



Trigonometric Ratios Ex 5.1 Q29

Answer :

Given:

$$8 \tan A = 15$$

Therefore,

$$\tan A = \frac{15}{8} \dots\dots (1)$$

To find:

$$\sin A - \cos A$$

Now we know $\tan \theta$ is defined as follows

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

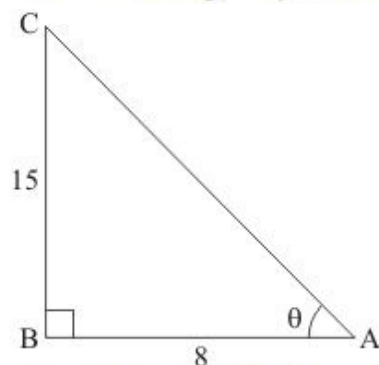
Now by comparing equation (1) and (2)

We get

$$\text{Perpendicular side opposite to } \angle A = 15$$

$$\text{Base side adjacent to } \angle A = 8$$

Therefore triangle representing angle A is as shown below



Side AC is unknown and can be found using Pythagoras theorem

Therefore,

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

Now by substituting the value of known sides from figure (a)

We get,

$$\begin{aligned} AC^2 &= 15^2 + 8^2 \\ &= 225 + 64 \\ &= 289 \end{aligned}$$

Now by taking square root on both sides

We get,

$$\begin{aligned} AC &= \sqrt{289} \\ &= 17 \end{aligned}$$

Therefore Hypotenuse side AC = 17 (3)

Now we know, $\sin A$ is defined as follows

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

Therefore from figure (a) and equation (3)

We get,

$$\begin{aligned}\sin A &= \frac{BC}{AC} \\ &= \frac{15}{17} \\ \sin A &= \frac{15}{17} \dots\dots (4)\end{aligned}$$

Now we know, $\cos A$ is defined as follows

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

Therefore from figure (a) and equation (3)

We get,

$$\begin{aligned}\cos A &= \frac{AB}{AC} \\ &= \frac{8}{17} \\ \cos A &= \frac{8}{17} \dots\dots (5)\end{aligned}$$

Now we need to find the value of expression $\sin A - \cos A$

Therefore by substituting the value of $\sin A$ and $\cos A$ from equation (4) and (5) respectively, we get,

$$\begin{aligned}\sin A - \cos A &= \frac{15}{17} - \frac{8}{17} \\ &= \frac{15-8}{17} \\ &= \frac{7}{17}\end{aligned}$$

$$\text{Hence } \sin A - \cos A = \frac{7}{17}$$

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