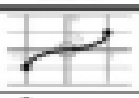
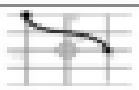
Inverse Trigonometric Functions

Inverse trigonometric functions use the ratio of sides from the triangle to find an angle of the triangle. The inverse tan of 1 (or arctan 1) is:

$$\arctan 1 = \tan^{-1} 1 = 45^\circ = \tfrac{\pi}{4}$$

Be careful! While $\sin^2 x$ is defined as $(\sin x)^2$, $\sin^{-1} x$ is not the same thing as $(\sin x)^{-1} = \frac{1}{\sin x} = \csc x$. The "−1" in "$\sin^{-1} x$" is not an exponent (even though it looks like one). It's the symbol for an inverse function, as it is in "$f^{-1}(x)$". Any trig symbol with a "−1" is an inverse trig function, and it will give an angle as its final value.

FUNCTION	GRAPH	DOMAIN (x)	RANGE (θ)	
arcsine $y = \arcsin x = \sin^{-1} x$		$[-1, 1]$	$[-\frac{\pi}{2}, \frac{\pi}{2}]$	
arccosine $y = \arccos x = \cos^{-1} x$		$[-1, 1]$	$[0, \pi]$	
arctangent $y = \arctan x = \tan^{-1} x$		$(-\infty, \infty)$	$(-\frac{\pi}{2}, \frac{\pi}{2})$	
arccosecant $y = \operatorname{arccsc} x = \csc^{-1} x$		$(-\infty, -1]$ $\cup [1, \infty)$	$[-\frac{\pi}{2}, 0)$ $\cup (0, \frac{\pi}{2}]$	
arcsecant $y = \operatorname{arcsec} x = \sec^{-1} x$		$(-\infty, -1]$ $\cup [1, \infty)$	$[0, \frac{\pi}{2}) \cup$ $(\frac{\pi}{2}, \pi]$	
arccotangent $y = \operatorname{arccot} x = \cot^{-1} x$		$(-\infty, \infty)$	$(0, \pi)$	

To evaluate $\sec^{-1} x$, $\csc^{-1} x$, and $\cot^{-1} x$ on a calculator, first invert x. The easiest way to do this is to type [1] [÷] x. Then use the inverse function that is the reciprocal of the one in the question: sin for csc, cos for sec, and tan for cot.

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