4.6 The Inverse Trig. Functions (cont.)

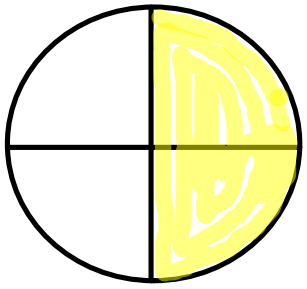
Objectives:

1) Find the exact value of inverse csc, sec, and cot functions.
2) Use a calculator to find approximate values of inverse csc, sec, and cot functions.
3) Know the properties of inverse functions.

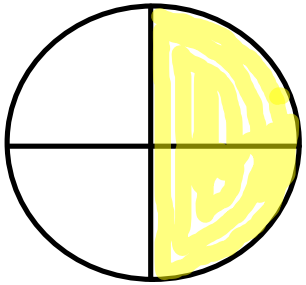
Review: Domain of SIN, COS, and TAN

Domain restrictions for Θ are as follows: (Principle Value)

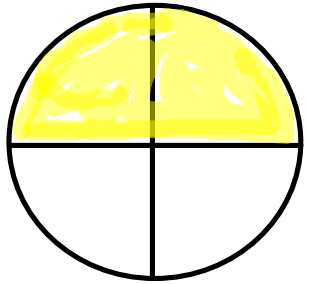
Sin^{-1} $-\pi/2 \leq \Theta \leq \pi/2$ (Quadrants I and IV)
Tan^{-1} $-\pi/2 < \Theta < \pi/2$ (Quadrants I and IV)
Cos^{-1} $0 \leq \Theta \leq \pi$ (Quadrants I and II)



Sin^{-1} $-\pi/2 \leq \Theta \leq \pi/2$



Tan^{-1} $-\pi/2 < \Theta < \pi/2$



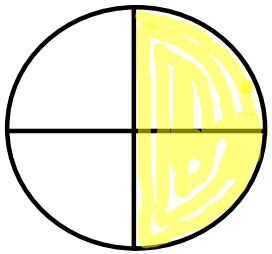
Cos^{-1} $0 \leq \Theta \leq \pi$

Finding $\sec^{-1} x,\ \csc^{-1} x,\ \cot^{-1} x$:

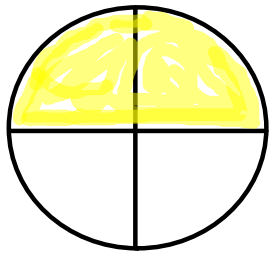
$$\csc^{-1}(a) = \sin^{-1}\left(\frac{1}{a}\right) \text{ where domain is } \frac{-\pi}{2} \le \theta \le \frac{\pi}{2},\ \theta \neq 0$$

$$\sec^{-1}(a) = \cos^{-1}\left(\frac{1}{a}\right) \text{ where domain is } 0 \le \theta \le \pi,\ \theta \neq \frac{\pi}{2}$$

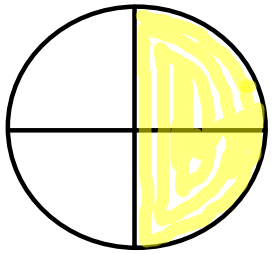
$$\cot^{-1}(a) = \tan^{-1}\left(\frac{1}{a}\right) \text{ where domain is } 0 < \theta < \pi$$



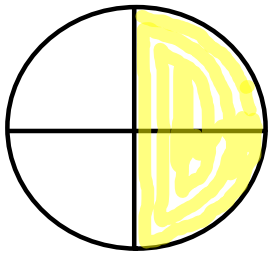
Sin^{-1} $-\pi/2 \le \Theta \le \pi/2$



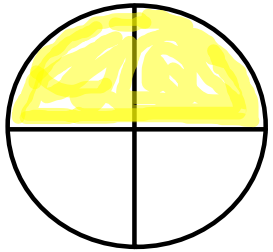
Cos^{-1} $0 \le \Theta \le \pi$



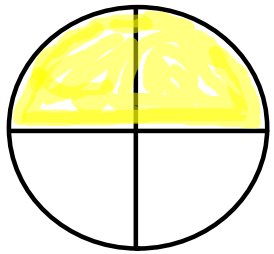
Tan^{-1} $-\pi/2 < \Theta < \pi/2$



Csc^{-1} $-\pi/2 \le \Theta \le \pi/2$



Sec^{-1} $0 \le \Theta \le \pi$

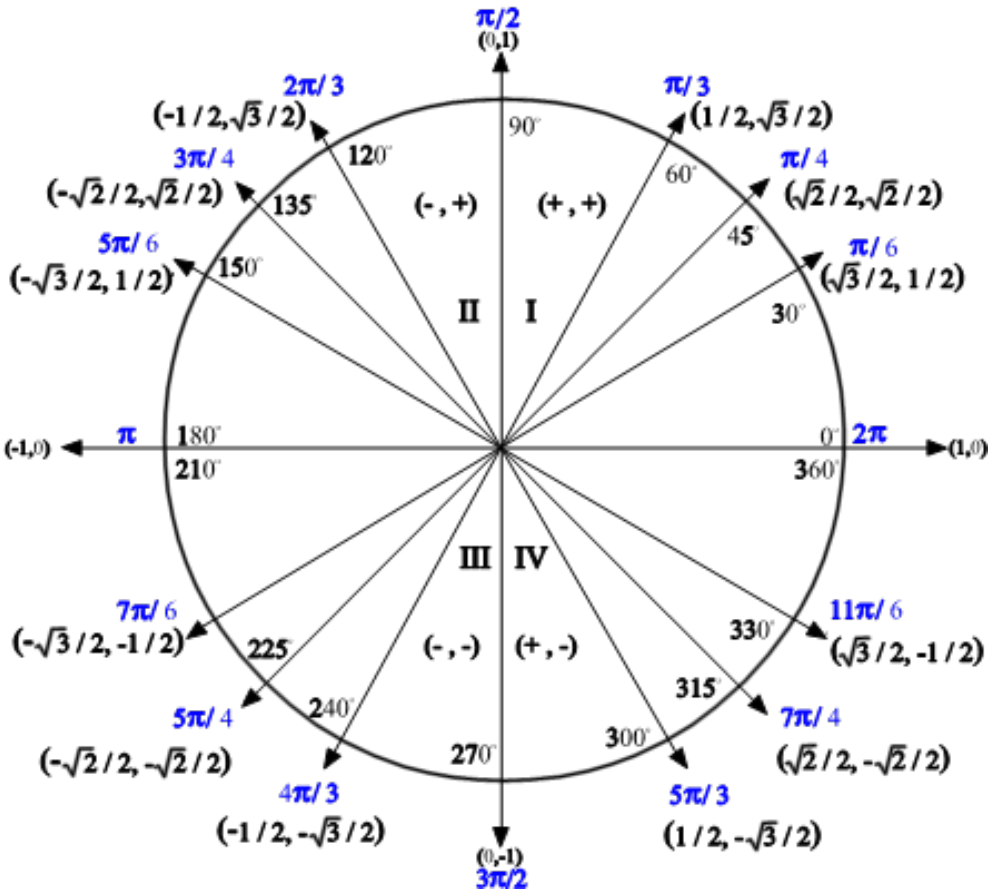


Cot^{-1} $0 < \Theta < \pi$

Find the Exact Value:
(use the unit circle!)

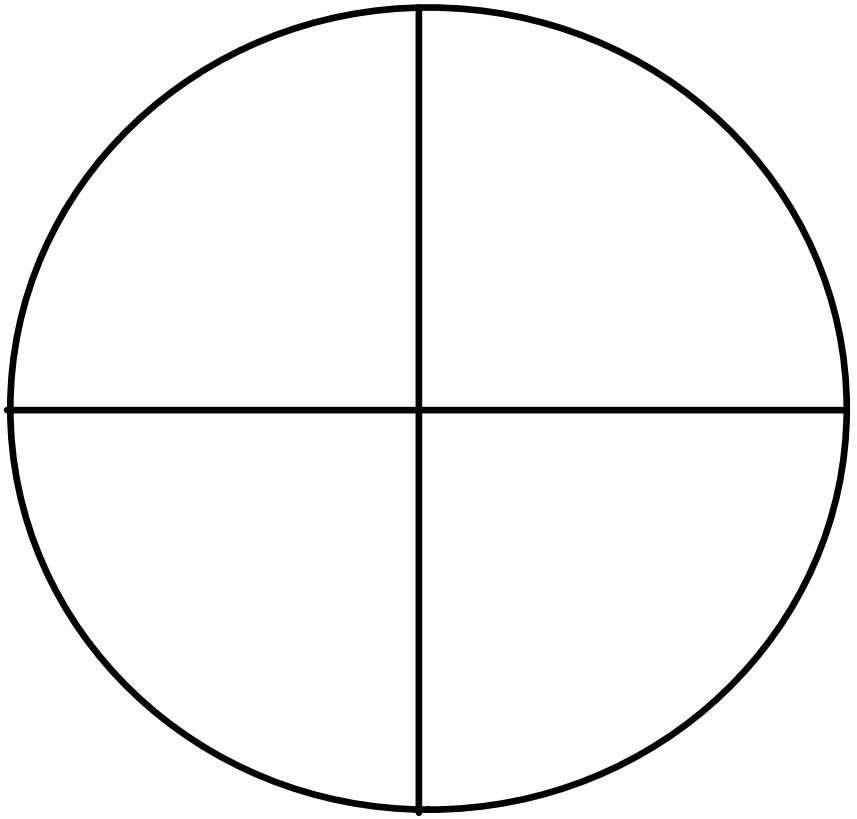
Ex. 1 $\sin^{-1}\left(\sin\frac{5\pi}{4}\right)$

Answer: ?



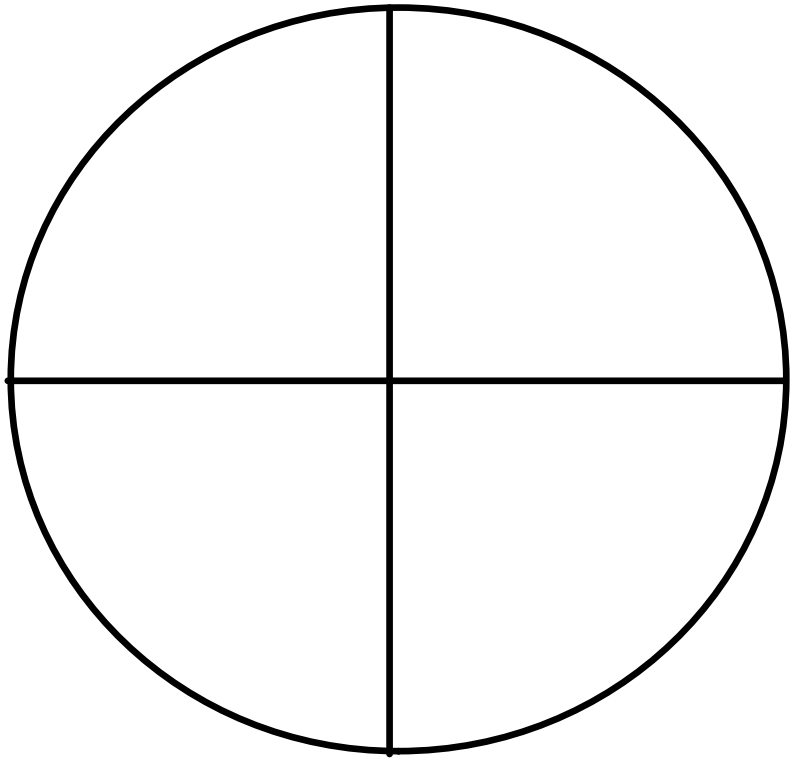
Ex. 2 $\sin\left[\tan^{-1}\left(\frac{1}{2}\right)\right]$

Answer: ?



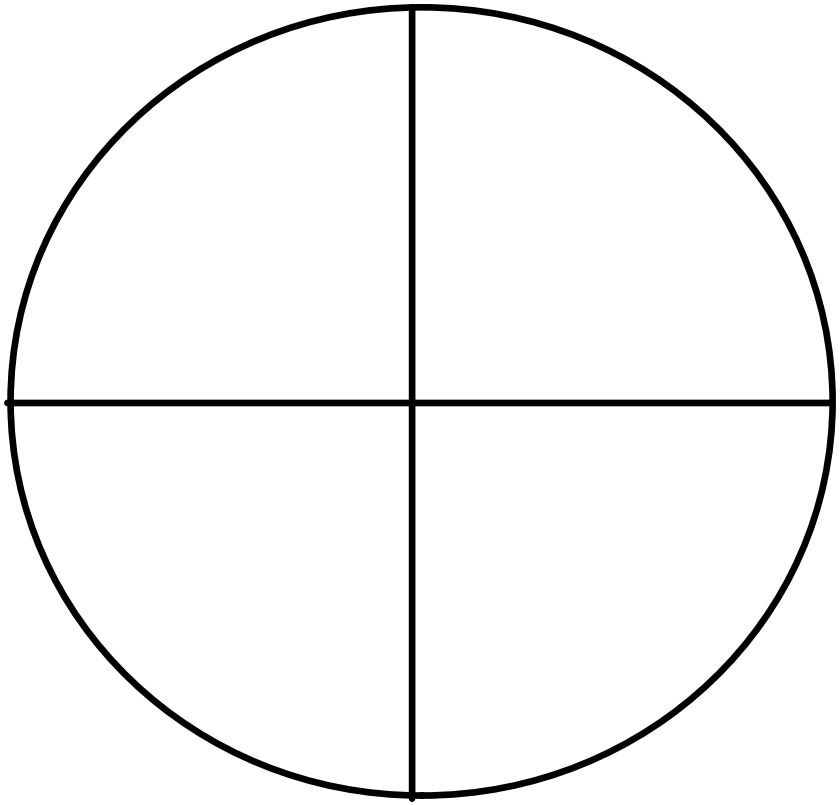
Ex. 3 $\cos\left[\sin^{-1}\left(-\frac{1}{3}\right)\right]$

Answer: ?



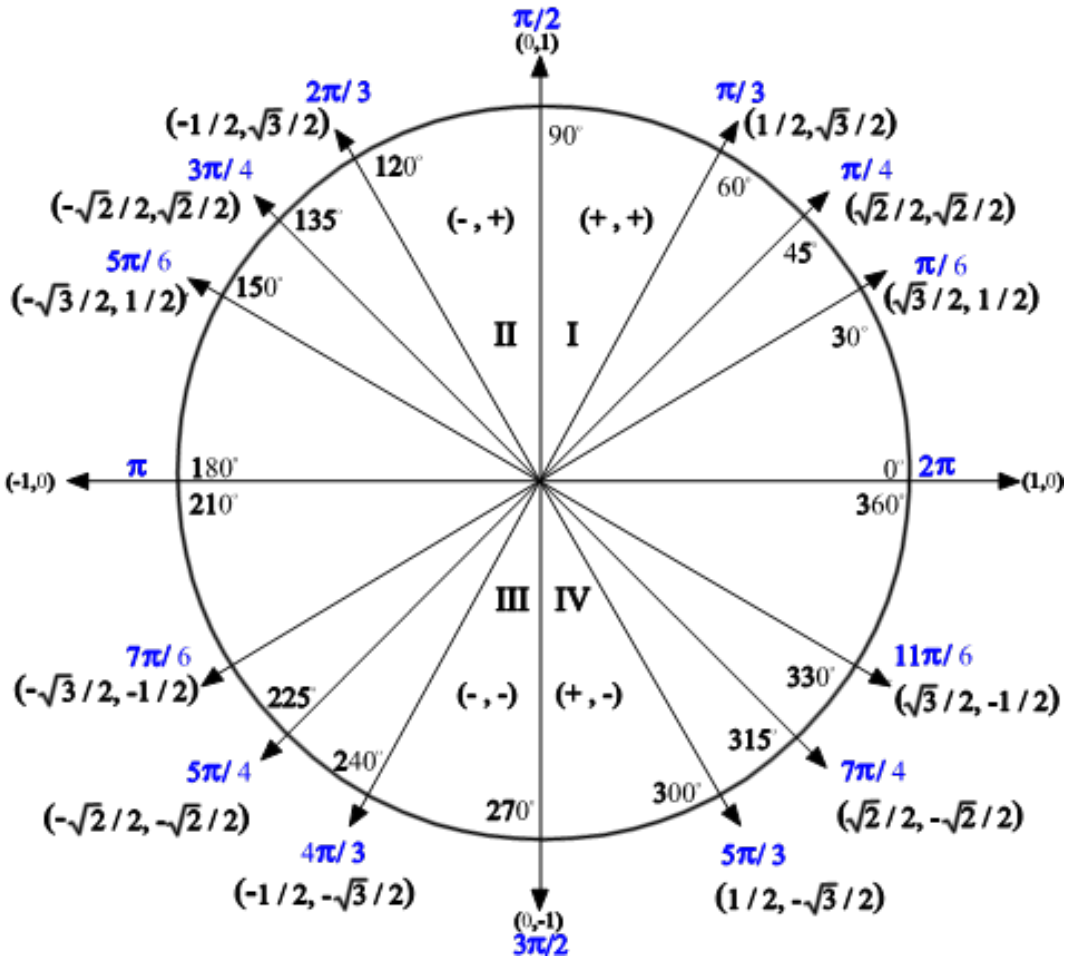
Ex. 4 $\tan\left[\cos^{-1}\left(-\frac{1}{3}\right)\right]$

Answer: ?



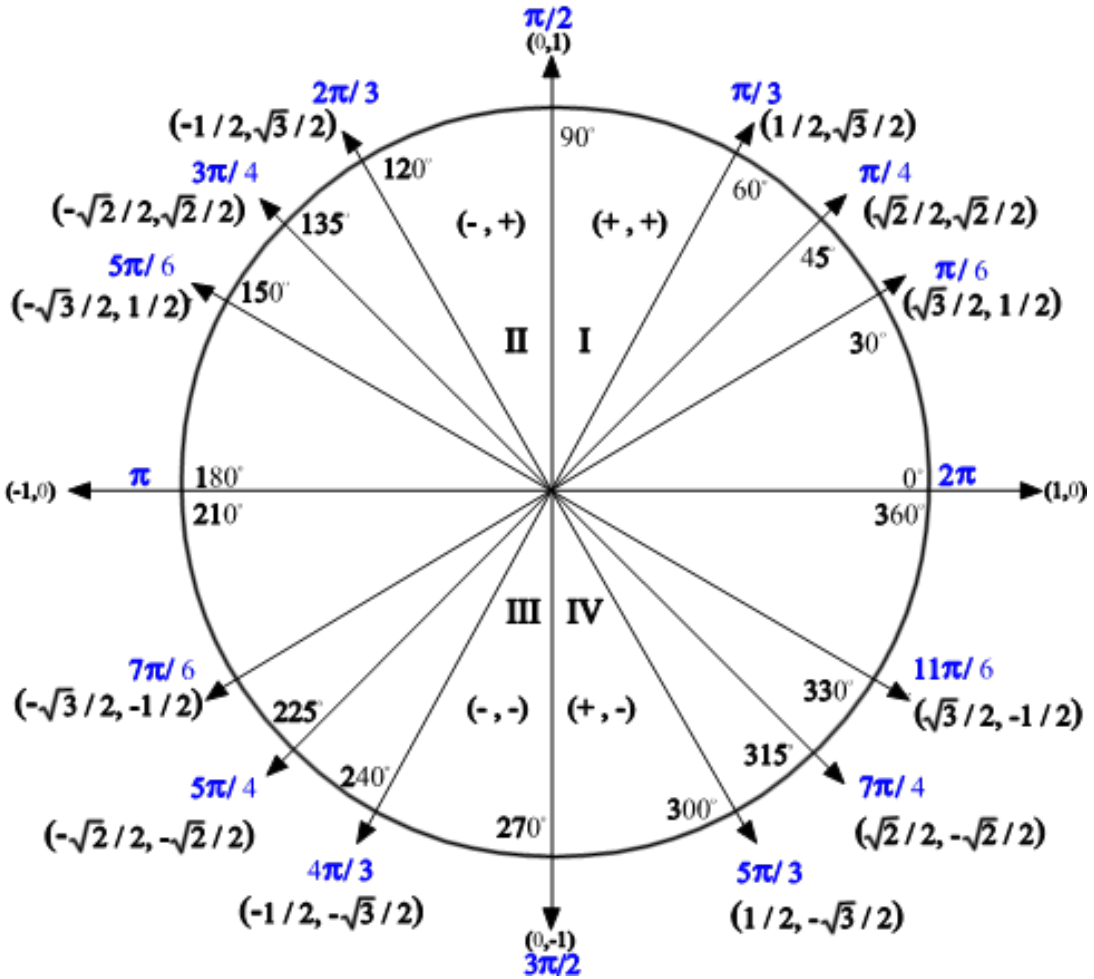
Ex. 5 $\csc^{-1} 2$

Answer: ?



Ex. 6 $\cot^{-1}\left(-\frac{\sqrt{3}}{3}\right)$

Answer: ?



Finding Approximate Values:

(Get out your calculator!!) Round to 2 decimal places.
These answers are in radians, so check your *mode*!

1) $\sec^{-1}(-3) =$?

2) $\csc^{-1}(-4) =$?

3) $\cot^{-1}(-2) =$?

Assignment:

W.S. 4.6: Day 2 (1-47 odd)