



Study of Properties of inverse trigonometric functions

Sunita

Abstract : Inverse of a function ‘f’ exists, if the function is one-one and onto, Since trigonometric functions are many-one over their domains, we restrict their domains and co-domains in order to make them one-one and onto and then find their inverse.

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Domains And Ranges

The domains and ranges (principal value branches) of inverse trigonometric functions are given below

Functions	Domain	Range (Principal value branches)
$y = \sin^{-1}x$	$[-1,1]$	$\frac{-\pi}{2}, \frac{\pi}{2}$
$y = \cos^{-1}x$	$[-1,1]$	$[0,\pi]$
$y = \operatorname{cosec}^{-1}x$	$\mathbf{R} - (-1,1)$	$\frac{-\pi}{2}, \frac{\pi}{2} - \{0\}$
$y = \sec^{-1}x$	$\mathbf{R} - (-1,1)$	$[0,\pi] - \frac{\pi}{2}$
$y = \tan^{-1}x$	\mathbf{R}	$\frac{-\pi}{2}, \frac{\pi}{2}$
$y = \cot^{-1}x$	\mathbf{R}	$(0,\pi)$

The Definition of Inverse trig functions can be seen as the following formulas. Each is the inverse of their respective trigonometric function. Also, each inverse trig function also has a unique domain and range that make them one-to-one functions.

- Inverse Sine function= arcsinx
- Inverse Cosine Function= arccosx