Finding Inverse Trig Values Exactly (Unless we are doing an application where we are trying to find the measure of an angle in degrees, it is expected that the output of an inverse trig function is in radians).

(a) $\cos^{-1}\left(\frac{1}{2}\right)=$ $\pi/3$

(b) $\sin^{-1}\left(-\frac{1}{2}\right)=$ $-\pi/6$

(c) $\cos^{-1}\left(\frac{-\sqrt{3}}{2}\right)=$ $5\pi/6$

(d) $\cos^{-1}(0)=$ $\pi/2$

(e) $\tan^{-1}(0)=$ 0

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

(g) $\cos^{-1}(2)=$ undefined

(h) $\tan^{-1}\left(\sqrt{3}\right)=$ $\pi/3$

(i) $\tan^{-1}(-1)=$ $-\pi/4$

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

Watch those restrictions!

We know $\left(f^{-1}\circ f\right)(x)=x$ for every x in the domain of f, and $\left(f\circ f^{-1}\right)(x)=x$ for every x in the domain of f^{-1}.

So why doesn't $\sin^{-1}(\sin(\frac{5\pi}{6}))=\frac{5\pi}{6}$? Sine inverse is only the inverse for $-\frac{\pi}{2}\le x\le\pi/2$
This would be $\pi/6$

Are $\sin\theta=\frac{1}{2}$ and $\theta=\sin^{-1}\left(\frac{1}{2}\right)$ equivalent? no. Only equivalent if $-\frac{\pi}{2}\le\theta\le\frac{\pi}{2}$

Since $\tan\left(\frac{7\pi}{4}\right)=-1$ then is $\tan^{-1}(-1)=\frac{7\pi}{4}$? no $\tan^{-1}(-1)=-\pi/4$

What quadrant is it implied that the terminal side of θ is in?

a) $\theta=\sin^{-1}\left(\frac{1}{3}\right)$ 1

b) $\theta=\cos^{-1}(-0.2)$ 2

c) $\theta=\tan^{-1}(7)$ 1

d) $\theta=\sin^{-1}(-0.4)$ 4

e) $\theta=\tan^{-1}\left(-\frac{1}{3}\right)$ 4

f) $\theta=\cos^{-1}\left(\frac{3}{5}\right)$ 1

Composition of trig and inverse trig functions. Find exactly.

a) $\sin\left(\cos^{-1}\left(\frac{-1}{3}\right)\right)=$ $2\sqrt{2}/3$

b) $\cos\left(\tan^{-1}(4)\right)=$ $1/\sqrt{17}$

c) $\tan\left(\sin^{-1}\left(\frac{-1}{5}\right)\right)=$ $-\frac{1}{2\sqrt{6}}$

d) $\sin\left(\tan^{-1}\left(\frac{-3}{4}\right)\right)=$ $-\frac{3}{5}$