = OD$

$AC \perp BD$

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

$DA = CB$ (sides of Square)

$\angle 1 = \angle 2 = 90°$

$AB = BA$ (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)
$OD = OB$

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)

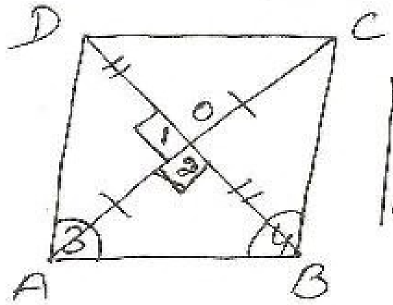
But $\angle 7 + \angle 8 = 180°$ (linear pair axiom)

$2\angle 7 = 180$

$\Rightarrow \angle 7 = 90°$

$\Rightarrow AC \perp BD$

(5)



$2\angle 3 = 180$
$\angle 3 = 90°$
rh ABCD is a square.

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

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

$OA = OA$ (common)

$\angle 1 = \angle 2 = 90°$

$OD = OB$ (given)

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

$AD = AB$ ... (i) (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 p

$\angle 3 = \angle 4$ (cpct)

But $\angle 3 + \angle 4 = 180°$ (co-int.)