Trigonometric Ratios Ex 5.1 Q6

Answer :

Given:

ΔPQR is right angled at vertex Q.

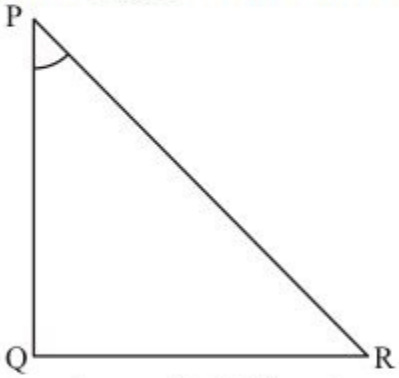
$PQ = 4\text{ cm}$

$RQ = 3\text{ cm}$

To find:

$\sin P, \sin R, \sec P, \sec R$

Given ΔPQR is as shown below



Hypotenuse side PR is unknown.

Therefore, we find side PR of ΔPQR by Pythagoras theorem

By applying Pythagoras theorem to ΔPQR

We get,

$PR^2 = PQ^2 + RQ^2$

Substituting values of sides from the above figure

$$PR^2 = 4^2 + 3^2$$

$$PR^2 = 16 + 9$$

$$PR^2 = 25$$

$$PR = \sqrt{25}$$

$$PR = 5$$

Hence, Hypotenuse = 5

Now by definition,

$$\sin P = \frac{\text{Perpendicular side opposite to} \angle P}{\text{Hypotenuse}}$$

$$\sin P = \frac{RQ}{PR}$$

Substituting values of sides from the above figure

$$\sin P = \frac{3}{5}$$

Now by definition,

$$\sin R = \frac{\text{Perpendicular side opposite to} \angle R}{\text{Hypotenuse}}$$

$$\sin R = \frac{PQ}{PR}$$

Substituting values of sides from the above figure

$$\sin R = \frac{4}{5}$$

By definition,

$$\sec P = \frac{1}{\cos P}$$

$$\sec P = \frac{1}{\frac{\text{Base side adjacent to } \angle P}{\text{Hypotenuse}}}$$

$$\sec P = \frac{\text{Hypotenuse}}{\text{Base side adjacent to } \angle P}.$$

Substituting values of sides from the above figure

$$\sec P = \frac{\text{PR}}{PQ}$$

$$\sec P = \frac{5}{4}$$

By definition,

$$\sec R = \frac{1}{\cos R}$$

$$\sec R = \frac{1}{\frac{\text{Base side adjacent to } \angle R}{\text{Hypotenuse}}}$$

$$\sec R = \frac{\text{Hypotenuse}}{\text{Base side adjacent to } \angle R}.$$

Substituting values of sides from the above figure

$$\sec R = \frac{\text{PR}}{RQ}$$

$$\sec R = \frac{5}{3}$$

Answer: $\sin P = \frac{3}{5}$, $\sin R = \frac{4}{5}$, $\sec P = \frac{5}{4}$ and $\sec R = \frac{5}{3}$

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