Trigonometric Identities Ex 6.2 Q6

Answer :

Given: $\cot\theta = \dfrac{1}{\sqrt{3}}$

We have to find the value of the expression $\dfrac{1-\cos^2\theta}{2-\sin^2\theta}$

We know that,

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

$\Rightarrow \operatorname{cosec}^2\theta = 1+\left(\dfrac{1}{\sqrt{3}}\right)^2$

$\Rightarrow \operatorname{cosec}^2\theta = \dfrac{4}{3}$

Using the identity $\sin^2\theta + \cos^2\theta = 1$, we have

$\dfrac{1-\cos^2\theta}{2-\sin^2\theta} = \dfrac{\sin^2\theta}{2-\sin^2\theta}$

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

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

$= \dfrac{1}{2\times\dfrac{4}{3}-1}$

$= \dfrac{3}{5}$

Hence, the value of the given expression is $\dfrac{3}{5}$.

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