INVERSE TRIG FUNCTIONS

$y = x^3 + 4$

$x = y^3 + 4$

$\sqrt[3]{x-4} = \sqrt[3]{y^3}$

$\sqrt[3]{x-4} = y$

$y = \sin\theta$

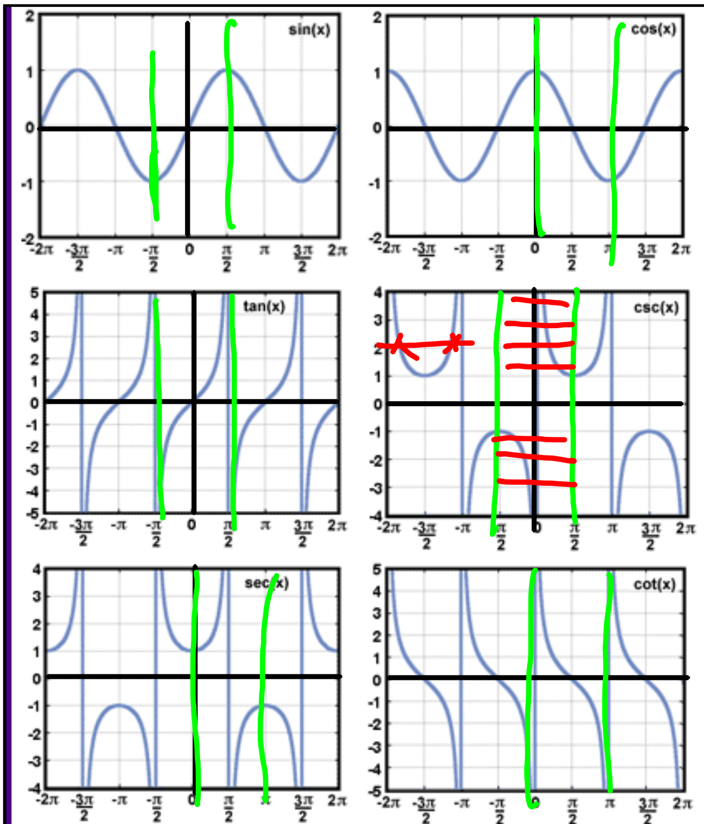
$\theta = \sin^{-1} y$

$\theta = \text{Arcsin } y$

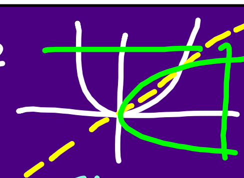
$\frac{1}{2} = \sin\frac{\pi}{6}$

$\frac{\pi}{6} = \sin^{-1} \frac{1}{2}$

Inverse Trig functions represent angles!



$y = x^2$



Cody Sells Cocaine

$\cos^{-1} x$
$\sec^{-1} x$
$\cot^{-1} x$

$\pi/2$

All + at

π 0

$\csc^{-1} x$
$\sin^{-1} x$
$\tan^{-1} x$

Crazy Sexy time

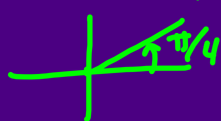
$-\frac{\pi}{2}$

Answers are angles - always in radians!

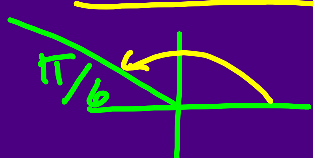
$\cos^{-1}x$, $\sec^{-1}x$, $\cot^{-1}x$: $-$ | All $+$

$\csc^{-1}x$, $\sin^{-1}x$, $\tan^{-1}x$: $-$

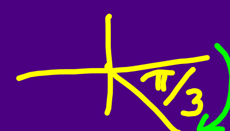
$\cos^{-1}\left(\frac{\sqrt{2}}{2}\right) = \boxed{\frac{\pi}{4}}$



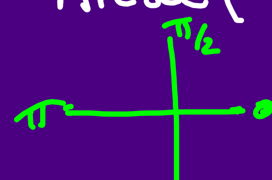
$\underline{\cot^{-1}(-\sqrt{3})} = \frac{5\pi}{6}$



$\text{Arcsin}\left(-\frac{\sqrt{3}}{2}\right) = -\frac{\pi}{3}$



$\text{Arcsec}(-1) = \pi$

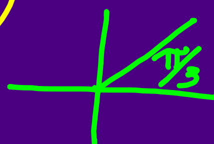


$\cos\left(\tan^{-1}\sqrt{3}\right)$

$\cos(\theta)$

$\cos\frac{\pi}{3}$

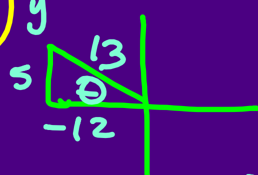
$=\frac{1}{2}$



$\sin\left(\text{Arccot}\,-\frac{12}{5}\right)$ $\frac{x}{y}$

$\sin(\theta)$

$\frac{y}{r}=\frac{5}{13}$



$25+144=r^2$

$169=r^2$

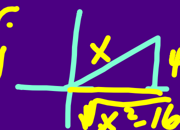
$13=r$

$\sec\left(\text{Arccsc}\,\frac{x}{4}\right)$ $\frac{r}{y}$

$=\sec(\theta)$

$=\frac{r}{x}$

$=\boxed{\frac{x}{\sqrt{x^2-16}}}$



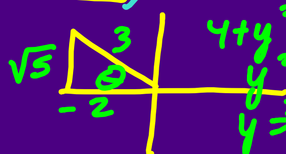
$a^2+16=x^2$

$\sqrt{a^2}=\sqrt{x^2-16}$

February 27, 2023

$\sin\left(2\,\text{Arccos}\left(-\frac{2}{3}\right)\right)$ $\frac{x}{r}$

$\sin(2\theta)$



$4+y^2=9$

$y^2=5$

$y=\pm\sqrt{5}$

$= 2\sin\theta\cos\theta$ (y/r, x/r)

$= 2\left(\frac{\sqrt{5}}{3}\right)\left(\frac{-2}{3}\right)$

$= \frac{-4\sqrt{5}}{9}$

$\cos\left(\text{Arctan}\left(\frac{1}{3}\right) - \text{Arcsec}\left(-\frac{5}{4}\right)\right)$ $\frac{y}{x}$, $\frac{r}{x}$

$\cos(A - B)$

$9+1=r^2$

$\sqrt{10}=\sqrt{r^2}$

$\cos A\cos B + \sin A\sin B$ ($\frac{x}{r}$, y/r)

$\left(\frac{3}{\sqrt{10}}\right)\left(\frac{-4}{5}\right)+\left(\frac{1}{\sqrt{10}}\right)\left(\frac{3}{5}\right)$

$\frac{-12}{5\sqrt{10}} + \frac{3}{5\sqrt{10}}$

$= -\frac{9}{5\sqrt{10}}\cdot\frac{\sqrt{10}}{\sqrt{10}} = -\frac{9\sqrt{10}}{50}$

INVERSE TRIG EQUATIONS ← Has = sign

1) Isolate Trig func.
2) Switch variables using an inverse.
3) Check if needed

Solve for x.

$$y = 3\sin\left(\frac{2}{3}x\right) - 4$$

$$\frac{y+4}{3} = \sin\left(\frac{2}{3}x\right)$$

$$\cancel{\frac{3}{2}}\cdot\cancel{\frac{2}{3}}x = \frac{3}{2}\sin^{-1}\left(\frac{y+4}{3}\right)$$

$$x = \frac{3}{2}\sin^{-1}\left(\frac{y+4}{3}\right)$$

$$3\pi + 4\tan^{-1}y = 2\pi$$
$$-3\pi \qquad\qquad -3\pi$$

$$4\tan^{-1}y = -\pi$$

$$\tan^{-1}y = \frac{-\pi}{4}$$

Stop
Check Limited Quads

$\pi/4$

$$\tan\left(\frac{-\pi}{4}\right) = y$$

$$\boxed{-1 = y}$$

$$\csc^{-1}y = \frac{2\pi}{3}$$

No sol.

$2\pi/3$