

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:

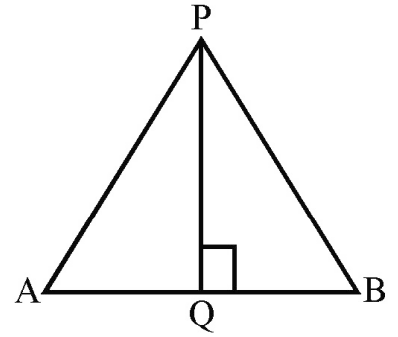
In $\triangle PAB$

$\overline{PQ} \perp \overline{AB}$ 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 $m\angle C = m\angle D = 90^\circ$

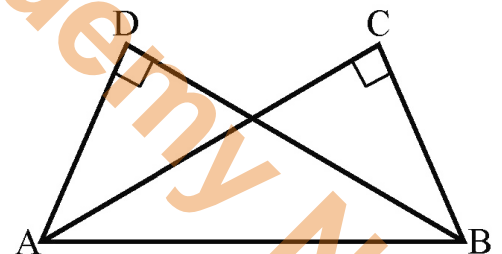
$\overline{BC} \cong \overline{AD}$

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°
$\overline{AB} \cong \overline{BA}$	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 $\overline{AD} \cong \overline{BC}$

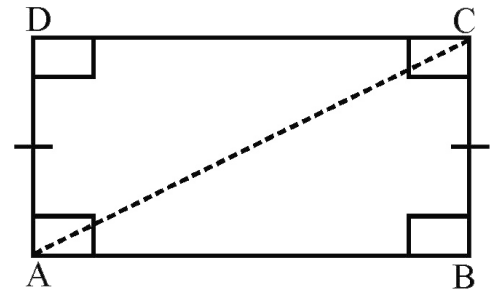
To prove

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°
$\overline{AC} \cong \overline{CA}$	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	