Congruent Triangles Ex 10.3 Q9

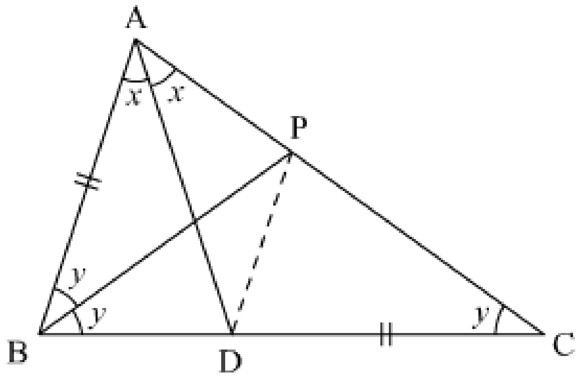
Answer :

It is given that in ΔABC

$\angle B = 2\angle C$

$AB = CD$

And AD bisects $\angle BAC$



We have to prove that $\angle BAC = 72^0$

Now let $\angle C = y$

$\angle B = 2y$ (Given)

Since AD is a bisector of $\angle BAC$ so let $\angle BAD = \angle CAD = x$

Let BP be the bisector of $\angle ABC$

If we join PD we have

In ΔBPC

$\angle CBP = \angle BCP = y$

So $BP = PC$

In triangle ABP and DCP we have

$\angle ABP = \angle DCP = y$

$AB = CD$ (Given)

$BP = PC$ (Proved above)

So by SAS congruence criterion, we have

$\Delta ABP \cong \Delta DCP$

$\Rightarrow \angle BAP = \angle CDP$

And $AP = DP$

$\angle CDP = 2x$, and $\angle ADP = \angle DAP = x$ (since $\angle A = 2x$)

In ΔABD we have

$\angle ADC = \angle ABD + \angle BAC$

Since,

$$\begin{aligned}\angle ADC &= \angle ADP + \angle CDP \\ &= x + 2x \\ &= 3x\end{aligned}$$

And,

$$\begin{aligned}\angle ADC &= \angle BAD + \angle ABD \\ &= x + 2y\end{aligned}$$

So,

$$3x = x + 2y$$

$$2x = 2y$$

$$\Rightarrow x = y$$

In ΔABC we have

$$\angle A + \angle B + \angle C = 180^0$$

$$2x + 2y + y = 180^0$$

$$5x = 180^0$$

$$x = 36^0$$

Here,

$$\angle BAC = 2x$$

$$= 2 \times 36^0$$

$$= 72^0$$

Hence $\boxed{\angle BAC = 72^0}$ Proved.

Congruent Triangles Ex 10.3 Q10

Answer :

It is given that

$\angle A = 90^0$

$AB = AC$

We have to find $\angle B$ and $\angle C$.

Since $AB = AC$ so, $\angle B = \angle C$

Now $\angle A + \angle B + \angle C = 180^0$ (property of triangle)

$\angle 90^0 + \angle B + \angle B = 180^0$ (Since $\angle B = \angle C$)

$$\angle 90^0 + 2\angle B = 180^0$$
$$2\angle B = 90^0$$
$$2B = \frac{90^0}{2}$$
$$\angle B = 45^0$$

Here $\angle B = \angle C = 45^o$

Then $\angle A = 90^0$

Hence

$$\boxed{\begin{aligned}\angle B &= 45^0 \\ \angle C &= 45^0\end{aligned}}$$

*********** END **********