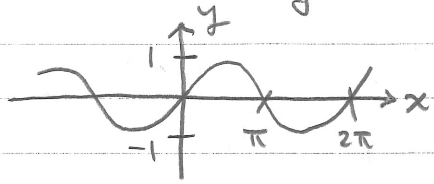
SUMMARY OF INVERSE TRIG FUNCTIONS

$f(x) = \sin^{-1}(x)$ or $\arcsin(x)$.

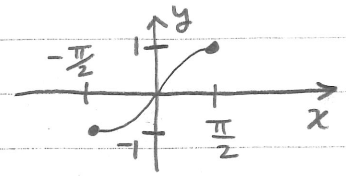
Definition

1 start with $y = \sin x$



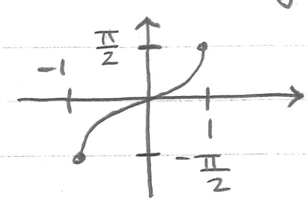
$y = \sin(x)$

2 restrict domain



$y = \sin(x),\ -\frac{\pi}{2} \le x \le \frac{\pi}{2}$

3 reflect about $y = x$



$y = \sin^{-1}(x)$.

$\therefore\ f(x) = \sin^{-1}(x)$

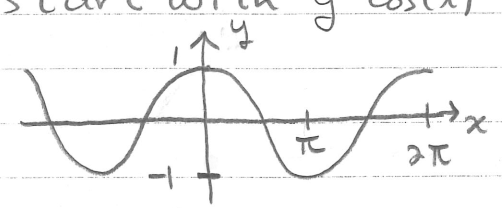
$= \text{angle } y \text{ in } [-\frac{\pi}{2}, \frac{\pi}{2}] \text{ such that } \sin(y) = x$

$$\frac{d}{dx}\left[\sin^{-1}(x)\right] = \frac{1}{\sqrt{1-x^2}}, \quad -1 < x < 1$$

$f(x) = \cos^{-1}(x)$ or $\arccos(x)$.

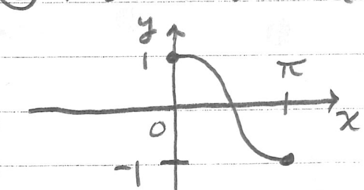
Definition:

1 start with $y = \cos(x)$



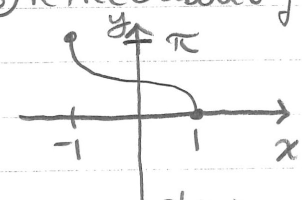
$y = \cos(x)$

2 restrict domain



$y = \cos(x),\ 0 \le x \le \pi$

3 reflect about $y = x$



$y = \cos^{-1}(x)$

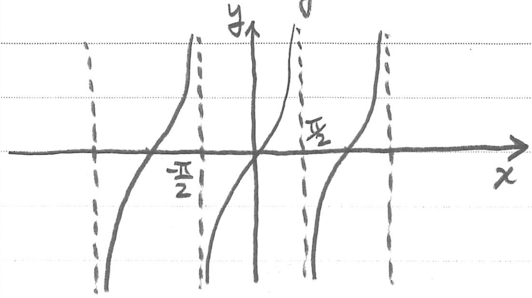
$\therefore\ f(x) = \cos^{-1}(x) = \text{angle } y \text{ in } [0, \pi] \text{ such that } \cos(y) = x$

$$\frac{d}{dx}\left[\cos^{-1}(x)\right] = \frac{-1}{\sqrt{1-x^2}}, \quad -1 < x < 1.$$

$f(x) = \tan^{-1}(x)$ or $\arctan(x)$

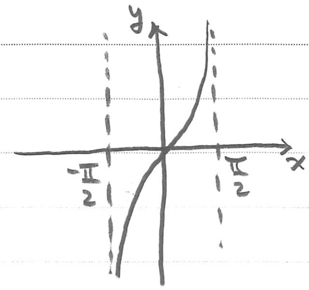
Definition:

1. start with $y = \tan(x)$

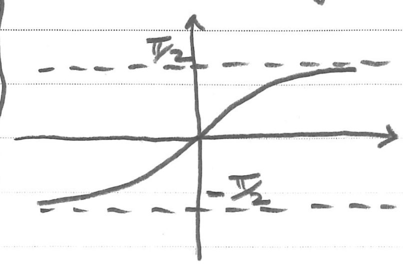


$y = \tan(x)$

2. restrict domain



3. reflect about $y = x$



$y = \tan^{-1}(x)$

$\therefore$ $f(x) = \tan^{-1}(x) =$ angle y in $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$ such that $\tan(y) = x$

$$\frac{d}{dx}\left[\tan^{-1}(x)\right] = \frac{1}{1+x^2}$$