Trigonometric Ratios Ex 5.2 Q10

Answer :

We have,

$\left(\operatorname{cosec}^2 45^\circ \sec^2 30^\circ\right)\left(\sin^2 30^\circ + 4\cot^2 45^\circ - \sec^2 60^\circ\right)$ ..... (1)

Now,

$\sin 30^\circ = \frac{1}{2}, \operatorname{cosec} 45^\circ = \sqrt{2}, \sec 30^\circ = \frac{2}{\sqrt{3}}, \sec 60^\circ = 2, \cot 45^\circ = 1$

So by substituting above values in equation (1)

We get,

$\left(\operatorname{cosec}^2 45^\circ \sec^2 30^\circ\right)\left(\sin^2 30^\circ + 4\cot^2 45^\circ - \sec^2 60^\circ\right)$

$= \left(\left(\sqrt{2}\right)^2 \times \left(\frac{2}{\sqrt{3}}\right)^2\right) \times \left(\left(\frac{1}{2}\right)^2 + 4 \times (1)^2 - (2)^2\right)$

$= \left(2 \times \frac{(2)^2}{\left(\sqrt{3}\right)^2}\right) \times \left(\frac{1^2}{2^2} + 4 \times 1 - 4\right)$

$= \left(2 \times \frac{4}{3}\right) \times \left(\frac{1}{4} + 4 - 4\right)$

$= \left(\frac{8}{3}\right) \times \left(\frac{1}{4}\right)$

Now, in above equation 4 cancel 8 and 2 remains

Hence,

$\left(\operatorname{cosec}^2 45^\circ \sec^2 30^\circ\right)\left(\sin^2 30^\circ + 4\cot^2 45^\circ - \sec^2 60^\circ\right)$

$= \frac{2}{3}$

Therefore,

$\left(\operatorname{cosec}^2 45^\circ \sec^2 30^\circ\right)\left(\sin^2 30^\circ + 4\cot^2 45^\circ - \sec^2 60^\circ\right) = \frac{2}{3}$

Trigonometric Ratios Ex 5.2 Q11

Answer :

We have,

$\text{cosec}^3 30^\circ \cos 60^\circ \tan^3 45^\circ \sin^2 90^\circ \sec^2 45^\circ \cot 30^\circ$ ..... (1)

Now,

$\text{cosec}\, 30^\circ = 2$, $\cos 60^\circ = \frac{1}{2}$, $\sec 45^\circ = \sqrt{2}$, $\tan 45^\circ = 1$, $\sin 90^\circ = 1$, $\cot 30^\circ = \sqrt{3}$

So by substituting above values in equation (1)

We get,

$$\text{cosec}^3 30^\circ \cos 60^\circ \tan^3 45^\circ \sin^2 90^\circ \sec^2 45^\circ \cot 30^\circ$$

$$= (2)^3 \times \left(\frac{1}{2}\right) \times (1)^3 \times (1)^2 \times \left(\sqrt{2}\right)^2 \times \left(\sqrt{3}\right)$$

$$= 8 \times \left(\frac{1}{2}\right) \times 1 \times 1 \times 2 \times \left(\sqrt{3}\right)$$

$$= \frac{8}{2} \times 2 \times \left(\sqrt{3}\right)$$

Now, 2 gets cancelled and we get,

$$\boxed{\text{cosec}^3 30^\circ \cos 60^\circ \tan^3 45^\circ \sin^2 90^\circ \sec^2 45^\circ \cot 30^\circ = 8\sqrt{3}}$$

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