

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 22:

If $3\tan^{-1}x + \cot^{-1}x = \pi$, then x equals

(A) 0

(B) 1

(C) -1

(D) $\frac{1}{2}$

Answer 22:

(B) 1

Solution:

Given that: $3\tan^{-1}x + \cot^{-1}x = \pi$

Now, we have $3\tan^{-1}x + \cot^{-1}x = \pi$

$$\Rightarrow 2\tan^{-1}x + (\tan^{-1}x + \cot^{-1}x) = \pi$$

$$\Rightarrow 2\tan^{-1}x + \left(\frac{\pi}{2}\right) = \pi$$

$$\left[\because \tan^{-1}x + \cot^{-1}x = \frac{\pi}{2} \right]$$

$$\Rightarrow 2\tan^{-1}x = \pi - \frac{\pi}{2}$$

$$\Rightarrow 2\tan^{-1}x = \frac{\pi}{2}$$

$$\Rightarrow \tan^{-1}x = \frac{\pi}{4}$$

$$\Rightarrow x = \tan\left(\frac{\pi}{4}\right)$$

$$\Rightarrow x = 1$$

Hence, the option (B) is correct.

