

# Mathematics

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## (Chapter 2)(Inverse Trigonometric Functions)

(Class XII)

### (Exemplar Problems)

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

#### Question 6:

Show that  $2\tan^{-1}(-3) = -\frac{\pi}{2} + \tan^{-1}\left(-\frac{4}{3}\right)$ .

#### Answer 6:

$$\text{LHS} = 2\tan^{-1}(-3)$$

$$= -2\tan^{-1}(3) \quad [ \text{As } \tan^{-1}(-x) = -\tan^{-1}(x) ]$$

$$= -\tan^{-1}\left[\frac{2 \times 3}{1 - (3)^2}\right] \quad [ \text{as } 2\tan^{-1}x = \tan^{-1}\frac{2x}{1 - x^2} ]$$

$$= -\tan^{-1}\left[\frac{6}{-8}\right] = -\tan^{-1}\left(-\frac{3}{4}\right)$$

$$= -\cot^{-1}\left(-\frac{4}{3}\right) \quad [ \text{As } \tan^{-1}x = \cot^{-1}\left(\frac{1}{x}\right) ]$$

$$= -\left[\frac{\pi}{2} - \tan^{-1}\left(-\frac{4}{3}\right)\right] \quad [ \text{As } \tan^{-1}x + \cot^{-1}x = \frac{\pi}{2} ]$$

$$= -\frac{\pi}{2} + \tan^{-1}\left(-\frac{4}{3}\right)$$

$$= \text{RHS}$$

