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Inverse Trig Functions

$y = x^3 + 4$

$x = y^3 + 4$

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

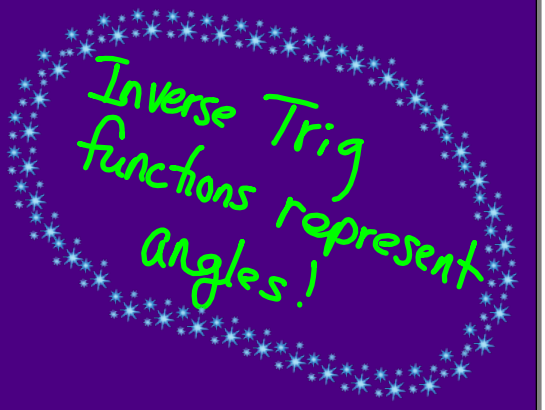
$\sqrt[3]{x-4} = f^{-1}$

$y = \sin\theta$

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

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

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



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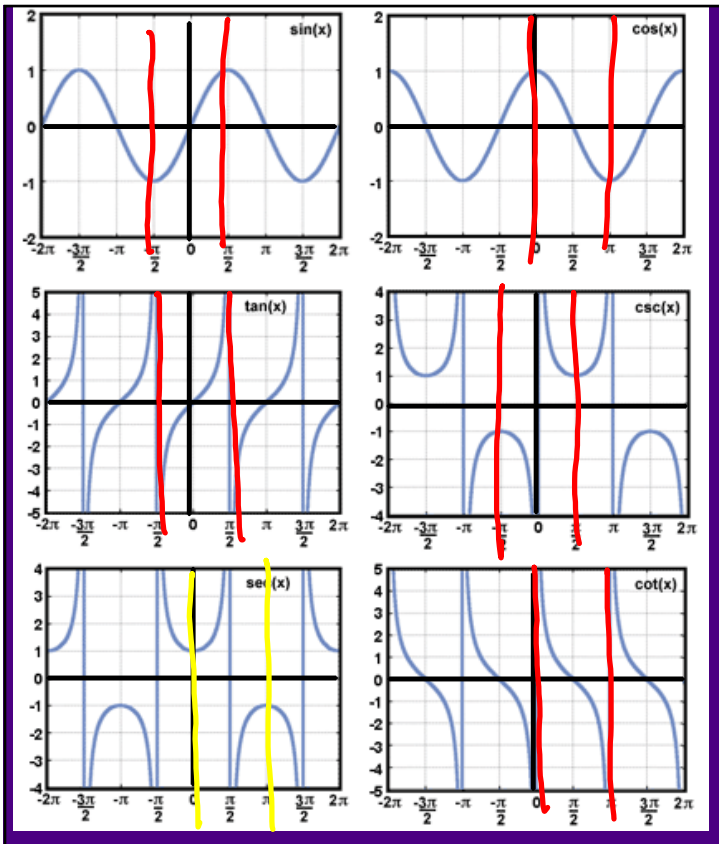

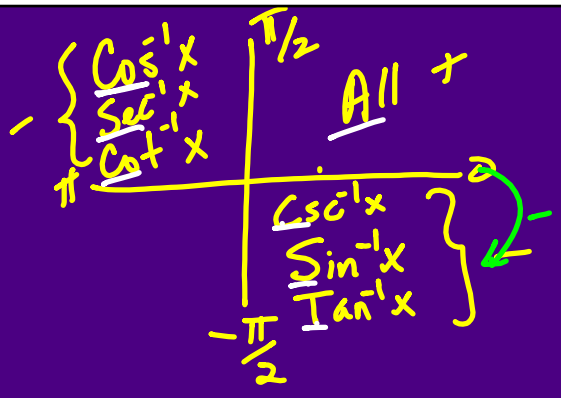

$\cos^{-1}\left(-\frac{1}{2}\right) = 120°$

$\sin^{-1}\left(-\frac{1}{2}\right) = -30°$

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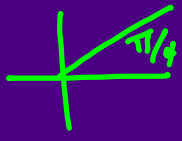
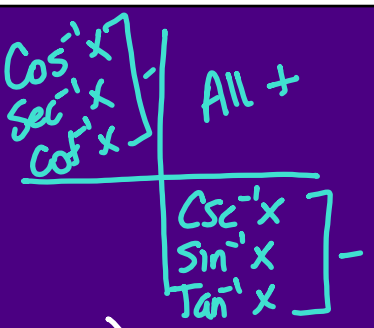
Answers are angles - always in radians!

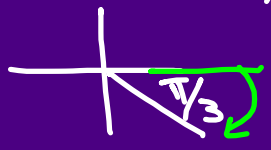
$\cos^{-1}\left(\frac{\sqrt{2}}{2}\right) = \frac{\pi}{4}$



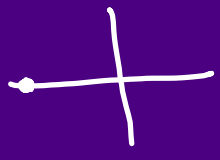
$\cot^{-1}(-\sqrt{3}) = \frac{5\pi}{6}$



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



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



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

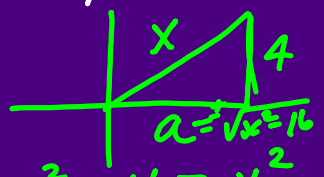
$\cos\theta$

$\cos\frac{\pi}{3} = \frac{1}{2}$

$\operatorname{Sec}\left(\operatorname{Arccsc}\frac{x}{4}\right)\frac{r}{y}$

$\sec\theta = \frac{r}{x}$

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



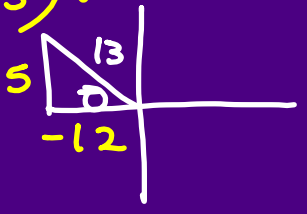
$a^2 + 16 = x^2$

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

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

$\sin(\theta)$

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



$25 + 144 = r^2$

$169 = r^2$

$13 = r$

$\operatorname{Cot}\left(\operatorname{Sec}^{-1}\left(\frac{7}{2}\right)\right)\frac{r}{x}$

$\operatorname{Cot}(\theta)$

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

$= \frac{-2\sqrt{5}}{15}$

$y^2 + 4 = 49$

$\sqrt{y^2} = \sqrt{45}$

$y = 3\sqrt{5}$

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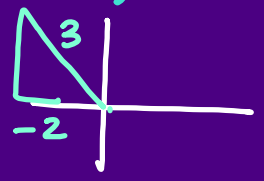
$\sin\left(2\,\text{Arccos}\left(\frac{-2}{3}\right)\right)$ $\frac{x}{r}$

$\sin(2\theta)$

$= 2\sin\theta\cos\theta$ ($\frac{y}{r}$, $\frac{x}{r}$)

$= \frac{2}{1}\left(\frac{\sqrt{5}}{3}\right)\left(\frac{-2}{3}\right)$

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

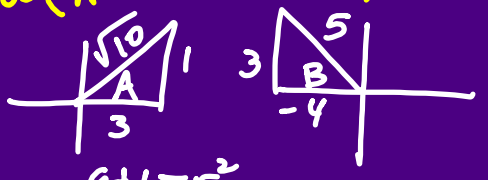


$y^2 + 4 = 9$

$\sqrt{y^2} = \pm\sqrt{5}$

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

$\cos(A - B)$



$9 + 1 = r^2$

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

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

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

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

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Inverse Trig Equations ← Has = sign

Solve for x.

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

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

$3\pi + 4\operatorname{Tan}^{-1} y = 2\pi$

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