Trigonometric Identities Ex 6.2 Q7

Answer :

Given: $\cos ecA = \sqrt{2}$

We have to find the value of the expression $\dfrac{2\sin^2 A + 3\cot^2 A}{4\left(\tan^2 A - \cos^2 A\right)}$

We know that,

$\cos ecA = \sqrt{2}$

$\Rightarrow \sin A = \dfrac{1}{\cos ecA} = \dfrac{1}{\sqrt{2}}$

$\cos A = \sqrt{1 - \sin^2 A} = \sqrt{1 - \left(\dfrac{1}{\sqrt{2}}\right)^2} = \dfrac{1}{\sqrt{2}}$

$\tan A = \dfrac{\sin A}{\cos A} = \dfrac{\dfrac{1}{\sqrt{2}}}{\dfrac{1}{\sqrt{2}}} = 1$

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

Therefore,

$$\dfrac{2\sin^2 A + 3\cot^2 A}{4\left(\tan^2 A - \cos^2 A\right)} = \dfrac{2 \times \left(\dfrac{1}{\sqrt{2}}\right)^2 + 3 \times 1^2}{4\left(1^2 - \left(\dfrac{1}{\sqrt{2}}\right)^2\right)}$$

$$= 2$$

Hence, the value of the given expression is 2.

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