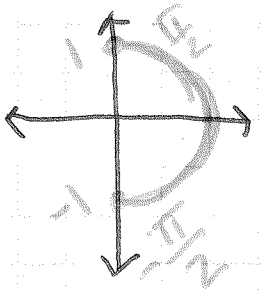
4.6 Inverse Functions

Inverse Functions: one-to-one.

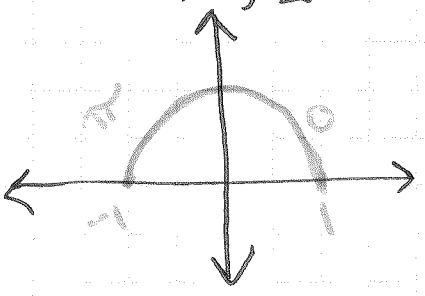
every x has exactly one y, and
every y has exactly one x

$\sin(x)$, $\cos(x)$, $\tan(x)$ not one-to-one,
We can restrict the domain, so the
inverse is a function.

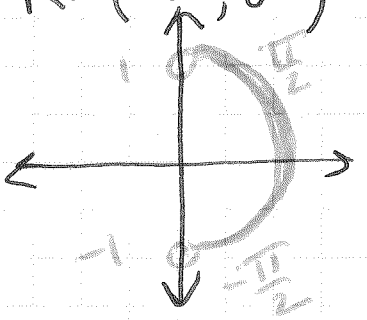
	$\sin(x)$	$\cos(x)$	$\tan(x)$
(R')	D: $[-\frac{\pi}{2}, \frac{\pi}{2}]$	D: $[0, \pi]$	D: $(-\frac{\pi}{2}, \frac{\pi}{2})$
(D')	R: $[-1, 1]$	R: $[-1, 1]$	R: $(-\infty, \infty)$



y-values



x-values



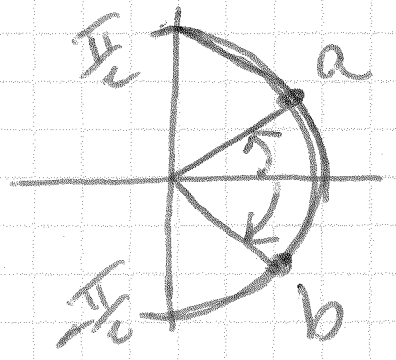
$\frac{y}{x}$-values

	$\sin^{-1}(x)$	$\cos^{-1}(x)$	$\tan^{-1}(x)$
same	$\arcsin(x)$	$\arccos(x)$	$\arctan(x)$

Find Exact Values (π, $\sqrt{}$, etc.)

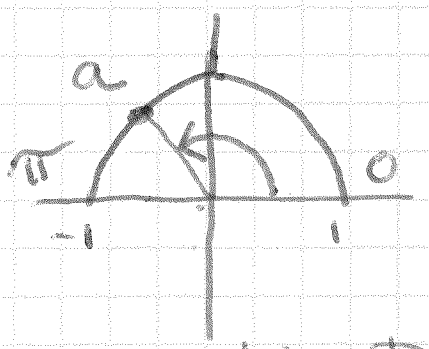
Ex 1

a. $\sin^{-1}\left(\frac{1}{2}\right) = \frac{\pi}{6}$ ← y value



b. $\arcsin\left(\frac{-\sqrt{2}}{2}\right) = \frac{-\pi}{4}$

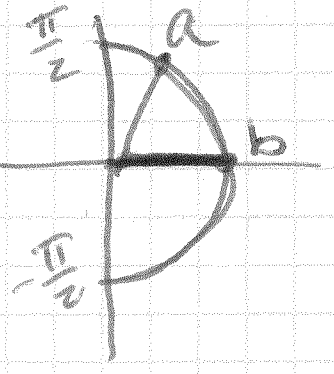
Ex 2 a) $\cos^{-1}\left(\frac{-\sqrt{2}}{2}\right) = \frac{3\pi}{4}$



b) $\arccos(-2)$

Does not exist, not in Domain

Ex 3 a) $\tan^{-1}(\sqrt{3}) = \frac{\pi}{3}$



b) $\arctan 0 = 0$

$\frac{y}{x}$ value angle

HW: 288: 1-15 all