Inverse Trigonometric Functions Class 12 Formula Sheet

CBSE Class 12 Maths · NCERT · for boards, NEET and JEE revision

ChapterNotes

Principal Value Branches

Function	Domain	Range (Principal Value)
$\sin^{-1}x$	$[-1, 1]$	$[-\pi/2, \pi/2]$
$\cos^{-1}x$	$[-1, 1]$	$[0, \pi]$
$\tan^{-1}x$	R (all reals)	$(-\pi/2, \pi/2)$
$\cot^{-1}x$	R	$(0, \pi)$
$\sec^{-1}x$	$R - (-1, 1)$	$[0, \pi] - \{\pi/2\}$
$\operatorname{cosec}^{-1}x$	$R - (-1, 1)$	$[-\pi/2, \pi/2] - \{0\}$

Important Properties

Complementary:

$\sin^{-1}x + \cos^{-1}x = \pi/2$

$\tan^{-1}x + \cot^{-1}x = \pi/2$

$\sec^{-1}x + \operatorname{cosec}^{-1}x = \pi/2$

Negative arguments:

$\sin^{-1}(-x) = -\sin^{-1}x$

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

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

Reciprocal:

$\sin^{-1}(1/x) = \operatorname{cosec}^{-1}x$

$\cos^{-1}(1/x) = \sec^{-1}x$

$\tan^{-1}(1/x) = \cot^{-1}x$ (for $x > 0$)

Sum formulas:

$\tan^{-1}x + \tan^{-1}y = \tan^{-1}((x+y)/(1-xy))$, if $xy < 1$

$\tan^{-1}x - \tan^{-1}y = \tan^{-1}((x-y)/(1+xy))$

Double angle:

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

Quick revision

- $\sin^{-1}x \in [-\pi/2, \pi/2]$; $\cos^{-1}x \in [0, \pi]$; $\tan^{-1}x \in (-\pi/2, \pi/2)$
- $\sin^{-1}x + \cos^{-1}x = \pi/2$ (always!)
- $\sin^{-1}(-x) = -\sin^{-1}x$; $\cos^{-1}(-x) = \pi - \cos^{-1}x$
- $\tan^{-1}x + \tan^{-1}y = \tan^{-1}((x+y)/(1-xy))$ when $xy < 1$
- $2\tan^{-1}x = \sin^{-1}(2x/(1+x^2))$ for $|x| \le 1$
- Always check if answer falls within principal value range!

Full chapter notes with solved examples and practice questions: https://chapternotes.in/cbse/class-12-maths/inverse-trigonometric-functions-class-12-notes/