

Mathematics

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(Chapter 2)(Inverse Trigonometric Functions)

(Class XII)

(Exemplar Problems)

Short Answer (S.A.)

Question 5:

Find the value of $\tan^{-1} \left(\tan \frac{2\pi}{3} \right)$.

Answer 5:

We have: $\tan^{-1} \left(\tan \frac{2\pi}{3} \right)$

$$= \tan^{-1} \left[\tan \left(\pi - \frac{\pi}{3} \right) \right]$$

$$= \tan^{-1} \left(-\tan \frac{\pi}{3} \right)$$

$$= \tan^{-1} \left[\tan \left(-\frac{\pi}{3} \right) \right] = -\frac{\pi}{3}$$

[As we know that the range of the principal value branch of \tan^{-1} is $\left(-\frac{\pi}{2}, \frac{\pi}{2} \right)$]

Hence, the value of $\tan^{-1} \left(\tan \frac{2\pi}{3} \right)$ is $-\frac{\pi}{3}$.

