

Property III

- (i) $\sin^{-1} x = \cos^{-1} \sqrt{1 - x^2}$
 $= \operatorname{cosec}^{-1} \left(\frac{1}{x} \right)$
- (ii) $\cos^{-1} x = \sin^{-1} \sqrt{1 - x^2}$
 $= \sec^{-1} \left(\frac{1}{x} \right)$
- (iii) $\tan^{-1} x = \cot^{-1} \left(\frac{1}{x} \right)$

Property IV

- (i) $\sin^{-1}(-x) = -\sin^{-1} x, \quad x \in [-1, 1]$
- (ii) $\cos^{-1}(-x) = \pi - \cos^{-1} x, \quad x \in [-1, 1]$
- (iii) $\tan^{-1}(-x) = -\tan^{-1} x, \quad x \in R$
- (iv) $\operatorname{cosec}^{-1}(-x) = -\operatorname{cosec}^{-1} x, \quad |x| \geq 1$
- (v) $\sec^{-1}(-x) = \pi - \sec^{-1} x, \quad |x| \geq 1$
- (vi) $\cot^{-1}(-x) = \pi - \cot^{-1} x, \quad x \in R$

Property V

- (i) $\sin^{-1} \left(\frac{1}{x} \right) = \operatorname{cosec}^{-1} x, \quad x \in (-\infty, -1] \cup [1, \infty)$
- (ii) $\cos^{-1} \left(\frac{1}{x} \right) = \sec^{-1} x, \quad x \in (-\infty, -1] \cup [1, \infty)$
- (iii) $\tan^{-1} \left(\frac{1}{x} \right) = \cot^{-1} x, \quad x > 0$

Property VI

- (i) $\sin^{-1} x + \cos^{-1} x = \frac{\pi}{2}, \quad x \in [-1, 1]$
- (ii) $\tan^{-1} x + \cot^{-1} x = \frac{\pi}{2}, \quad x \in R$
- (iii) $\sec^{-1} x + \operatorname{cosec}^{-1} x = \frac{\pi}{2}, \quad |x| \geq 1$

Property VII

- (i) $\tan^{-1} x + \tan^{-1} y \begin{cases} = \tan^{-1} \left(\frac{x+y}{1-xy} \right), & xy < 1 \\ = \pi + \tan^{-1} \left(\frac{x+y}{1-xy} \right), & x > 0, y > 0 \text{ and } xy > 1 \end{cases}$
- (ii) $\tan^{-1} x - \tan^{-1} y = \tan^{-1} \left(\frac{x-y}{1+xy} \right), \quad xy > -1$