

# Mathematics

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## (Chapter 2)(Inverse Trigonometric Functions)

(Class XII)

### (Exemplar Problems)

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

#### Question 9:

If  $2\tan^{-1}(\cos \theta) = \tan^{-1}(2\operatorname{cosec} \theta)$ , then show that  $\theta = \frac{\pi}{4}$ .

#### Answer 9:

Given that:

$$2\tan^{-1}(\cos \theta) = \tan^{-1}(2\operatorname{cosec} \theta)$$

$$\Rightarrow \tan^{-1} \frac{2 \cos \theta}{1 - (\cos \theta)^2} = \tan^{-1}(2\operatorname{cosec} \theta)$$

$$\Rightarrow \frac{2 \cos \theta}{1 - (\cos \theta)^2} = (2\operatorname{cosec} \theta)$$

$$\Rightarrow \frac{2 \cos \theta}{\sin^2 \theta} = \left( \frac{2}{\sin \theta} \right)$$

$$\Rightarrow \frac{1 \cos \theta}{\sin \theta} = 1$$

$$\Rightarrow \tan \theta = 1$$

$$\Rightarrow \theta = \frac{\pi}{4}$$



$$\left[ \text{as } 2\tan^{-1}x = \tan^{-1} \frac{2x}{1+x^2} \right]$$

$$[\text{as } \sin \theta \neq 0]$$

