Trigonometric Ratios Ex 5.1 Q5

Answer :

Given: $15\cot A = 8$

To Find: $\sin A, \sec A$

Since $15\cot A = 8$

By taking 15 on R.H.S

We get,

$$\cot A = \frac{8}{15} \ldots\ldots(1)$$

By definition,

$$\cot A = \frac{1}{\tan A}$$

Hence,

$$\cot A = \frac{1}{\frac{\text{Perpendicular side opposite to} \angle A}{\text{Base side adjacent to } \angle A}}$$

$$\cot A = \frac{\text{Base side adjacent to } \angle A}{\text{Perpendicular side opposite to} \angle A} \ldots\ldots(2)$$

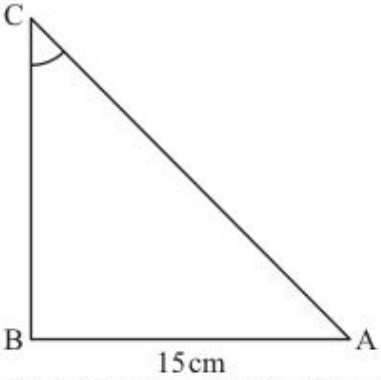
Comparing equation (1) and (2)

We get,

Base side adjacent to $\angle A = 8$

Perpendicular side opposite to $\angle A = 15$

ΔABC can be drawn as shown below using above information



Hypotenuse side AC is unknown.

Therefore, we find side AC of ΔABC by Pythagoras theorem.

So, by applying Pythagoras theorem to ΔABC

We get,

$AC^2 = AB^2 + BC^2$

Substituting values of sides from the above figure

$AC^2 = 8^2 + 15^2$

$AC^2 = 64 + 225$

$AC^2 = 289$

$AC = \sqrt{289}$

$AC = 17$

Therefore, Hypotenuse = 17

Now by definition,

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

$$\text{Therefore, } \sin A = \frac{BC}{AC}$$

Substituting values of sides from the above figure

$$\sin A = \frac{15}{17}$$

By definition,

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

Hence,

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

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

Substituting values of sides from the above figure

$$\sec A = \frac{17}{8}$$

Answer: $\sin A = \frac{15}{17}$ and $\sec A = \frac{17}{8}$

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