Trigonometric Ratios Ex 5.2 Q4

Answer :

We have to find

$\sin^2 30^\circ + \sin^2 45^\circ + \sin^2 60^\circ + \sin^2 90^\circ$ ..... (1)

Now,

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

So by substituting above values in equation (1)

We get,

$\sin^2 30^\circ + \sin^2 45^\circ + \sin^2 60^\circ + \sin^2 90^\circ$

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

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

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

Now by taking denominator 4 together and simplifying

We get,

$\sin^2 30^\circ + \sin^2 45^\circ + \sin^2 60^\circ + \sin^2 90^\circ$

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

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

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

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

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

Now by taking LCM

We get,

$$\sin^2 30^\circ + \sin^2 45^\circ + \sin^2 60^\circ + \sin^2 90^\circ$$

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

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

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

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

Therefore,

$$\sin^2 30^\circ + \sin^2 45^\circ + \sin^2 60^\circ + \sin^2 90^\circ = \frac{5}{2}$$

Trigonometric Ratios Ex 5.2 Q5

Answer :

We have to find the following expression

$\cos^2 30^\circ + \cos^2 45^\circ + \cos^2 60^\circ + \cos^2 90^\circ$ ..... (1)

Now,

$\cos 45^\circ = \frac{1}{\sqrt{2}}, \cos 30^\circ = \frac{\sqrt{3}}{2}, \cos 60^\circ = \frac{1}{2}, \cos 90^\circ = 0$

So by substituting above values in equation (1)

We get,

$\cos^2 30^\circ + \cos^2 45^\circ + \cos^2 60^\circ + \cos^2 90^\circ$

$= \left(\frac{\sqrt{3}}{2}\right)^2 + \left(\frac{1}{\sqrt{2}}\right)^2 + \left(\frac{1}{2}\right)^2 + (0)^2$

$= \frac{\left(\sqrt{3}\right)^2}{2^2} + \frac{1^2}{\left(\sqrt{2}\right)^2} + \frac{1^2}{2^2} + 0$

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

Now by taking denominator 4 together and simplifying

We get,

$\cos^2 30^\circ + \cos^2 45^\circ + \cos^2 60^\circ + \cos^2 90^\circ$

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

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

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

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

Now by taking LCM

We get,

$$\cos^2 30^\circ + \cos^2 45^\circ + \cos^2 60^\circ + \cos^2 90^\circ$$

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

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

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

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

Therefore,

$$\cos^2 30^\circ + \cos^2 45^\circ + \cos^2 60^\circ + \cos^2 90^\circ = \frac{3}{2}$$

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