

## Trigonometry Functions - Class XI

### Past Year JEE Questions

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#### Questions

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##### Question: 01

The value of  $\cot \frac{\pi}{24}$  is :

- A.  $\sqrt{2} + \sqrt{3} + 2 - \sqrt{6}$
- B.  $\sqrt{2} + \sqrt{3} + 2 + \sqrt{6}$
- C.  $\sqrt{2} - \sqrt{3} - 2 + \sqrt{6}$
- D.  $3\sqrt{2} - \sqrt{3} - \sqrt{6}$

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#### Solutions

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##### Solution: 01

##### Explanation

$$\cot \theta = \frac{1 + \cos 2\theta}{\sin 2\theta} = \frac{1 + \left(\frac{\sqrt{3}+1}{2\sqrt{2}}\right)}{\left(\frac{\sqrt{3}-1}{2\sqrt{2}}\right)}$$

$$\theta = \frac{\pi}{24}$$

$$\Rightarrow \cot\left(\frac{\pi}{24}\right) = \frac{1 + \left(\frac{\sqrt{3}+1}{2\sqrt{2}}\right)}{\left(\frac{\sqrt{3}-1}{2\sqrt{2}}\right)}$$

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

$$= \frac{2\sqrt{6} + 2\sqrt{2} + 3 + \sqrt{3} + \sqrt{3} + 1}{2}$$

$$= \sqrt{6} + \sqrt{2} + \sqrt{3} + 2$$