

Saturday, December 01, 2018
2:52 PM

KEY

Precalc

4.4C: Trig functions of any angle

Obj: To evaluate trig functions of any angle

Hwk: 4.4C - draw reference triangle or each;

VC on SEPARATE sheet of paper

4.1 - 4.4 Test

Radian Project due

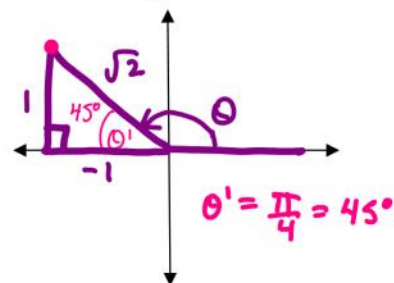
Do Now:

1. Find the sine, cosine and tangent for $\theta = \frac{3\pi}{4}$

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

$\cos \theta = -\frac{1}{\sqrt{2}} \cdot \frac{\sqrt{2}}{2} = -\frac{\sqrt{2}}{2}$

$\tan \theta = \frac{1}{-1} = -1$



2. The point $(9, -40)$ is on the terminal side of angle θ .

Determine the 6 trig functions of θ .

$\sin \theta = \frac{-40}{41}$

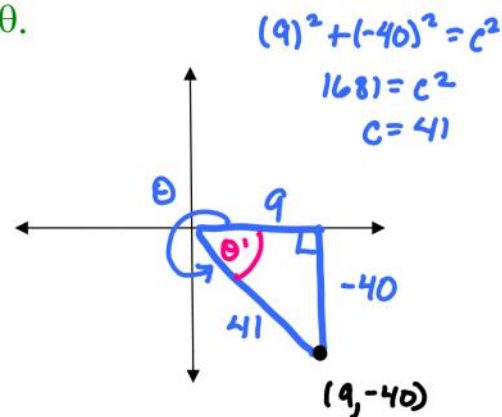
$\csc \theta = \frac{-41}{40}$

$\cos \theta = \frac{9}{41}$

$\sec \theta = \frac{41}{9}$

$\tan \theta = \frac{-40}{9}$

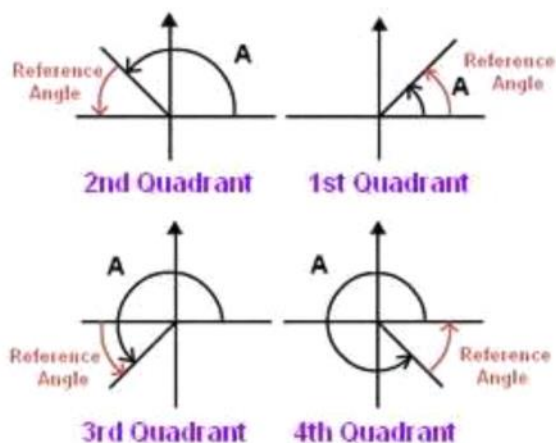
$\cot \theta = \frac{-9}{40}$



Recap:

Reference angle: the POSITIVE acute angle θ' formed by the terminal side of θ and the x-axis.

i.e. PART OF THE BOWTIE!!!



To find the reference angle θ' , determine how "far" you need to go to get to the closest x-axis

***REFERENCE ANGLE IS ALWAYS POSITIVE!!!**

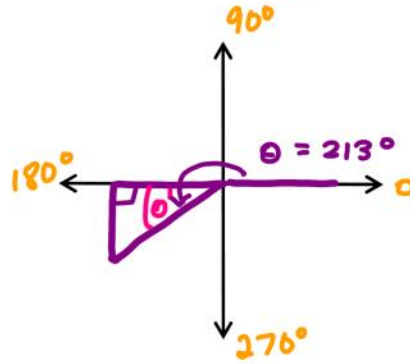
Example 1:

Sketch and find the reference angle for:

a. $\theta = 213^\circ$

$$\theta' = 213^\circ - 180^\circ$$

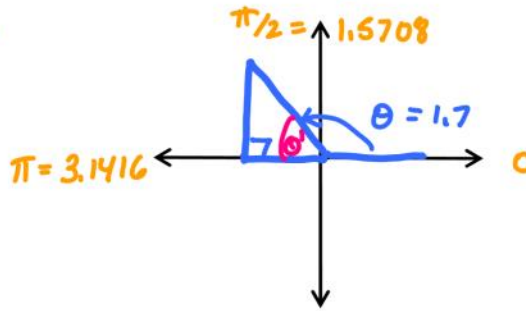
$$\theta' = 33^\circ$$



b. $\theta = 1.7$

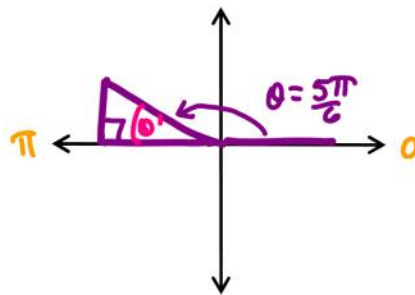
$$\theta' = \pi - 1.7$$

$$\theta' = 1.4$$



e. $\theta = \frac{5\pi}{6}$

$$\theta' = \frac{\pi}{6}$$

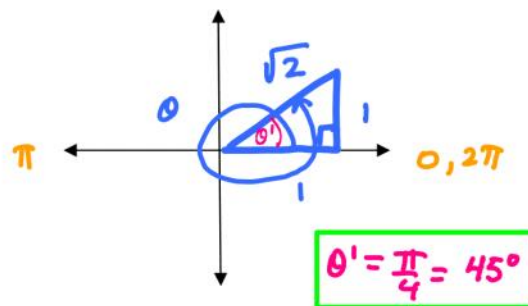


Example 2:

Evaluate the sine, cosine, and tangent functions for:

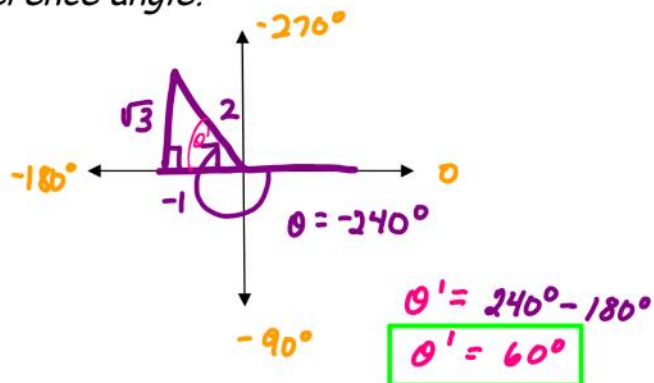
a) $\theta = \frac{9\pi}{4}$ What is the reference angle?

$\sin \theta = \frac{1}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{2}$
 $\cos \theta = \frac{\sqrt{2}}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{2}$
 $\tan \theta = \frac{1}{1} = 1$



b) $\theta = -240^\circ$ What is the reference angle?

$\sin \theta = \frac{\sqrt{3}}{2}$
 $\cos \theta = -\frac{1}{2}$
 $\tan \theta = \frac{\sqrt{3}}{-1} = -\sqrt{3}$

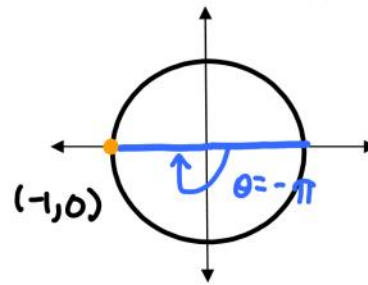


Example 3:

Evaluate the sine, cosine, and tangent functions for:

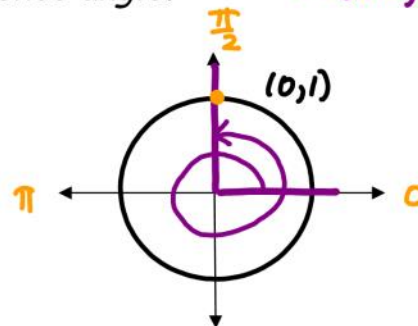
a) $\theta = -\pi$ What is the reference angle? * none, use unit circle

$$\begin{aligned} y \quad \sin \theta &= 0 \\ x \quad \cos \theta &= -1 \\ \frac{y}{x} \quad \tan \theta &= \frac{0}{-1} = 0 \end{aligned}$$



b) $\theta = \frac{5\pi}{2}$ What is the reference angle? * none, use point on unit circle

$$\begin{aligned} y \quad \sin \theta &= 1 \\ x \quad \cos \theta &= 0 \\ \frac{y}{x} \quad \tan \theta &= \frac{1}{0} = \text{undef} \end{aligned}$$



Example 4:

S	A
T	C

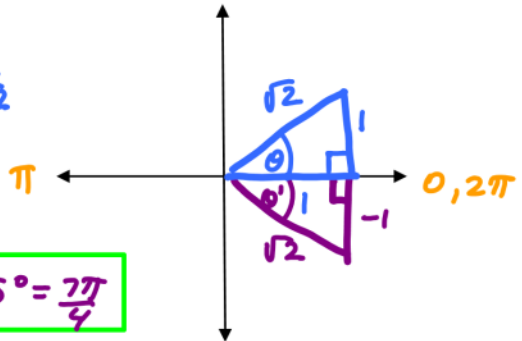
Find 2 solutions for the given equation where
 $0 \leq \theta \leq 2\pi$ (in radians) and $0^\circ \leq \theta \leq 360^\circ$ (in degrees)

$\frac{x}{r}$ a. $\cos \theta = \frac{\sqrt{2}}{2} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{2}{2\sqrt{2}} = \frac{1}{\sqrt{2}}$

* un-rationalize

Quadrant I: $\theta = 45^\circ = \frac{\pi}{4}$

Quadrant IV: $\theta = 360^\circ - 45^\circ = 315^\circ = \frac{7\pi}{4}$



$\frac{x}{r}$ b. $\cos \theta = -\frac{\sqrt{2}}{2} \cdot \frac{\sqrt{2}}{\sqrt{2}} = -\frac{2}{2\sqrt{2}} = -\frac{1}{\sqrt{2}}$

↑ neg

S	A
T	C

