Congruence Ex 16.4 Q1

Answer :

1) We have

Since $\angle ABO = \angle CDO = 45^\circ$ and both are alternate angles,
$AB \parallel DC$
$\angle BAO = \angle DCO$ (alternate angle , $AB \parallel CD$ and AC is a transversal line)
$\angle ABO = \angle CDO = 45^\circ$ (given in the figure)
Also, $AB = DC$ (Given in the figure)
Therefore, by ASA $\triangle AOB \cong \triangle DOC$

2)
In $\triangle ABC$,
Now $AB = AC$ (Given)
$\angle ABD = \angle ACD = 40^\circ$ (Angles opposite to equal sides)
$\angle ABD + \angle ACD + \angle BAC = 180^\circ$ (Angle sum property)
$40^\circ + 40^\circ + \angle BAC = 180^\circ$
$\angle BAC = 180^\circ - 80^\circ = 100^\circ$
$\angle BAD + \angle DAC = \angle BAC$
$\angle BAD = \angle BAC - \angle DAC = 100^\circ - 50^\circ = 50^\circ$
$\angle BAD = \angle CAD = 50^\circ$
Therefore, by ASA, $\triangle ABD \cong \triangle ADC$

3)
In$\triangle ABC$,
$\angle A + \angle B + \angle C = 180^\circ$(Angle sum property)
$\angle C = 180^\circ - \angle A - \angle B$
$\angle C = 180^\circ - 30^\circ - 90^\circ = 60^\circ$
In$\triangle PQR$,
$\angle P + \angle Q + \angle R = 180^\circ$(Angle sum property)
$\angle P = 180^\circ - \angle Q - \angle R$
$\angle P = 180^\circ - 60^\circ - 90^\circ = 30^\circ$
$\angle BAC = \angle QPR = 30^\circ$
$\angle BCA = \angle PRQ = 60^\circ$
and $AC = PR$ (Given)
Therefore, by ASA, $\triangle ABC \cong \triangle PQR$

4)
We have only $BC = QR$ but none of the angles of $\triangle ABC$ AND $\triangle PQR$ are equal.
Therefore, $\triangle ABC \ncong \triangle PRQ$

Congruence Ex 16.4 Q2

Answer :

(i) Yes, $\triangle ADB \cong \triangle ADC$, by ASA criterion of congruency
(ii) We have used $\angle BAD = \angle CAD$
$\angle ADB = \angle ADC = 90^\circ$ since $AD \perp BC$
and $AD = DA$
(iii) Yes, $BD = DC$ since, $\triangle ADB \cong \triangle ADC$

Congruence Ex 16.4 Q3

Answer :

We have drawn

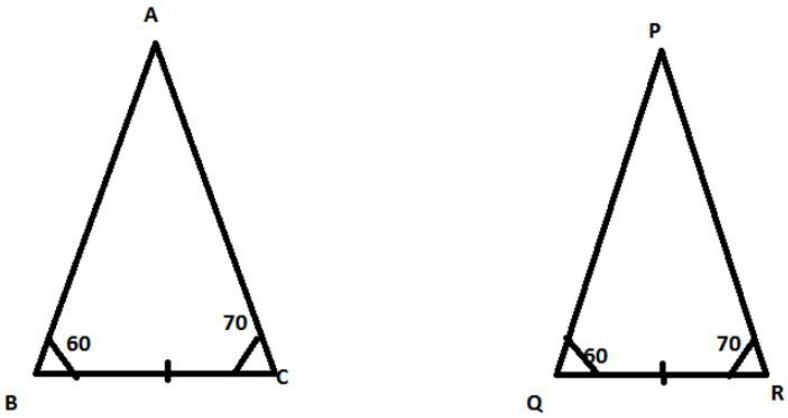
$\triangle ABC$ with $\angle ABC = 60^\circ$ and $\angle ACB = 70^\circ$

We now construct $\triangle PQR \cong \triangle ABC$

$\triangle PQR$ has $\angle PQR = 60^\circ$ and $\angle PRQ = 70^\circ$

Also we construct $\triangle PQR$ such that $BC = QR$

Therefore by ASA the two triangles are congruent



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