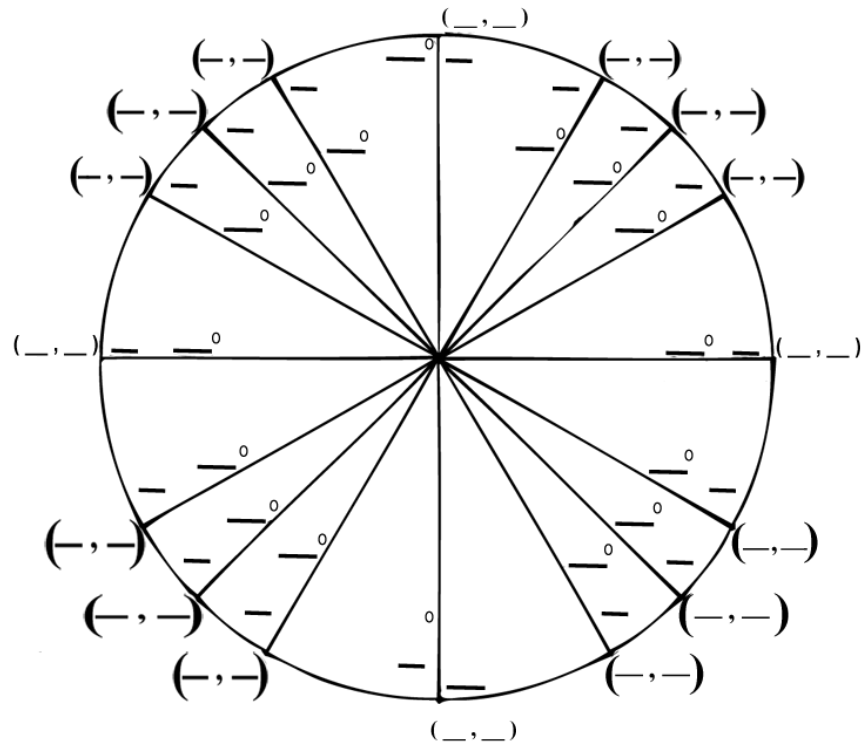
1. Please complete the unit circle:
Meaning Put In all coordinates, degrees, and radians



2. List the three Pythagorean Identities:

   1.
   2.
   3.

$\sin(x) = \sin(x+2\pi)$

period of $\tan x$ is π ($\Rightarrow$ period of $\cot$ is π)

$\sin(x)$ is odd $\quad \sin(-x) = -\sin(x)$

$\cos(x)$ is even $\quad \cos(-x) = \cos(x)$

3. Give a function equivalent to what is given:

a) $\sin(-x) = \sin(-x+204\pi) = -\sin(x)$

$\cot(x+\frac{\pi}{2}) = \cot(x-\frac{\pi}{2}+\pi)$

b) $\cot(x-\frac{\pi}{2}) = \cot\left(-\left(\frac{\pi}{2}-x\right)\right) = \boxed{-\cot\left(\frac{\pi}{2}-x\right)}$

odd b/c tan is odd

$-\tan x$

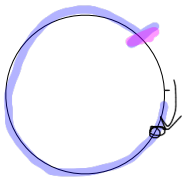
$\cot(x-\frac{\pi}{2})$

$\cot(x-\frac{\pi}{2}) = \dfrac{\cos(x-\frac{\pi}{2})}{\sin(x-\frac{\pi}{2})}$

$= \dfrac{\sin(x)}{-\cos(x)}$

$= -\tan(x)$

4. Evaluate Exactly, without decimals: *(if undefined, write UND)*



a) $\sin(\frac{17\pi}{2}) =$

ref angle $360-315 = 45^\circ$

b) $\cos(-315^\circ) = \cos(315) = \cos(-45^\circ) = \cos(45^\circ) = \frac{\sqrt{2}}{2}$

ref angle? $360 - 315 = 45^\circ$

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

$\frac{\sqrt{3}}{2} = \cos(x)$ where is $\cos = \frac{\sqrt{3}}{2}$

$\frac{\pi}{6}$

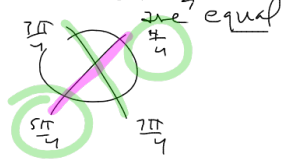
d) $\tan(405^\circ) =$

e) $\arctan(1) = \tan^{-1}(1) =$ angle in $(-\frac{\pi}{2}, \frac{\pi}{2})$ whose slope $= 1$

$= \frac{\pi}{4}$

$\tan^{-1}(1) =$ angle whose sine & cosine are equal

f) $\cot(3\pi) =$



g) $\csc^{-1}(2) = x$

$\csc(x) = \frac{1}{\sin(x)}$

so, $\operatorname{arccsc}(x) = \frac{1}{\sin(x)}$

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

where is $\sin(x) = 2$?

$\csc^{-1}(2) = x$

so $\csc(\csc^{-1}(2)) = \csc(x)$

$2 = \csc(x) = \frac{1}{\sin(x)}$

$2\sin(x) = 1$

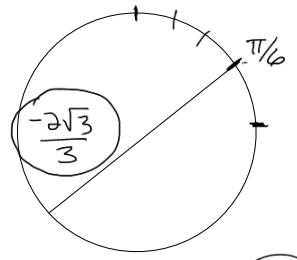
$\boxed{\sin(x) = \frac{1}{2}}$

$x = \frac{\pi}{6}$

$\csc(x) = 2$

$\frac{7\pi}{6} = \frac{6\pi}{6} + \frac{\pi}{6}$

$= \pi + \frac{\pi}{6}$



not ok

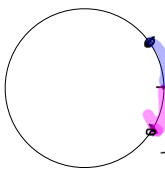
h) $\sec(\frac{7\pi}{6}) = \frac{1}{\cos(\frac{7\pi}{6})} = \frac{1}{\left(-\frac{\sqrt{3}}{2}\right)} = \frac{-2}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{-2\sqrt{3}}{3}$

$\frac{-\frac{1}{2}}{\frac{\sqrt{3}}{2}} = \frac{-1}{2} \cdot \frac{2}{\sqrt{3}}$

$\cos(\frac{\pi}{6}) = \frac{\sqrt{3}}{2}$

$\frac{1}{2}$ $\frac{\sqrt{3}}{2}$

i) $\sin^{-1}(0) =$ 0



$\left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$

$\frac{11\pi}{6}$ $(+,-)$

j) $\tan(\frac{11\pi}{6}) = \frac{\sin\frac{11\pi}{6}}{\cos\frac{11\pi}{6}} = \frac{-\frac{1}{2}}{\frac{\sqrt{3}}{2}} = \frac{-1}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{-\sqrt{3}}{3}$

k) $\text{arccot}(-1) =$

$\sec^{-1}(x) = \frac{1}{\cos^{-1}(x)}$ l) $\sec^{-1}(0) = \frac{1}{\cos^{-1}(0)} = \frac{1}{\text{where is cosine} = 0} = \frac{1}{\frac{\pi}{2}}$ $\frac{2}{\pi}$

$\pi \curvearrowright 0$

5. What is $\sin(\tan^{-1}(x))$?

mix of trig fcn & another inverse trig.

$\tan^{-1}(x)$ is an angle.

Ex

$\csc^{-1}(0) = \frac{1}{\sin^{-1}(0)}$

$= \frac{1}{\text{where's sine} = 0}$

$= \frac{1}{0}$ UND

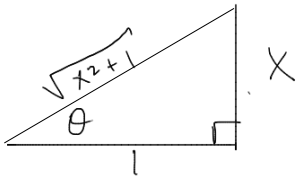
① set $\boxed{\tan^{-1}(x) = \theta}$

② $\tan(\tan^{-1}(x)) = \tan(\theta)$

$x = \tan\theta$

③ make △ that captures this

choose sides so that $\tan\theta = \frac{\text{opp}}{\text{adj}} = x$



④ Pyth thm determine missing side

use △

⑤ go back to problem: $\sin(\tan^{-1}(x)) = \sin(\theta) = \frac{\text{opp}}{\text{hyp}}$

$= \frac{x}{\sqrt{x^2+1}}$

Ex

$\sin(\sec^{-1}(x)) =$ _____

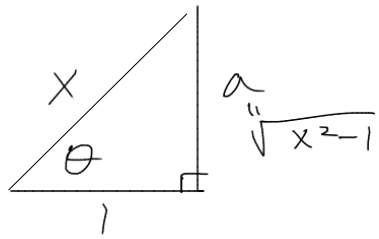
① set $\boxed{\sec^{-1}(x) = \theta}$

② $x = \sec\theta$

③ make 

$\sec\theta = \frac{hyp}{adj} = x$

$\sec\theta = \frac{1}{\cos\theta} = \frac{1}{\frac{adj}{hyp}}$



④ P.T. ⇝ side

$x^2 = 1 + a^2$

$\sqrt{x^2-1} = a$

(use + b/c a = length

⑤ $\sin(\sec^{-1}(x)) = \sin(\theta)$

$= \frac{\sqrt{x^2-1}}{x}$

6. For The following, write the letter of the graph corresponding to its equation.

a) $y = \cos(x)$

b) $y = 2\sin(\frac{5}{6}x)$

c) $y = -\cos(x - \frac{5\pi}{4}) + 1$

d) $y = \frac{1}{2}\sin(2x) + \frac{1}{2}$

e) $y = \frac{2}{3}\cos(x + \frac{3\pi}{4}) - 1$

f) $y = -\frac{1}{3}\sin(3(x + \frac{\pi}{3}))$

7. State the Period, Amplitude and all Shifts of the following functions:

a) $y = 12\cos(\frac{3\pi}{8}x) + 3$

Amplitude: $|12|$

Period: $\frac{2\pi}{(3\pi/8)}$

Vertical Shift: 3

Horizontal Shift: None

$k(x - p)$

b) $y = -(\frac{2}{3})\sin(x + \frac{2\pi}{6}) - 2$

Amplitude: $|-\frac{2}{3}| = 2/3$

Period: $\frac{2\pi}{1} = 2\pi$

Vertical Shift: 2

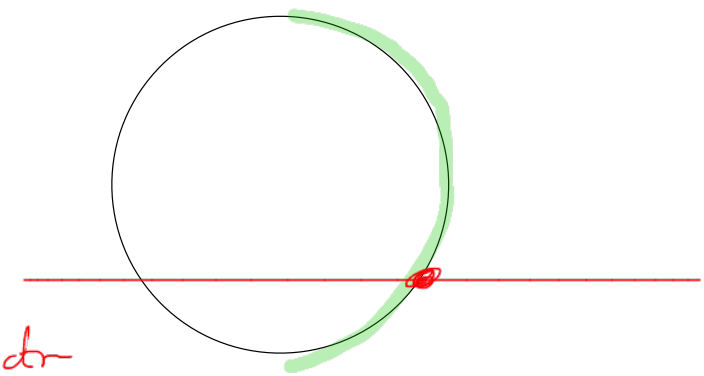
Horizontal Shift: $\frac{2\pi}{6}$ to left

I , IV

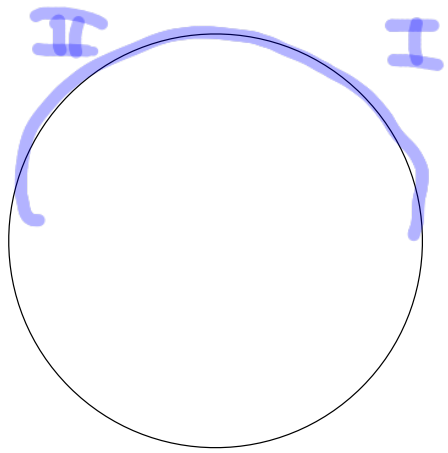
$\sin^{-1}(x)$ = the angle in $[-\frac{\pi}{2}, \frac{\pi}{2}]$ whose y-coord is x

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

draw horiz line $y = -\frac{1}{2}$



Find intersection w/ a I or IV



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

$$-5\pi - \frac{\pi}{3}$$

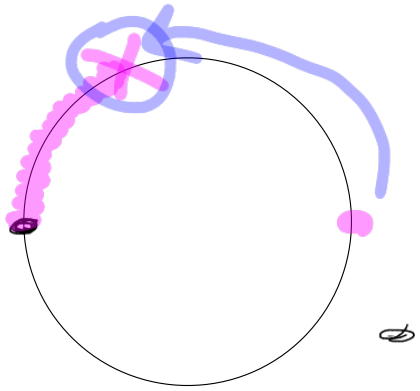
$$\frac{-16\pi}{3} = \frac{-15\pi}{3} - \frac{\pi}{3}$$

$$\parallel$$

$$\frac{-18\pi}{3} + \frac{2\pi}{3}$$

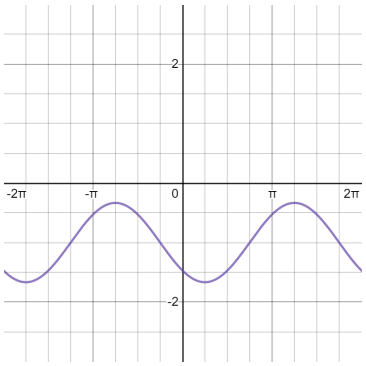
$$\parallel$$

$$-6\pi + \frac{2\pi}{3}$$

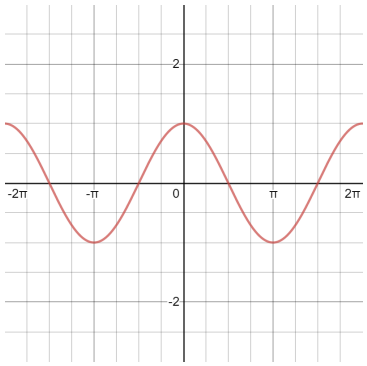


GRAPHS For #6

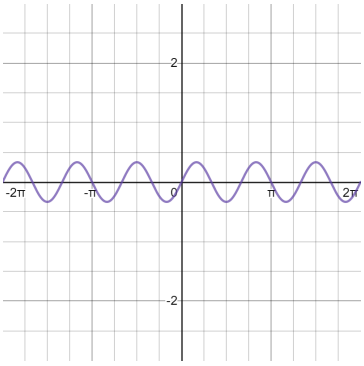
A)



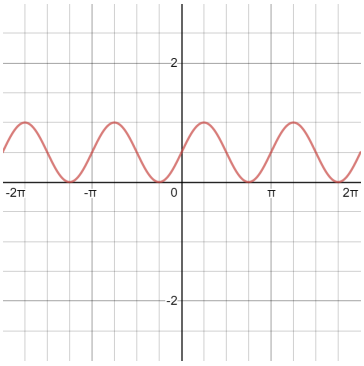
D)



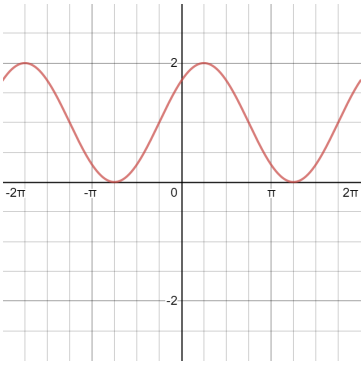
B)



E)



C)



F)