

Trigonometric Ratios Ex 5.2 Q18 Answer:

We have.

$$\frac{\sin 30^{\circ}}{\sin 45^{\circ}} + \frac{\tan 45^{\circ}}{\sec 60^{\circ}} - \frac{\sin 60^{\circ}}{\cot 45^{\circ}} - \frac{\cos 30^{\circ}}{\sin 90^{\circ}} \quad \dots \dots (1)$$

Now,

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

 $\sec 60^{\circ} = 2$

So by substituting above values in equation (1)

We get,

$$\frac{\sin 30^{\circ}}{\sin 45^{\circ}} + \frac{\tan 45^{\circ}}{\sec 60^{\circ}} - \frac{\sin 60^{\circ}}{\cot 45^{\circ}} - \frac{\cos 30^{\circ}}{\sin 90^{\circ}}$$

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

Now by further simplifying

We get,

$$\frac{\sin 30^{\circ}}{\sin 45^{\circ}} + \frac{\tan 45^{\circ}}{\sec 60^{\circ}} - \frac{\sin 60^{\circ}}{\cot 45^{\circ}} - \frac{\cos 30^{\circ}}{\sin 90^{\circ}}$$
$$= \frac{1}{2} \times \frac{\sqrt{2}}{1} + \frac{1}{2} - \frac{\sqrt{3}}{2} - \frac{\sqrt{3}}{2}$$

Since,
$$2 = \sqrt{2} \times \sqrt{2}$$

Therefore,

$$\frac{\sin 30^{\circ}}{\sin 45^{\circ}} + \frac{\tan 45^{\circ}}{\sec 60^{\circ}} - \frac{\sin 60^{\circ}}{\cot 45^{\circ}} - \frac{\cos 30^{\circ}}{\sin 90^{\circ}}$$
$$= \frac{1}{\sqrt{2} \times \sqrt{2}} \times \frac{\sqrt{2}}{1} + \frac{1}{2} - \frac{\sqrt{3}}{2} - \frac{\sqrt{3}}{2}$$

Now, one $\sqrt{2}$ gets cancelled and

We get,

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

Now, by taking LCM

We get,

$$\frac{\sin 30^{\circ}}{\sin 45^{\circ}} + \frac{\tan 45^{\circ}}{\sec 60^{\circ}} - \frac{\sin 60^{\circ}}{\cot 45^{\circ}} - \frac{\cos 30^{\circ}}{\sin 90^{\circ}}$$

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

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

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

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

Therefore,

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

Trigonometric Ratios Ex 5.2 Q19

Answer:

We have,

$$\frac{\tan 45^{\circ}}{\csc 30^{\circ}} + \frac{\sec 60^{\circ}}{\cot 45^{\circ}} - \frac{5\sin 90^{\circ}}{2\cos 0^{\circ}} \quad \dots \quad (1)$$
Now.

 $\sin 90^\circ = \cos 0^\circ = 1 \cdot \tan 45^\circ = \cot 45^\circ = 1 \cdot \csc 30^\circ = \sec 60^\circ = 2$ So by substituting above values in equation (1)

We get,

$$\frac{\tan 45^{\circ}}{\cos \cos 30^{\circ}} + \frac{\sec 60^{\circ}}{\cot 45^{\circ}} - \frac{5\sin 90^{\circ}}{2\cos 0^{\circ}}$$
$$= \frac{1}{2} + \frac{2}{1} - \frac{5 \times 1}{2 \times 1}$$
$$= \frac{1}{2} + \frac{2}{1} - \frac{5}{2}$$

Now by taking terms with denominator 2 together and solving

We get,

$$\frac{\tan 45^{\circ}}{\cos \sec 30^{\circ}} + \frac{\sec 60^{\circ}}{\cot 45^{\circ}} - \frac{5\sin 90^{\circ}}{2\cos 90^{\circ}}$$

$$= \frac{1-5}{2} + \frac{2}{1}$$

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

Now $\frac{-4}{2}$ gets reduced to -2

Therefore,

$$\frac{\tan 45^{\circ}}{\csc 30^{\circ}} + \frac{\sec 60^{\circ}}{\cot 45^{\circ}} - \frac{5\sin 90^{\circ}}{2\cos 90^{\circ}}$$
$$= -2 + 2$$
$$= 0$$

Therefore,

$$\frac{\tan 45^{\circ}}{\csc 30^{\circ}} + \frac{\sec 60^{\circ}}{\cot 45^{\circ}} - \frac{5\sin 90^{\circ}}{2\cos 0^{\circ}} = 0$$

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