August 26, 2026

National Dog Day

Today in History:

19th Amendment adopted (1920)

Number of the Day: 966

966 = 2 x 3 x 7 x 23

966 is the largest number that is 46 times the sum of its digits

Fun Fact:

It took Leonardo DaVinci 10 years to paint the Mona Lisa.

Quote of the Day:

"If you can dream it, you can do it."

-Walt Disney

Today's Weather:

Partly cloudy, high 80°.

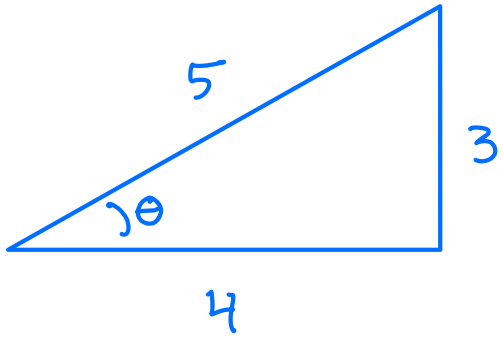
Math 121

Quiz #2

If $\sin\theta = \frac{3}{5}$ and $\pi/2 < \theta < \pi$, find:

$\cos\theta = -\frac{4}{5}$

$\tan\theta = -\frac{3}{4}$



INVERSE FUNCTIONS

IF $f(x)$ & $g(x)$ ARE INVERSE FUNCTIONS THEN

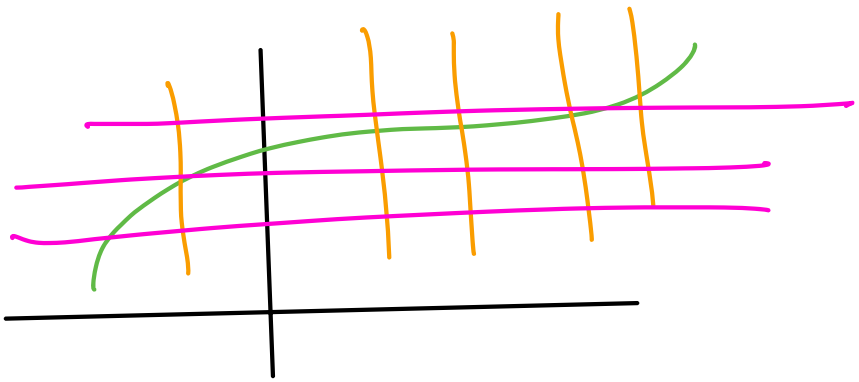
$$f(g(x)) = x$$
$$g(f(x)) = x$$

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

MUST BE ONE-TO-ONE

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

DOMAIN $f(x)$ = RANGE $f^{-1}(x)$



FINDING INVERSES

EXAMPLE:

$f(x) = 3x + 2$

$y = 3x + 2$

$x = 3y + 2$

$3y = x - 2$

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

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

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

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

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

$x(y+1) = 1$

$xy + x = 1$

$xy = 1 - x$

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

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

EXAMPLE 3

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

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

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

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

$5xy - 3x = y+2$

$5xy - y = 3x+2$

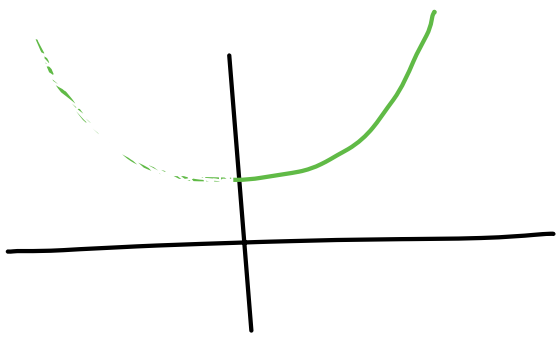
$y(5x-1) = 3x+2$

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

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

EXAMPLE 4

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



$x \geq 0$

$y = x^2 + 4$

$x = y^2 + 4$

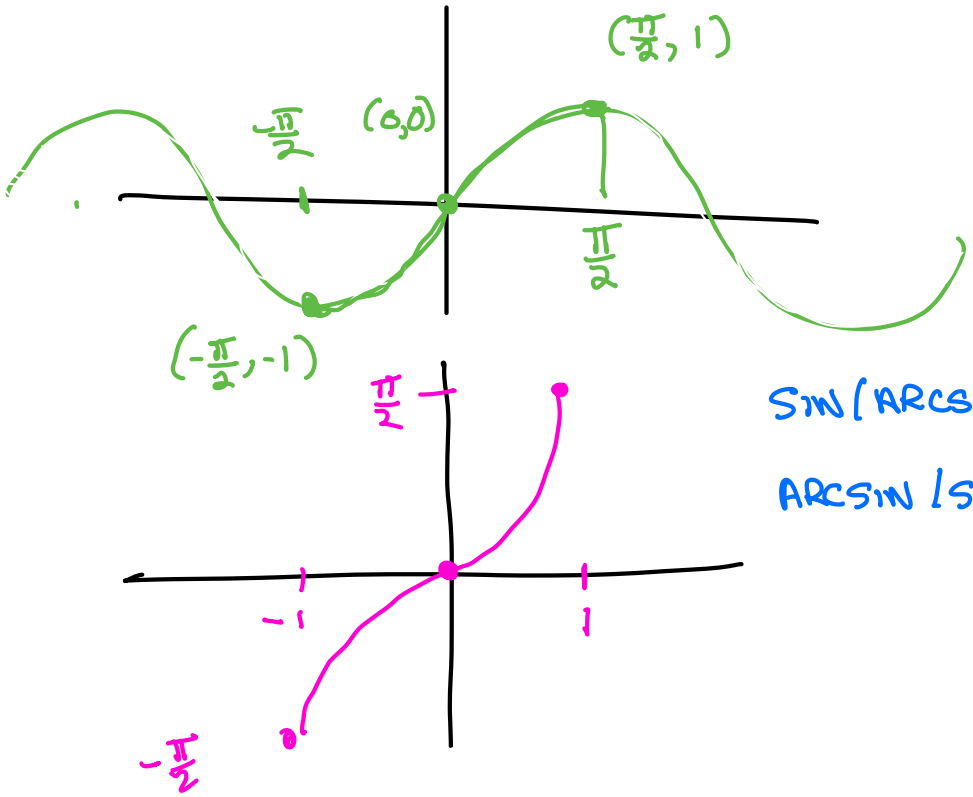
$y^2 = x - 4$

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

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

TRIG INVERSES

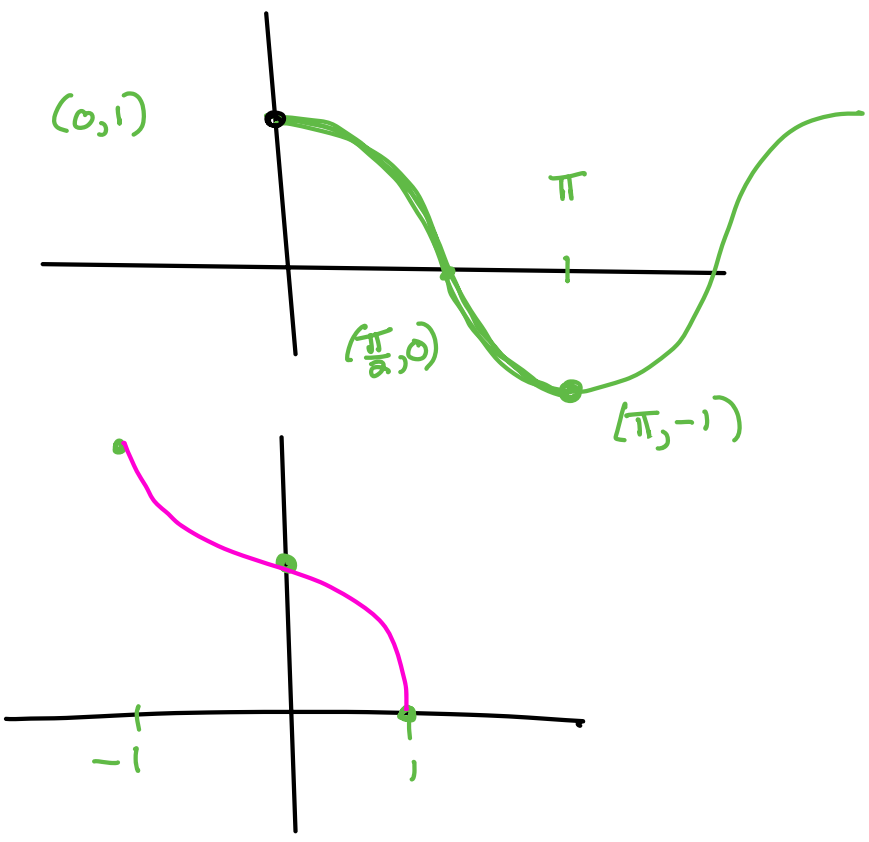
① $f(x) = \text{ARCSIN}\, x \quad (\sin^{-1} x)$



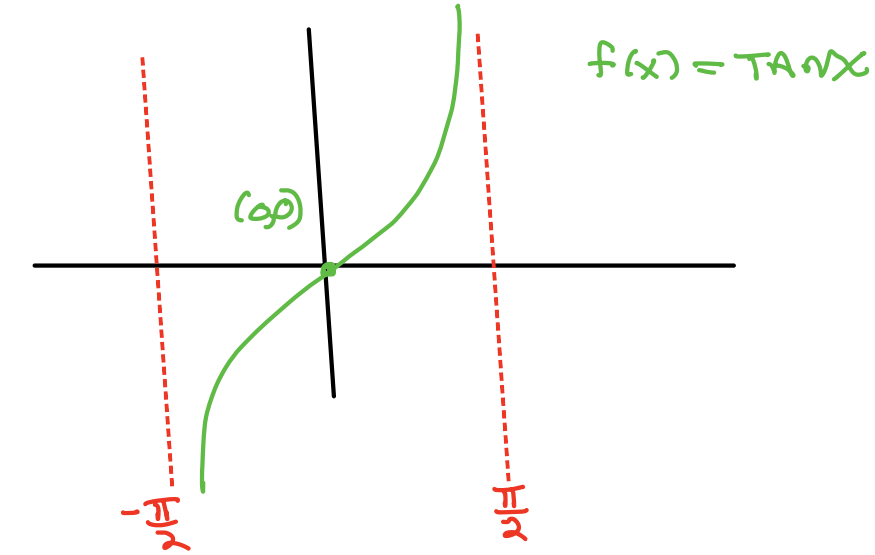
$\sin(\text{ARCSIN}\, x) = x$

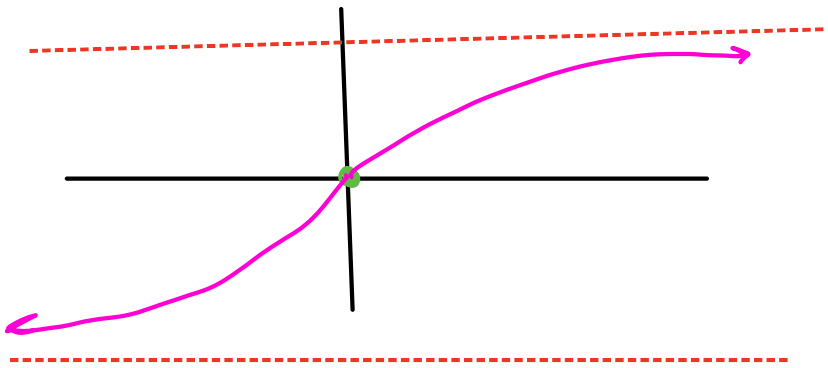
$\text{ARCSIN}(\sin x) = x$

② $f(x) = \text{ARCCOS}\, x$



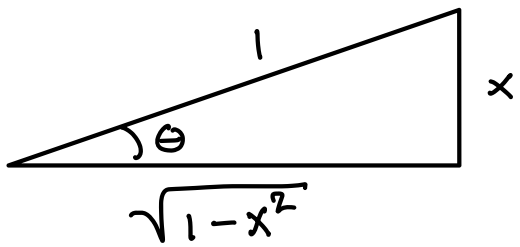
③ $f(x) = \text{ARCTAN}\,x$





$$\cos\left(\underbrace{\text{ARCSIN}\,x}_{\theta}\right) = \cos(\theta) = \sqrt{1-x^2}$$

$$\theta = \text{ARCSIN}\,x \iff \sin\theta = \frac{x}{1}$$



EXPONETIALS / LOGS

$f(x) = b^x$

RULES $b^0 = 1$

$b^x b^y = b^{x+y}$

$\frac{b^x}{b^y} = b^{x-y}$

$(b^x)^y = b^{xy}$

$f(x) = e^x$

$\log_b(b^x) = x$

$b^{\log_b x} = x$

$y = \log_b x$ $\quad b^y = x$

$\log_b 1 = 0$

$\log_b b = 1$

$\log_b(xy) = \log_b x + \log_b y$

$\log_b\left(\frac{x}{y}\right) = \log_b x - \log_b y$

$\log_b(x^y) = y \log_b x$

HYPERBOLIC TRIG FUNCTIONS

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

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

$$\sin^2 x + \cos^2 x = 1$$

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

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

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