

Mathematics

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(Chapter 2)(Inverse Trigonometric Functions)

(Class XII)

(Exemplar Problems)

Objective Type Questions

Choose the correct answers from the given four options in the following (MCQ):

Question 37:

If $\cos^{-1}x > \sin^{-1}x$, then

(A) $\frac{1}{\sqrt{2}} < x \leq 1$

(B) $0 \leq x < \frac{1}{\sqrt{2}}$

(C) $-1 \leq x < \frac{1}{\sqrt{2}}$

(D) $x > 0$

Answer 37:

(A) $\frac{1}{\sqrt{2}} < x \leq 1$

Solution:

Given that: $\cos^{-1}x > \sin^{-1}x$ where $x \in [-1, 1]$

Now, we have

$$\cos^{-1}x > \sin^{-1}x$$

$$\Rightarrow \frac{\pi}{2} - \sin^{-1}x > \sin^{-1}x \quad [\because \cos^{-1}x + \sin^{-1}x = \frac{\pi}{2}]$$

$$\Rightarrow \frac{\pi}{2} > 2\sin^{-1}x$$

$$\Rightarrow \frac{\pi}{4} > \sin^{-1}x$$

$$\Rightarrow \sin\left(\frac{\pi}{4}\right) > x$$

$$\Rightarrow \frac{1}{\sqrt{2}} < x$$

$$\Rightarrow -1 \leq x \leq \frac{1}{2} \quad [\because x \in [-1, 1]]$$

Hence, the option (A) is correct.

