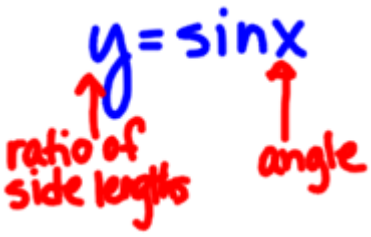
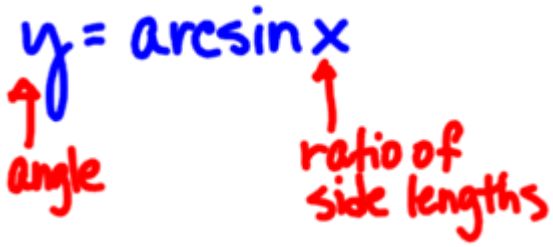
1.13 Inverse Trig Functions

Inverse of Trig Functions: None of the six basic trig functions is one-to-one. However, if the domain is restricted, the new function does have an inverse.

If $f(x) = \sin x$ then $f^{-1}(x) = \sin^{-1} x$ *or* $\arcsin x$

Inverse Trig Functions		
Function	Domain	Range
$y = \cos^{-1} x$	$-1 \le x \le 1$	$0 \le y \le \pi$
$y = \sin^{-1} x$	$-1 \le x \le 1$	$-\frac{\pi}{2} \le y \le \frac{\pi}{2}$
$y = \tan^{-1} x$	$-\infty < x < \infty$	$-\frac{\pi}{2} < y < \frac{\pi}{2}$
$y = \sec^{-1} x$	$\lvert x \rvert \ge 1$	$0 \le y \le \pi, \quad y \ne \frac{\pi}{2}$
$y = \csc^{-1} x$	$\lvert x \rvert \ge 1$	$-\frac{\pi}{2} \le y \le \frac{\pi}{2}, y \ne 0$
$y = \cot^{-1} x$	$-\infty < x < \infty$	$0 \le y \le \pi$

Examples:

1. $\sin^{-1}\frac{\sqrt{3}}{2} = \frac{\pi}{3}$	2. $\tan^{-1} -1 = -\frac{\pi}{4}$
3. $\cos^{-1} 0 = \frac{\pi}{2}$	4. $\sin^{-1}(\sin\frac{3\pi}{4}) = \frac{\pi}{4}$

Trig Identities you MUST KNOW!

$\sin\theta = \frac{opposite}{hypotentuse} = \frac{1}{\csc\theta}$	$\cos\theta = \frac{adjacent}{hypotentuse} = \frac{1}{\sec\theta}$	$\tan\theta = \frac{opposite}{adjacent} = \frac{\sin\theta}{\cos\theta} = \frac{1}{\cot\theta}$
$\csc\theta = \frac{hyp}{opp} = \frac{1}{\sin\theta}$	$\sec\theta = \frac{hyp}{adj} = \frac{1}{\cos\theta}$	$\cot\theta = \frac{adj}{opp} = \frac{\cos\theta}{\sin\theta} = \frac{1}{\tan\theta}$
$\sin^2\theta = (\sin\theta)^2$	$\sin^2\theta + \cos^2\theta = 1$	
$1 + \cot^2\theta = \csc^2\theta$	$\tan^2\theta + 1 = \sec^2\theta$	