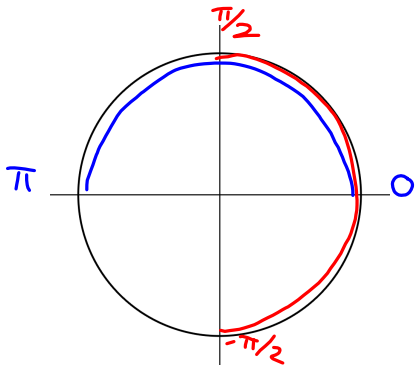
Assignments for the Week of Oct. 3

- Read 6.5, 6.6
- 45 minutes of Khan Academy
- Textbook assignment due Friday 10/7:
  6.5 #1-24 all Inverse Trig Functions

- Textbook assignment due Friday 10/14:
  6.5 #25-55 odd Inverse Trig Functions
  6.6 #1-21 odd finding solutions between 0 and 2pi
  #61-69 odd finding all possible solutions (+2pi*k)
  #71-83 odd

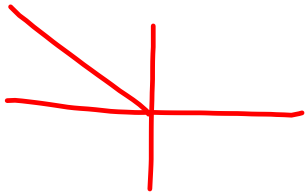
Summary of Restricted Domains:

Interval	Functions	Quadrants
$\left(-\frac{\pi}{2},\frac{\pi}{2}\right)$	$\sin x, \csc x, \tan x$	IV & I
$(0,\pi)$	$\cos x, \sec x, \cot x$	I & II



$$\tan^{-1}\left(\tan\left(\frac{-\pi}{6}\right)\right) = \frac{-\pi}{6}$$

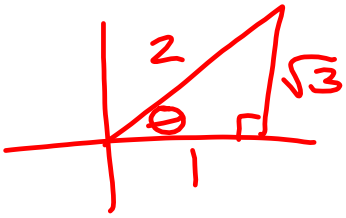
$$\sin^{-1}\left(\sin\left(\frac{3\pi}{4}\right)\right) = \frac{\pi}{4}$$



$$\cos\left(\cos^{-1}(7)\right) = \text{undefined}$$

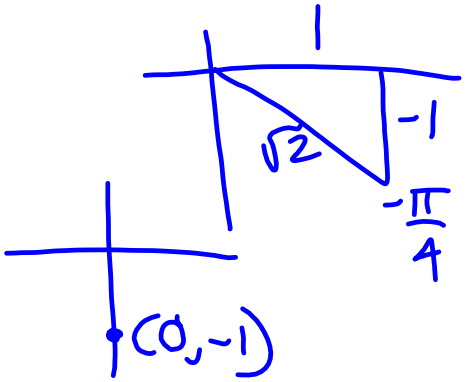
$$\sin\left(\sin^{-1}\left(\frac{1}{2}\right)\right) = \frac{1}{2}$$

1. $\cos\left(\underbrace{\sin^{-1}\frac{\sqrt{3}}{2}}_{\theta}\right) = \boxed{\frac{1}{2}}$



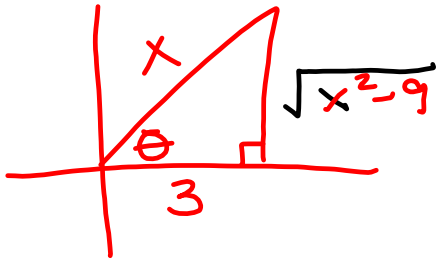
2. $\sin^{-1}\left[\tan\left(\frac{-\pi}{4}\right)\right]$

$= \sin^{-1}(-1) = \boxed{\frac{-\pi}{2}}$



3. $\tan\left(\underbrace{\cos^{-1}\frac{3}{x}}_{\theta}\right), x>0$

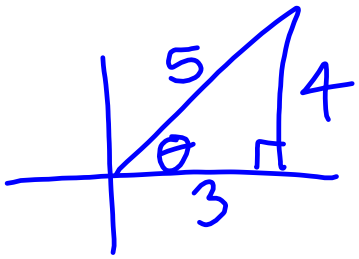
$= \boxed{\frac{\sqrt{x^2-9}}{3}}$



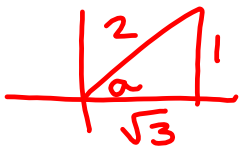
4. $\sin\left(2\underbrace{\cos^{-1}\frac{3}{5}}_{\theta}\right) = \sin 2\theta$

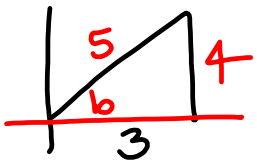
$= 2\sin\theta\cos\theta$

$= 2 \cdot \frac{4}{5} \cdot \frac{3}{5} = \boxed{\frac{24}{25}}$



5. $\sin\left(\underbrace{\sin^{-1}\frac{1}{2}}_{a}+\underbrace{\cos^{-1}\frac{3}{5}}_{b}\right)$



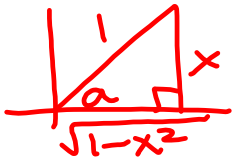


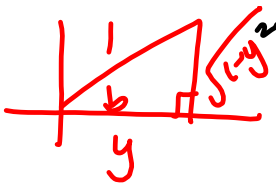
$$\sin(a+b)=\sin a\cos b+\cos a\sin b$$

$$=\frac{1}{2}\cdot\frac{3}{5}+\frac{\sqrt{3}}{2}\cdot\frac{4}{5}$$

$$=\boxed{\frac{3+4\sqrt{3}}{10}}$$

6. $\cos\left(\underbrace{\sin^{-1}x}_{a}-\underbrace{\cos^{-1}y}_{b}\right)$ $x,y>0$





$$\cos(a-b)=\cos a\cos b+\sin a\sin b$$

$$=\sqrt{1-x^2}\cdot y+x\cdot\sqrt{1-y^2}$$

$$=\boxed{y\sqrt{1-x^2}+x\sqrt{1-y^2}}$$

6.6

Solving Trigonometric Equations

$\sin^{-1}\left(\frac{1}{2}\right)$ versus $\sin x = \frac{1}{2}$

single angle θ between $-\frac{\pi}{2}$ & $\frac{\pi}{2}$ s.t. $\sin\theta = \frac{1}{2}$

$\frac{\pi}{6}$

every angle x that makes this equation true

$\frac{\pi}{6} + 2\pi k$

$\frac{5\pi}{6} + 2\pi k$

, $k \in \mathbb{Z}$ (integers)

Solve for $x \in [0, 2\pi)$.

2. $2\sin x = \sqrt{3}$

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

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

4. $\cos x - 1 = 0$

$\cos x = 1$

$x = 0$

6. $2\sin x\cos x = \sqrt{3}\sin x$

$2\sin x\cos x - \sqrt{3}\sin x = 0$

$\sin x(2\cos x - \sqrt{3}) = 0$

$\sin x = 0$, $2\cos x - \sqrt{3} = 0$

$x = 0, \pi$ $\cos x = \frac{\sqrt{3}}{2}$

$x = \pi/6, 11\pi/6$

Algebra Review

$(x-2)(x-3)(x-4) = 0$

$x-2=0$, $x-3=0$, $x-4=0$

$x=2$, $x=3$, $x=4$

The **Zero Product Property** states:

If $AB = 0$, then $A = 0$ or $B = 0$.