



Trigonometric Identities Ex 6.2 Q3

Answer :

$$\text{Given: } \tan \theta = \frac{1}{\sqrt{2}}$$

We have to find the value of the expression $\frac{\operatorname{cosec}^2 \theta - \sec^2 \theta}{\operatorname{cosec}^2 \theta + \cot^2 \theta}$

We know that,

$$1 + \cot^2 \theta = \operatorname{cosec}^2 \theta$$

$$\Rightarrow \operatorname{cosec}^2 \theta - \cot^2 \theta = 1$$

Therefore, the given expression can be written as

$$\begin{aligned} \frac{\operatorname{cosec}^2 \theta - \sec^2 \theta}{\operatorname{cosec}^2 \theta + \cot^2 \theta} &= \frac{\operatorname{cosec}^2 \theta - \sec^2 \theta}{1 + \cot^2 \theta + \cot^2 \theta} \\ &= \frac{\operatorname{cosec}^2 \theta - \sec^2 \theta}{1 + 2 \cot^2 \theta} \end{aligned}$$

$$\tan \theta = \frac{1}{\sqrt{2}} \Rightarrow \cot \theta = \sqrt{2}$$

$$\begin{aligned} \frac{\operatorname{cosec}^2 \theta - \sec^2 \theta}{1 + 2 \cot^2 \theta} &= \frac{1 + \cot^2 \theta - (1 + \tan^2 \theta)}{1 + 2 \cot^2 \theta} && (\text{since } \sec^2 \theta = 1 + \tan^2 \theta) \\ &= \frac{\cot^2 \theta - \tan^2 \theta}{1 + 2 \cot^2 \theta} \\ &= \frac{(\sqrt{2})^2 - \left(\frac{1}{\sqrt{2}}\right)^2}{1 + 2 \times (\sqrt{2})^2} \\ &= \frac{3}{10} \end{aligned}$$

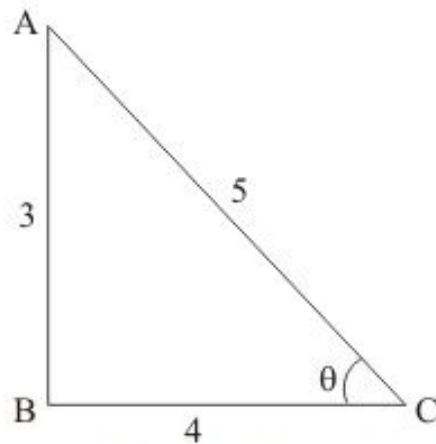
Hence, the value of the given expression is $\boxed{\frac{3}{10}}$.

Trigonometric Identities Ex 6.2 Q4

Answer :

Given: $\tan \theta = \frac{3}{4}$

We have to find the value of the expression $\frac{1 - \cos \theta}{1 + \cos \theta}$.



From the above figure, we have

$$\begin{aligned} AC &= \sqrt{AB^2 + BC^2} \\ &= \sqrt{3^2 + 4^2} \\ &= 5 \end{aligned}$$

$$\Rightarrow \cos \theta = \frac{4}{5}$$

Therefore,

$$\begin{aligned} \frac{1 - \cos \theta}{1 + \cos \theta} &= \frac{1 - \frac{4}{5}}{1 + \frac{4}{5}} \\ &= \frac{1}{9} \end{aligned}$$

Hence, the value of the given expression is $\frac{1}{9}$.

***** END *****