

# Mathematics

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## (Chapter 2)(Inverse Trigonometric Functions)

(Class XII)

### (Exemplar Problems)

#### Short Answer (S.A.)

#### Question 7:

Find the real solution of the equation

$$\tan^{-1}\sqrt{x(x+1)} + \sin^{-1}\sqrt{x^2+x+1} = \frac{\pi}{2}.$$

#### Answer 7:

Given that  $\tan^{-1}\sqrt{x(x+1)} + \sin^{-1}\sqrt{x^2+x+1} = \frac{\pi}{2}$

$$\Rightarrow \cot^{-1}\sqrt{x(x+1)} = \sin^{-1}\sqrt{x^2+x+1} \quad \left[ \text{As } \tan^{-1}x + \cot^{-1}x = \frac{\pi}{2} \right]$$

$$\Rightarrow \cot^{-1}\sqrt{x(x+1)} = \sin^{-1}\sqrt{x^2+x+1}$$

$$\Rightarrow \sin^{-1}\frac{1}{\sqrt{x^2+x+1}} = \sin^{-1}\sqrt{x^2+x+1}$$



$$\left[ \text{As } \cot^{-1}\frac{a}{b} = \sin^{-1}\frac{b}{\sqrt{a^2+b^2}} \right]$$

$$\Rightarrow \frac{1}{\sqrt{x^2+x+1}} = \sqrt{x^2+x+1}$$

$$\Rightarrow x^2+x+1 = 1$$

$$\Rightarrow x^2+x = 0 \quad \Rightarrow x(x+1) = 0$$

$$\Rightarrow x = 0 \text{ or } x = -1$$

