

Trigonometry Functions - Class XI

Past Year JEE Questions

Questions

Question: 01

The value of

$$\cos^3\left(\frac{\pi}{8}\right)\cos\left(\frac{3\pi}{8}\right) + \sin^3\left(\frac{\pi}{8}\right)\sin\left(\frac{3\pi}{8}\right)$$

is :

A. $\frac{1}{\sqrt{2}}$

B. $\frac{1}{2}$

C. $\frac{1}{4}$

D. $\frac{1}{2\sqrt{2}}$

Solutions

Solution: 01

Explanation

$$\cos^3\left(\frac{\pi}{8}\right)\cos\left(\frac{3\pi}{8}\right) + \sin^3\left(\frac{\pi}{8}\right)\sin\left(\frac{3\pi}{8}\right)$$

$$= \cos^3\left(\frac{\pi}{8}\right)\sin\left(\frac{\pi}{8}\right) + \sin^3\left(\frac{\pi}{8}\right)\cos\left(\frac{\pi}{8}\right)$$

$$= \sin\left(\frac{\pi}{8}\right)\cos\left(\frac{\pi}{8}\right)\left[\cos^2\left(\frac{\pi}{8}\right) + \sin^2\left(\frac{\pi}{8}\right)\right]$$

$$= \sin\left(\frac{\pi}{8}\right)\cos\left(\frac{\pi}{8}\right) \times 1$$

$$= \frac{1}{2} \times 2 \sin\left(\frac{\pi}{8}\right)\cos\left(\frac{\pi}{8}\right)$$

$$= \frac{1}{2} \sin\left(\frac{\pi}{4}\right)$$

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