WARMUP

Find θ so the following are true: (in radians)

1) $\sin\theta = \frac{\sqrt{2}}{2}$

   $\theta = \frac{\pi}{4}, \frac{3\pi}{4}$

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

   $\frac{2\pi}{3}, \frac{4\pi}{3}$

3) $\tan\theta = \frac{\sqrt{3}}{3}$

   $\frac{\pi}{6}, \frac{7\pi}{6}$

4) $\cos\theta = 0$

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

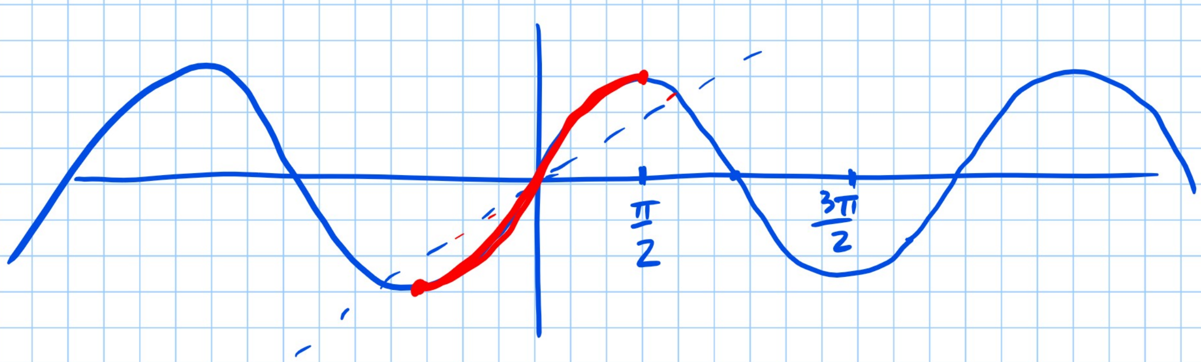
5) $\sin\theta = -\frac{\sqrt{3}}{2}$

   $\frac{4\pi}{3}, \frac{5\pi}{3}$

6) $\tan\theta = -1$

   $\frac{3\pi}{4}, \frac{7\pi}{4}$

Section 6.1 Inverse Sine, Cosine, and Tangent



Inverse Sine

$\sin^{-1}x$ ($\arcsin x$) is asking for the angle between $-\frac{\pi}{2}$ and $\frac{\pi}{2}$ whose sine is x

$$\sin^{-1}\frac{\sqrt{2}}{2} = \frac{\pi}{4}$$

Inverse Cosine

$\cos^{-1}x$ ($\arccos x$) is asking for the angle between 0 and π whose cosine is x

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

Inverse Tangent

$\tan^{-1}x$ ($\arctan x$) is asking for angle between $-\frac{\pi}{2}$ and $\frac{\pi}{2}$ whose tangent is x

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

sine	cosine	tangent
$\sin^{-1}(-1) = -\frac{\pi}{2}$	$\cos^{-1}(-1) = \pi$	$\tan^{-1}(-\sqrt{3}) = -\frac{\pi}{3}$
$\sin^{-1}\left(-\frac{\sqrt{3}}{2}\right) = -\frac{\pi}{3}$	$\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right) = \frac{5\pi}{6}$	$\tan^{-1}(-1) = -\frac{\pi}{4}$
$\sin^{-1}\left(-\frac{\sqrt{2}}{2}\right) = -\frac{\pi}{4}$	$\cos^{-1}\left(-\frac{\sqrt{2}}{2}\right) = \frac{3\pi}{4}$	$\tan^{-1}\left(-\frac{\sqrt{3}}{3}\right) = -\frac{\pi}{6}$
$\sin^{-1}\left(-\frac{1}{2}\right) = -\frac{\pi}{6}$	$\cos^{-1}\left(-\frac{1}{2}\right) = \frac{2\pi}{3}$	$\tan^{-1} 0 = 0$
$\sin^{-1} 0 = 0$	$\cos^{-1} 0 = \frac{\pi}{2}$	$\tan^{-1} \frac{\sqrt{3}}{3} = \frac{\pi}{6}$
$\sin^{-1} \frac{1}{2} = \frac{\pi}{6}$	$\cos^{-1} \frac{1}{2} = \frac{\pi}{3}$	$\tan^{-1} 1 = \frac{\pi}{4}$
$\sin^{-1} \frac{\sqrt{2}}{2} = \frac{\pi}{4}$	$\cos^{-1} \frac{\sqrt{2}}{2} = \frac{\pi}{4}$	$\tan^{-1} \sqrt{3} = \frac{\pi}{3}$
$\sin^{-1} \frac{\sqrt{3}}{2} = \frac{\pi}{3}$	$\cos^{-1} \frac{\sqrt{3}}{2} = \frac{\pi}{6}$	
$\sin^{-1} 1 = \frac{\pi}{2}$	$\cos^{-1} 1 = 0$	

ex: $$\cos\Big(\underbrace{\cos^{-1}\frac{\sqrt{2}}{2}}_{\text{today's chart}}\Big) = \cos\underbrace{\frac{\pi}{4}}_{\text{Ch 5 Chart}} = \frac{\sqrt{2}}{2}$$

$$\sin\left(\sin^{-1}\frac{14}{15}\right) = \frac{14}{15}$$

as long as sin, cos, or tan are on the outside of $\sin^{-1}$, $\cos^{-1}$, or $\tan^{-1}$ the functions cancel. *

* For sin and cos, the number inside has to be between -1 and 1, inclusive, or else it's undefined.

ex: $$\cos\left(\cos^{-1}\frac{8}{5}\right) = \text{undefined}$$

$$\tan\left(\tan^{-1}(3\times10^8)\right) = 3\times10^8$$

When inverse is on the outside evaluate the inside first

$$\cos^{-1}\left(\underbrace{\cos\frac{11\pi}{6}}_{\text{ch 5}}\right) = \underbrace{\cos^{-1}\frac{\sqrt{3}}{2}}_{\text{today}} = \frac{\pi}{6}$$

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

If $-\frac{\pi}{2} \leq N \leq \frac{\pi}{2}$, then $\sin^{-1}(\sin N) = N$

If $0 \leq N \leq \pi$, then $\cos^{-1}(\cos N) = N$

$\boxed{\text{p468 1-35 odd}}$