

## Exercise 10.4

**Q.1** In  $\triangle PAB$  of figure  $\overline{PQ} \perp \overline{AB}$  and  $\overline{PA} \cong \overline{PB}$  prove that  $\overline{AQ} \cong \overline{BQ}$  and  $\angle APQ \cong \angle BPQ$

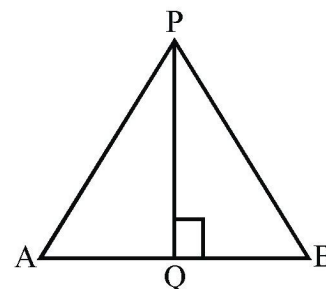
**Given:**

In  $\triangle PAB$

$\overline{PQ} \perp \overline{AB}$  and  $\overline{PA} \cong \overline{PB}$

**To prove**

$\overline{AQ} \cong \overline{BQ}$  and  $\angle APQ \cong \angle BPQ$



**Proof**

Statements	Reasons
In $\triangle APQ \leftrightarrow \triangle BPQ$	
$\overline{PA} \cong \overline{PB}$	Given
$\angle AQP \cong \angle BQP$	Given $\overline{PQ} \perp \overline{AB}$
$\overline{PQ} \cong \overline{PQ}$	Common
$\therefore \triangle APQ \cong \triangle BPQ$	H.S $\cong$ H.S
So $\overline{AQ} \cong \overline{BQ}$	Corresponding sides of congruent triangles
and $\angle APQ \cong \angle BPQ$	Corresponding angles of congruent triangles

**Q.2** In the figure  $m\angle C \cong m\angle D = 90^\circ$  and  $\overline{BC} \cong \overline{AD}$  prove that  $\overline{AC} \cong \overline{BD}$  and  $\angle BAC \cong \angle ABD$

**Given**

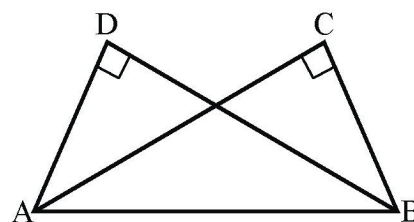
In the figure given  $m\angle C = m\angle D = 90^\circ$

$\overline{BC} \cong \overline{AD}$

**To Prove**

$\overline{AC} \cong \overline{BD}$

$\angle BAC \cong \angle ABD$



**Proof**

Statements	Reasons
In $\triangle ABD \leftrightarrow \triangle BAC$	
$\overline{AD} \cong \overline{BC}$	Given
$\angle D \cong \angle C$	Each $90^\circ$
$\overline{AB} \cong \overline{BA}$	Common
Thus $\triangle ABD \cong \triangle BAC$	H-S $\cong$ H-S
$\therefore \overline{AC} \cong \overline{BD}$	Corresponding sides of congruent triangles
$\therefore \angle BAC \cong \angle ABD$	Corresponding angles of congruent triangles

**Q.3** In the figure,  $m\angle B = m\angle D = 90^\circ$  and  $\overline{AD} \cong \overline{BC}$  prove that ABCD is a rectangle

**Given**

In the figure

$m\angle B = m\angle D = 90^\circ$  and  $\overline{AD} \cong \overline{BC}$

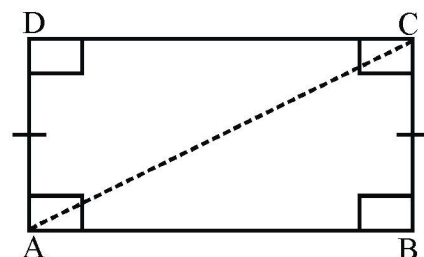
**To prove**

ABCD is a rectangle

**Construction**

Join A to C

**Proof**



Statements	Reasons
In $\triangle ABC \leftrightarrow \triangle CDA$	
$\angle B \cong \angle D$	Given each angle = $90^\circ$
$\overline{AC} \cong \overline{CA}$	Common
$\overline{BC} \cong \overline{DA}$	Given
$\therefore \triangle ABC \cong \triangle CDA$	H-S $\cong$ H-S
$\overline{AB} \cong \overline{CD}$	Corresponding sides of congruent triangles
and $\angle ACB \cong \angle CAD$	Corresponding angles of congruent triangles
Hence ABCD is a rectangle	

**Last Updated: September 2020**

Report any mistake at [freeilm786@gmail.com](mailto:freeilm786@gmail.com)