Trigonometric Ratios Ex 5.1 Q33

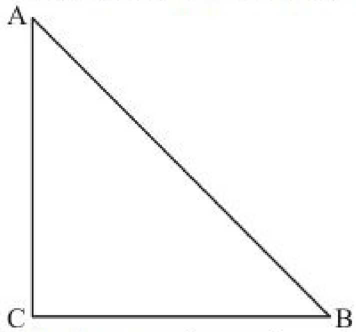
Answer :

Given:

$\cos A = \cos B$ ...... (1)

To show: $\angle A = \angle B$

ΔABC is as shown in figure below



Now since $\cos A = \cos B$ ......from (1)

Therefore

$$\frac{AC}{AB} = \frac{BC}{AB}$$

Now observe that denominator of above equality is same that is *AB*

Hence $\frac{AC}{AB} = \frac{BC}{AB}$ only when $AC = BC$

Therefore $AC = BC$ ...... (2)

We know that when two sides of a triangle are equal, then angle opposite to the sides are also equal.

Therefore from equation (2)

We can say that

Angle opposite to side *AC* = Angle opposite to side *BC*

Therefore,

$\angle B = \angle A$

Hence, $\angle A = \angle B$

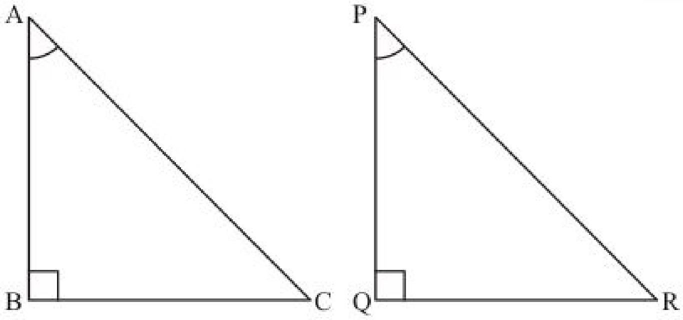
Trigonometric Ratios Ex 5.1 Q34

Answer :

Given: $\tan A = \tan P$

To show: $\angle A = \angle P$

Consider two right angled triangles ABC and PQR such that $\tan A = \tan P$



Therefore we have,

$\tan A = \frac{BC}{AB}$ and $\tan P = \frac{QR}{PQ}$

Since it is given that $\tan A = \tan P$

Therefore,

$\frac{BC}{AB} = \frac{QR}{PQ}$

Now by interchanging position of *AB* and *QR* by cross multiplication

We get,

$\frac{BC}{QR} = \frac{AB}{PQ}$

Let $\frac{BC}{QR} = \frac{AB}{PQ} = k$ (say) ...... (1)

Now by cross multiplication

$BC = kQR$ and $AB = kPQ$ ...... (2)

Now by using Pythagoras theorem in triangles ABC and PQR

We have,

$AC^2 = AB^2 + BC^2$ and $PR^2 = PQ^2 + QR^2$

Therefore

$AC = \sqrt{AB^2 + BC^2}$ and $PR = \sqrt{PQ^2 + QR^2}$

Now $\frac{AC}{PR} = \frac{\sqrt{AB^2 + BC^2}}{\sqrt{PQ^2 + QR^2}}$

Now using equation (2)

We get,

$$\frac{AC}{PR} = \frac{\sqrt{(kPQ)^2 + (kQR)^2}}{\sqrt{PQ^2 + QR^2}}$$

$$\frac{AC}{PR} = \frac{\sqrt{k^2PQ^2 + k^2QR^2}}{\sqrt{PQ^2 + QR^2}}$$

Now by taking k^2 common

We get,

$$\frac{AC}{PR} = \frac{\sqrt{k^2\left(PQ^2 + QR^2\right)}}{\sqrt{PQ^2 + QR^2}}$$

Therefore,

$$\frac{AC}{PR} = \frac{k\sqrt{\left(PQ^2 + QR^2\right)}}{\sqrt{PQ^2 + QR^2}}$$

Now $\sqrt{PQ^2 + QR^2}$ gets cancelled

Therefore,

$$\frac{AC}{PR} = k \quad \ldots\ldots (3)$$

From (1) and (3)

$$\frac{BC}{QR} = \frac{AB}{PQ} = \frac{AC}{PR} = k$$

Therefore, $\Delta ABC \sim \Delta PQR$

Hence, $\angle A = \angle P$

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