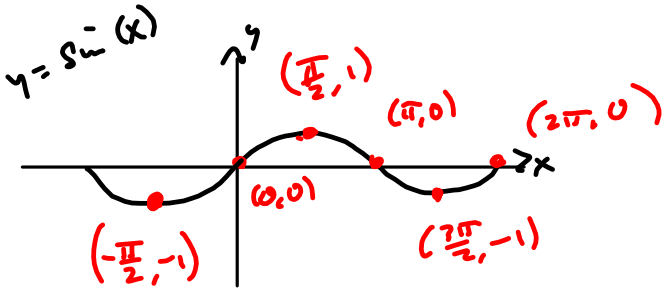
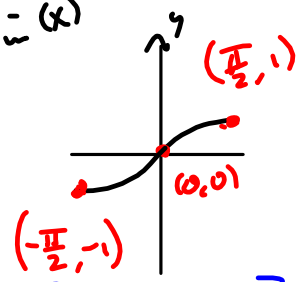


inverse with respect to function composition, not multiplication

unfortunate abuse of notation

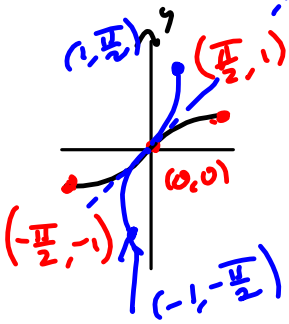
To talk about $\arcsin(x) = \sin^{-1}(x)$ we need to restrict sine to keep things 1-to-1.

Restricted to be 1-to-1



$D = [-\frac{\pi}{2}, \frac{\pi}{2}]$

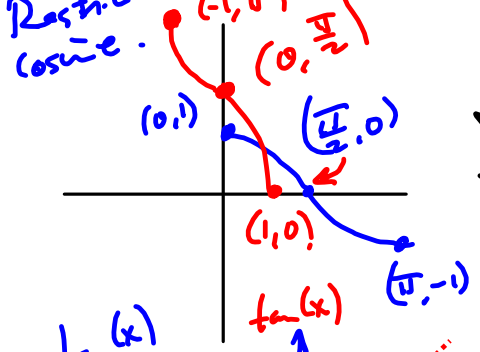
$R = [-1, 1]$



$D(\arcsin(x)) = D(\sin^{-1}(x)) = [-1, 1]$

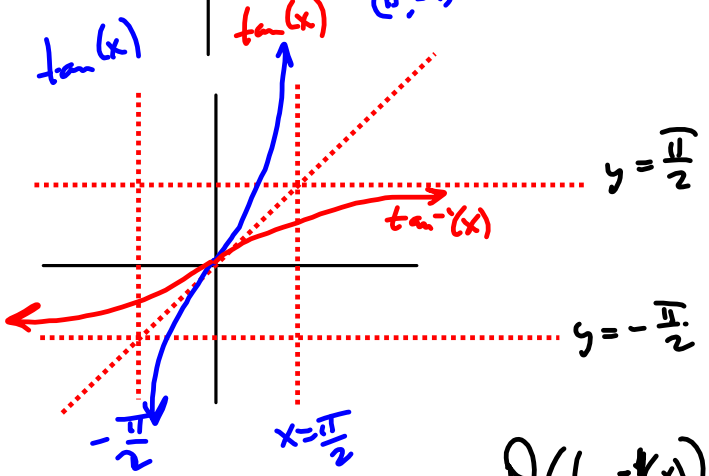
$R(\arcsin(x)) = [-\frac{\pi}{2}, \frac{\pi}{2}]$

Restricted cosine.



$D(\arccos(x)) = [-1, 1]$

$R(\arccos(x)) = [0, \pi]$



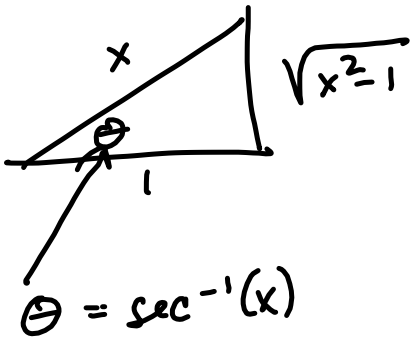
$\frac{d}{dx} \tan x = \sec^2 x$

$\lim_{x \to 0} \sec^2 x = 1$ so slope of tangent as $x \to 0$ is $m = 1$

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

$R(\tan^{-1}(x)) = (-\frac{\pi}{2}, \frac{\pi}{2})$

$\tan(\sec^{-1}(x)) = \tan\theta = \sqrt{x^2-1}$



$\sec\theta = x$, i.e., $\cos\theta = \frac{1}{x}$