

INVERSE TRIGONOMETRIC FORMULAS

- $\sin^{-1}(-x) = -\sin^{-1}(x)$, $x \in [-1, 1]$
- $\cos^{-1}(-x) = \pi - \cos^{-1}(x)$, $x \in [-1, 1]$
- $\tan^{-1}(-x) = -\tan^{-1}(x)$, $x \in \mathbb{R}$
- $\operatorname{cosec}^{-1}(-x) = -\operatorname{cosec}^{-1}(x)$, $|x| \geq 1$
- $\sec^{-1}(-x) = \pi - \sec^{-1}(x)$, $|x| \geq 1$
- $\cot^{-1}(-x) = \pi - \cot^{-1}(x)$, $x \in \mathbb{R}$

- $\sin^{-1}x + \cos^{-1}x = \pi/2$, $x \in [-1, 1]$
- $\tan^{-1}x + \cot^{-1}x = \pi/2$, $x \in \mathbb{R}$
- $\sec^{-1}x + \operatorname{cosec}^{-1}x = \pi/2$, $|x| \geq 1$

- $\sin^{-1}(1/x) = \operatorname{cosec}^{-1}(x)$
if $x \geq 1$ or $x \leq -1$
- $\cos^{-1}(1/x) = \sec^{-1}(x)$
if $x \geq 1$ or $x \leq -1$
- $\tan^{-1}(1/x) = \cot^{-1}(x)$
 $x > 0$

- $\tan^{-1}x + \tan^{-1}y = \tan^{-1}\left(\frac{(x+y)}{(1-xy)}\right)$
if the value $xy < 1$
- $\tan^{-1}x - \tan^{-1}y = \tan^{-1}\left(\frac{(x-y)}{(1+xy)}\right)$
if the value $xy > -1$

- $2 \tan^{-1} x = \sin^{-1}\left(\frac{2x}{(1+x^2)}\right)$, $|x| \leq 1$
- $2 \tan^{-1} x = \cos^{-1}\left(\frac{(1-x^2)}{(1+x^2)}\right)$, $x \geq 0$
- $2 \tan^{-1} x = \tan^{-1}\left(\frac{2x}{(1-x^2)}\right)$, $-1 < x < 1$

INVERSE TRIGONOMETRIC FORMULAS

- $3\sin^{-1}x = \sin^{-1}(3x-4x^3)$
- $3\cos^{-1}x = \cos^{-1}(4x^3-3x)$
- $3\tan^{-1}x = \tan^{-1}((3x-x^3)/(1-3x^2))$

- $\cos(\cos^{-1}(x)) = x \quad -1 \leq x \leq 1$

- $\tan(\tan^{-1}(x)) = x \quad -\infty < x < \infty$

- $\operatorname{cosec}(\operatorname{cosec}^{-1}(x)) = x \quad -\infty < x \leq 1 \text{ or } -1 \leq x < \infty$

- $\sec(\sec^{-1}(x)) = x \quad -\infty < x \leq 1 \text{ or } 1 \leq x < \infty$

- $\cot(\cot^{-1}(x)) = x \quad -\infty < x < \infty$

- $\sin^{-1}(\sin \theta) = \theta \quad -\pi/2 \leq \theta \leq \pi/2$

- $\cos^{-1}(\cos \theta) = \theta \quad 0 \leq \theta \leq \pi$

- $\tan^{-1}(\tan \theta) = \theta \quad -\pi/2 < \theta < \pi/2$

- $\operatorname{cosec}^{-1}(\operatorname{cosec} \theta) = \theta$
 $-\pi/2 \leq \theta < 0 \text{ or } 0 < \theta \leq \pi/2$

- $\sec^{-1}(\sec \theta) = \theta$
 $0 \leq \theta \leq \pi/2 \text{ or } \pi/2 < \theta \leq \pi$

- $\cot^{-1}(\cot \theta) = \theta \quad 0 < \theta < \pi$