August 27, 2025

Banana Lovers Day

Today in History:

The Battle of Brooklyn (1776)

Krakatoa erupts (1883)

Number of the Day: 676

676 = 2 x 2 x 13 x 13

676 is the smallest palindromic square whose square root is not palindromic.

Fun Fact:

You can hear a blue whale's heartbeat from more than 2 miles away.

Quote of the Day:

"Be thankful we're not getting all the government we're paying for."

- Will Rogers

Today's Weather:

Sunny, high near 72^{o}

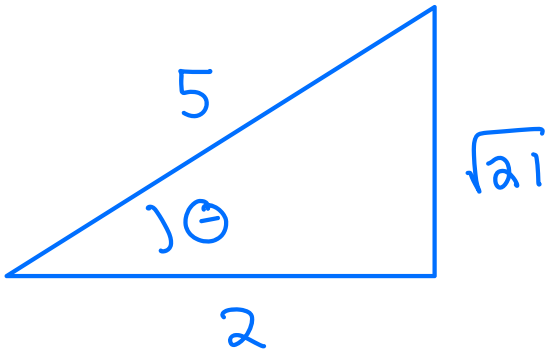
Math 121

Quiz #2

If $\cos\theta = \frac{2}{5}$ and $0 < \theta < \frac{\pi}{2}$, find:

$\sin\theta = \frac{\sqrt{21}}{5}$

$\tan\theta = \frac{\sqrt{21}}{2}$



INVERSE FUNCTIONS

IF $f(x)$ AND $g(x)$ ARE INVERSE FUNCTIONS

$$f(g(x)) = x$$

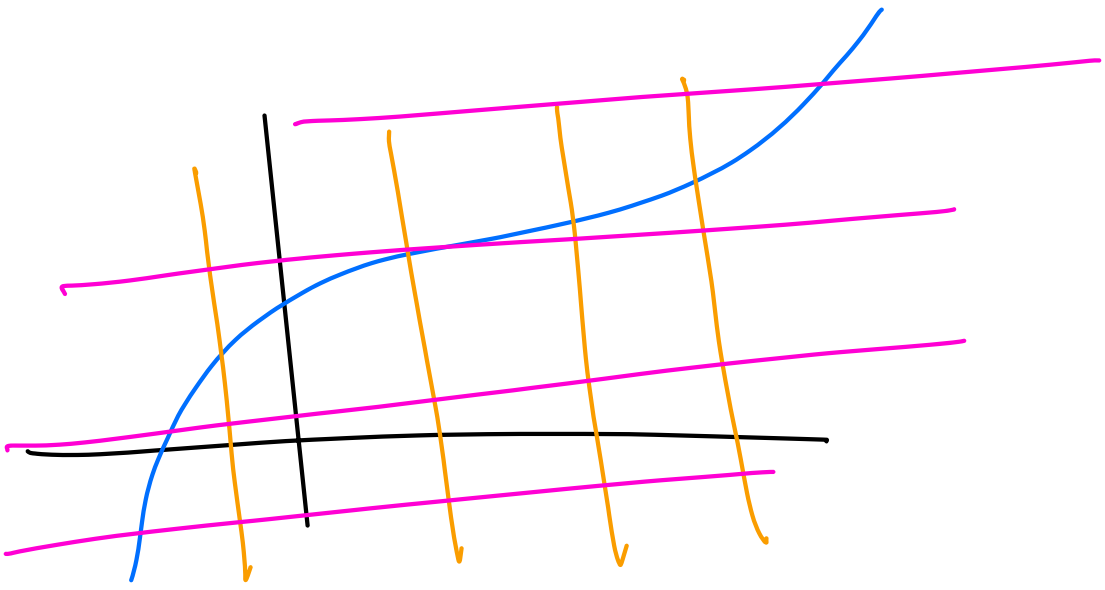
$$g(f(x)) = x$$

$$g(x) = f^{-1}(x)$$

FUNCTION MUST BE

1 - TO - 1

$$f(a) = f(b) \iff a = b$$



FINDING INVERSES

EXAMPLE 1 $f(x) = 3x + 2$

$y = 3x + 2$

$x = 3y + 2$

$x - 2 = 3y$

$y = \frac{x-2}{3}$

$f^{-1}(x) = \frac{x-2}{3}$

EXAMPLE 2 $f(x) = \frac{1}{x+1}$

$y = \frac{1}{x+1}$

$x = \frac{1}{y+1}$

$x(y+1) = 1$

$xy + x = 1$

$xy = 1 - x$

$y = \frac{1-x}{x}$

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

EXAMPLE 3 $f(x) = \frac{x+2}{5x-3}$

$y = \frac{x+2}{5x-3}$

$x = \frac{y+2}{5y-3}$

$x(5y-3) = y+2$

$5xy - 3x = y+2$

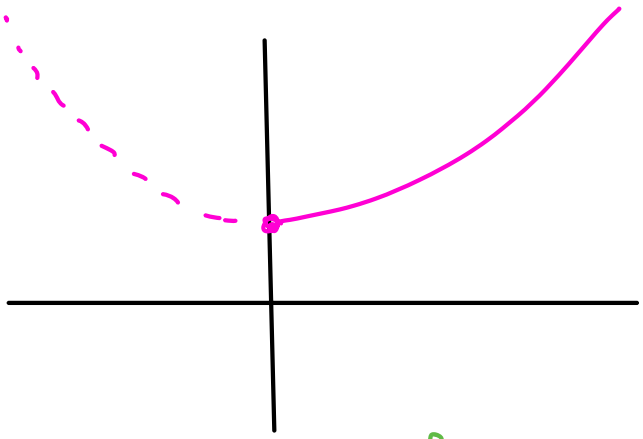
$5xy - y = 3x+2$

$y(5x-1) = 3x+2$

$y = \frac{3x+2}{5x-1}$

$f^{-1}(x) = \frac{3x+2}{5x-1}$

EXAMPLE 4 $f(x) = x^2 + 4$



$x \geq 0$

$y = x^2 + 4$

$x = y^2 + 4$

$y^2 = x - 4$

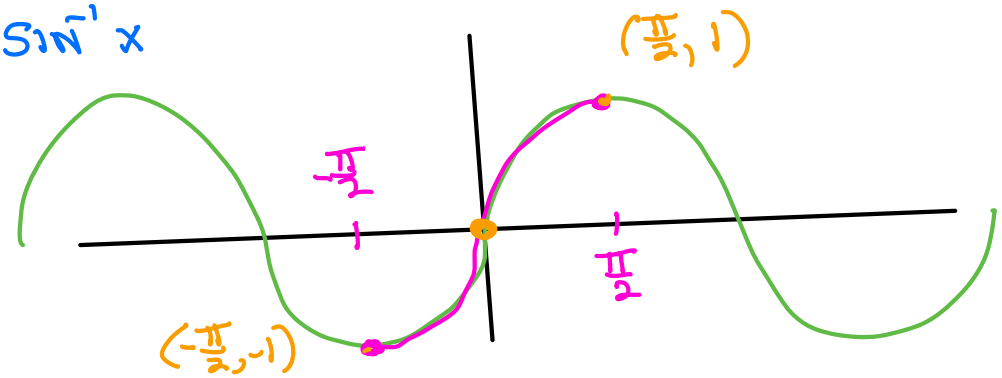
$y = \pm\sqrt{x-4}$

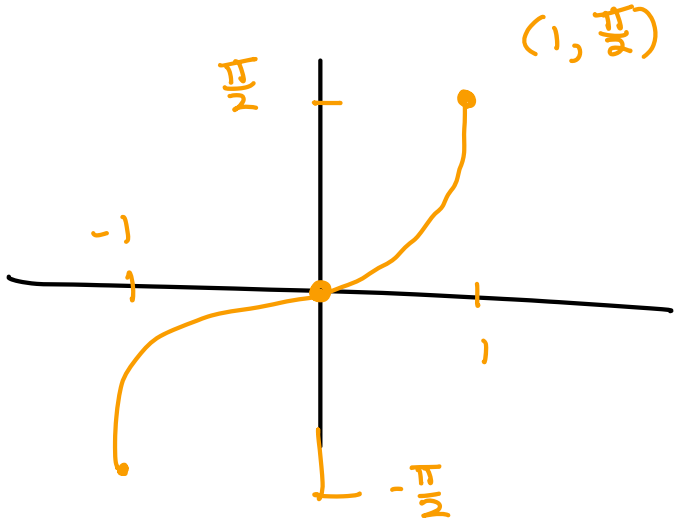
$f^{-1}(x) = \sqrt{x-4}$

TRIG INVERSES

→ ARCSINX (INVERSE OF SINX)

$\sin^{-1} x$



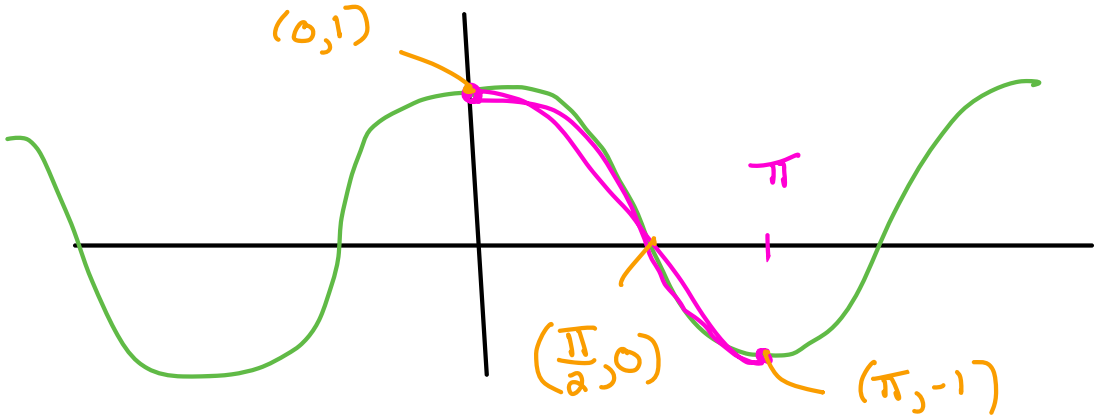


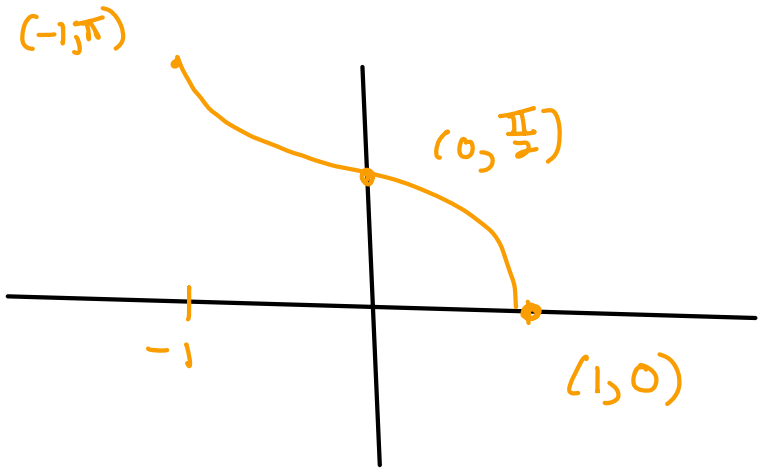
$\sin(\arcsin x) = x$

$\arcsin(\sin x) = x$

$\arccos x$ (INVERSE OF COSINE)

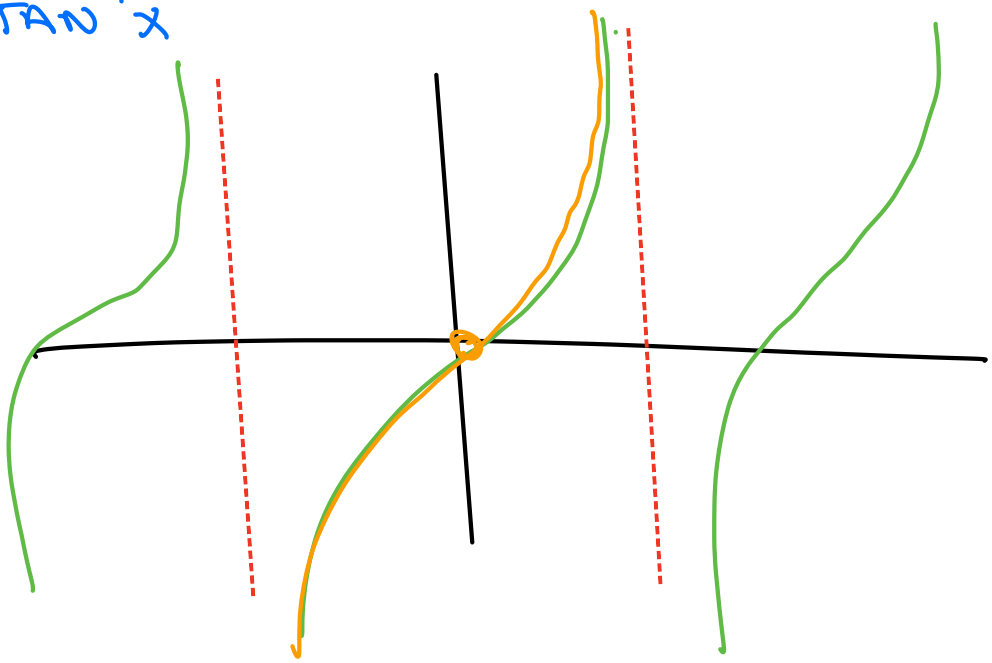
$\cos^{-1} x$

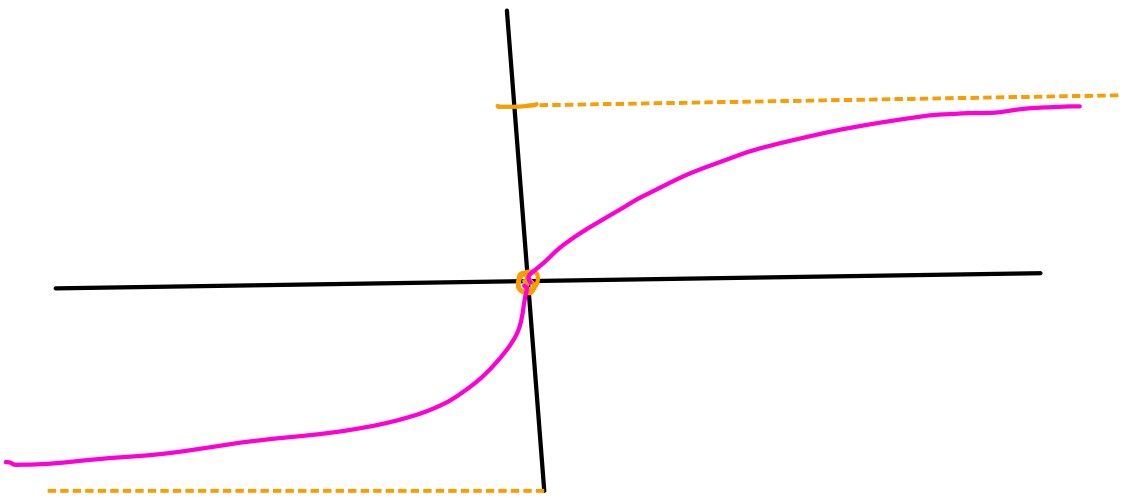




ARCTANX INVERSE OF TAN

$TAN^{-1}X$



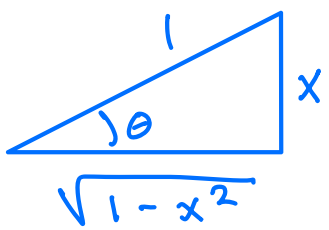


θ

$\cos(\underline{\text{ARC SIN}x}) = \cos(\theta) = \sqrt{1-x^2}$

$\sin(\theta = \text{ARCSIN}x)$

$\sin\theta = \frac{x}{1}$



HYPERBOLIC TRIG FUNCTIONS

$$\sinh x = \frac{e^x - e^{-x}}{2}$$

$$\cosh x = \frac{e^x + e^{-x}}{2}$$

$$\cosh^2 x - \sinh^2 x = 1$$

$$\tanh x = \frac{\sinh x}{\cosh x} \qquad \operatorname{sech} x = \frac{1}{\cosh x}$$

$$\coth x = \frac{\cosh x}{\sinh x} \qquad \operatorname{csch} x = \frac{1}{\sinh x}$$