Trigonometric Ratios Ex 5.2 Q14

Answer :

We have,

$$\frac{\sin 30^\circ - \sin 90^\circ + 2\cos 0^\circ}{\tan 30^\circ \tan 60^\circ} \quad \ldots\ldots (1)$$

Now,

$$\sin 30^\circ = \frac{1}{2}, \sin 90^\circ = \cos 0^\circ = 1, \tan 30^\circ = \frac{1}{\sqrt{3}}, \tan 60^\circ = \sqrt{3}$$

So by substituting above values in equation (1)

We get,

$$\frac{\sin 30^\circ - \sin 90^\circ + 2\cos 0^\circ}{\tan 30^\circ \tan 60^\circ}$$

$$= \frac{\frac{1}{2} - 1 + 2 \times 1}{\frac{1}{\sqrt{3}} \times \sqrt{3}}$$

Now, $\sqrt{3}$ present in the denominator of above expression gets cancelled and we get,

$$\frac{\sin 30^\circ - \sin 90^\circ + 2\cos 0^\circ}{\tan 30^\circ \tan 60^\circ}$$

$$= \frac{\frac{1}{2} - 1 + 2}{1}$$

$$= \frac{1}{2} - 1 + 2$$

Now by taking LCM in the above expression we get,

$$\frac{\sin 30^\circ - \sin 90^\circ + 2\cos 0^\circ}{\tan 30^\circ \tan 60^\circ}$$

$$= \frac{1}{2} - \frac{1 \times 2}{1 \times 2} + \frac{2 \times 2}{1 \times 2}$$

$$= \frac{1}{2} - \frac{2}{2} + \frac{4}{2}$$

$$= \frac{1 - 2 + 4}{2}$$

$$= \frac{5 - 2}{2}$$

$$= \frac{3}{2}$$

Therefore,

$$\frac{\sin 30^\circ - \sin 90^\circ + 2\cos 0^\circ}{\tan 30^\circ \tan 60^\circ} = \frac{3}{2}$$

Trigonometric Ratios Ex 5.2 Q15

Answer :

We have,

$$\frac{4}{\cot^2 30°} + \frac{1}{\sin^2 60°} - \cos^2 45° \quad \ldots\ldots (1)$$

Now,

$$\cot 30° = \sqrt{3}, \ \cos 45° = \frac{1}{\sqrt{2}}, \ \sin 60° = \frac{\sqrt{3}}{2}$$

So by substituting above values in equation (1)

We get,

$$\frac{4}{\cot^2 30°} + \frac{1}{\sin^2 60°} - \cos^2 45°$$

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

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

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

$$= \frac{4}{3} + \frac{4}{3} - \frac{1}{2}$$

Now LCM of denominator of above expression is 6

Therefore by taking LCM we get,

$$\frac{4}{\cot^2 30°} + \frac{1}{\sin^2 60°} - \cos^2 45°$$

$$= \frac{4 \times 2}{3 \times 2} + \frac{4 \times 2}{3 \times 2} - \frac{1 \times 3}{2 \times 3}$$

$$= \frac{8}{6} + \frac{8}{6} - \frac{3}{6}$$

$$= \frac{8 + 8 - 3}{6}$$

$$= \frac{16 - 3}{6}$$

$$= \frac{13}{6}$$

Hence,

$$\frac{4}{\cot^2 30°} + \frac{1}{\sin^2 60°} - \cos^2 45° = \frac{13}{6}$$