$$\sin^2\theta = \frac{1-\cos(2\theta)}{2}$$

$$= (\sin\theta)^2$$

$$\sin^{-1}\left(\frac{\sqrt{3}}{2}\right) = 60^\circ = \frac{\pi}{3}$$

$$\sin^{-1}\frac{y}{r} = \left(\sin\frac{y}{r}\right)^{-1}$$ Noooo !

$\sin^{-1}\frac{y}{r}$ is "special."
It denotes the angle whose sine is $\frac{y}{r}$.

Ask a question

Solve $4\sin^2\theta - 3 = 0$

$$\sin^2\theta = \frac{3}{4}$$

$$\sin\theta = \pm\frac{\sqrt{3}}{2}$$

$$\sin\theta = \frac{\sqrt{3}}{2}$$

$$\sin^{-1}(\sin\theta) = \sin^{-1}\left(\frac{\sqrt{3}}{2}\right) = 60^\circ$$

Build a question

$$4\left(x-\frac{\sqrt{3}}{2}\right)\left(x+\frac{\sqrt{3}}{2}\right)$$

$$= (2x-\sqrt{3})(2x+\sqrt{3})$$

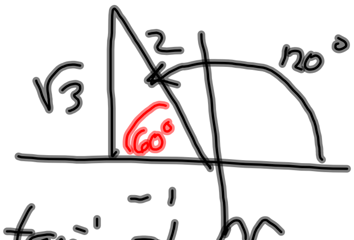
$$= 4x^2-3$$

only gives you the reference angle

The only "$\sin\theta = \frac{\sqrt{3}}{2}$" that $\sin^{-1}\left(\frac{y}{r}\right)$ sees.

Calculator gives the $60°$ ref. angle. <u>You</u> have to supply the other solution

There is an another.



I'd be in degrees mode for $\sin^{-1}$, $\cos^{-1}$, $\tan^{-1}$ stuff

Answers to $\sin\theta = \frac{\sqrt{3}}{2}$ are

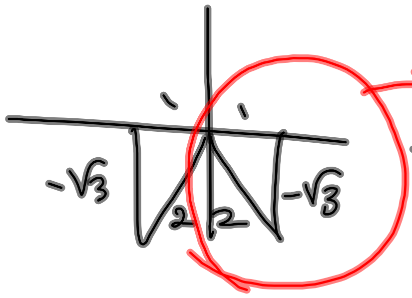
$60°$, $120°$

$\frac{\pi}{3}$, $\frac{2\pi}{3}$

That's half of the answer to $\sin\theta = \pm\frac{\sqrt{3}}{2}$

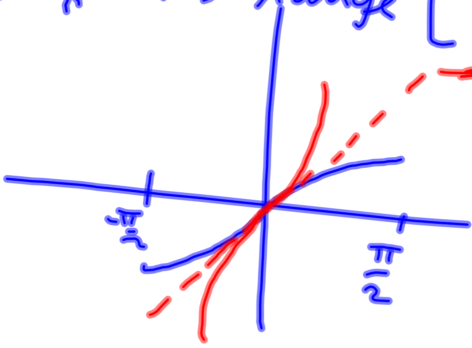
$\sin\theta = -\frac{\sqrt{3}}{2}$

$x^3 = 1$ has 3 roots



Calculator sees only this one.

$\sin^{-1} x$ has range $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$



Restrict sine so it's 1-to-1 so that $\sin^{-1}\left(\frac{y}{r}\right) = \arcsin\left(\frac{y}{r}\right)$ is a function, with one, unambiguous output.

cosine & inverse cosine.

Apr 14-9:01 AM