

WU... write the 2 special triangles and the six trig functions and fill in the blanks below...

	60°	45°	30°
Radians			
cscθ	$\frac{2}{\sqrt{3}}$	$\sqrt{2}$	$\frac{2}{1}$
secθ	$\frac{2}{\sqrt{3}}$	$\sqrt{2}$	$\frac{2\sqrt{3}}{3}$
cotθ	$\frac{\sqrt{3}}{3}$	1	$\frac{\sqrt{3}}{1}$

SOH CAH TOA  
 Sin Cos Tan  
 CSC SEC COT

Jan 17-10:54 AM

We need to think about cutting the pi.

Jan 15-8:29 PM

We need to think about cutting the pi. UNIT CIRCLE

Jan 15-8:29 PM

Let's Review HW Pg 870 #5-11 odd

UNIT CIRCLE #12-15, 17-23 odd

(12) 6 trig values

$\theta = 0$

$\sin 0 = 0$   $\csc 0 = \frac{1}{\sin 0} = \text{und}$   
 $\cos 0 = 1$   $\sec 0 = \frac{1}{\cos 0} = 1$   
 $\tan 0 = \frac{\sin 0}{\cos 0} = 0$   $\cot 0 = \frac{1}{\tan 0} = \text{und}$   
 $\frac{1}{\tan} = \frac{\cos}{\sin}$

(13)  $\theta = \frac{\pi}{2}$

$(\cos, \sin)$   
 $(x, y)$   
 $(0, 1)$

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Chp 13.3 GENERAL DEFINITIONS OF TRIGONOMETRIC FUNCTIONS

KEY CONCEPT For Your Notebook

General Definitions of Trigonometric Functions

Let  $\theta$  be an angle in standard position, and let  $(x, y)$  be the point where the terminal side of  $\theta$  intersects the circle  $x^2 + y^2 = r^2$ . The six trigonometric functions of  $\theta$  are defined as follows:

$\sin \theta = \frac{y}{r}$   $\csc \theta = \frac{r}{y}, y \neq 0$   
 $\cos \theta = \frac{x}{r}$   $\sec \theta = \frac{r}{x}, x \neq 0$   
 $\tan \theta = \frac{y}{x}, x \neq 0$   $\cot \theta = \frac{x}{y}, y \neq 0$

These functions are sometimes called circular functions.

Apr 1-10:05 AM

Given the point evaluate the six trig values for the following circular function.

$x^2 + y^2 = r^2$

$\sin \theta = \frac{y}{r}$   
 $\cos \theta = \frac{x}{r}$   
 $\tan \theta = \frac{y}{x}$

Jan 17-10:53 AM

**UNIT CIRCLE - same concept...what if the radius is 1...**

**KEY CONCEPT For Your Notebook**

**The Unit Circle**

The circle  $x^2 + y^2 = 1$ , which has center (0, 0) and radius 1, is called the **unit circle**. The values of  $\sin \theta$  and  $\cos \theta$  are simply the  $y$ -coordinate and  $x$ -coordinate, respectively, of the point where the terminal side of  $\theta$  intersects the unit circle.

$\sin \theta = \frac{y}{r} = \frac{y}{1} = y$        $\cos \theta = \frac{x}{r} = \frac{x}{1} = x$

$\csc \theta = 1/y$        $\sec \theta = 1/x$

$\tan \theta = y/x$        $\cot \theta = x/y$

Mar 30-3:04 PM

	90°	180°	270°	0° or 360°
Radians				
$\sin \theta$				
$\cos \theta$				
$\tan \theta$				

$\csc \theta =$        $\sec \theta =$        $\cot \theta =$

Jan 15-8:06 PM

Evaluate the six trig functions for the following quadrantal angles.

1.)  $\frac{\pi}{2}$       2.)  $\frac{3\pi}{2}$

3.)  $2\pi$       4.)  $-\pi$

Jan 17-10:56 AM

HOW DO WE FIND TRIGONOMETRIC FUNCTIONS FOR ANGLE MEASUREMENTS OVER 90 degrees OR LESS THAN 0 degrees ?

**REFERENCE ANGLES**

A reference angle is an acute angle formed by the terminal side of the angle and the x axis.

**KEY CONCEPT For Your Notebook**

**Reference Angle Relationships**

Let  $\theta$  be an angle in standard position. The **reference angle** for  $\theta$  is the acute angle  $\theta'$  formed by the terminal side of  $\theta$  and the  $x$ -axis. The relationship between  $\theta$  and  $\theta'$  is shown below for nonquadrantal angles  $\theta$  such that  $0^\circ < \theta < 360^\circ$  ( $0 < \theta < 2\pi$ ).

Quadrant II      Quadrant III      Quadrant IV

Degree:  $\theta' = 180^\circ - \theta$       Degree:  $\theta' = \theta - 180^\circ$       Degree:  $\theta' = 360^\circ - \theta$   
 Radian:  $\theta' = \pi - \theta$       Radian:  $\theta' = \theta - \pi$       Radian:  $\theta' = 2\pi - \theta$

*\* In radians you need common denominator.*

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To Find **REFERENCE ANGLES**

90      0

Quadrant II      Quadrant I

$180 - \theta$        $\theta$

$\pi - \theta$

180      360

Quadrant III      Quadrant IV

$\theta - 180$        $360 - \theta$

$\theta - \pi$        $2\pi - \theta$

270

Apr 11-8:31 AM

Find the following reference angles

1.)  $242^\circ$        $\theta' = 62^\circ$

2.)  $\frac{5\pi}{7}$        $\theta' = \frac{2\pi}{7}$

3.)  $\frac{14\pi}{9}$        $\theta' = \frac{4\pi}{9}$

4.)  $-72^\circ$        $\theta' = 72^\circ$  (clockwise)

5.)  $42^\circ$        $\theta' = 42^\circ$

6.)  $-\pi$        $\theta' = 0$

Reference Angles are always positive

*No  $\theta'$  exists  $\theta = 0$*

Jan 19-7:23 PM

13.3 (1/1b) ASTC pg 868

Determine pos & neg trig functions

$(x, y)$   
 $(\cos, \sin)$

sin csc  
 cos sec  
 tan cot

Jan 20-8:29 AM

Biggest job of all

13.3 EVALUATE TRIG FUNCTIONS FOR ANY ANGLE  $\theta$

STEPS

- 1) Find Reference Angle
- 2.) Evaluate the Trig for Ref Angle
- 3.) Determine Pos/Neg
- 4.) PIAT  
Put it all together

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Evaluate

Sin  $135^\circ$

1) Find Reference Angle  $\theta' = 45^\circ$   
 2.) Evaluate the Trig for Ref Angle  $\sin 45^\circ = \frac{\sqrt{2}}{2}$   
 3.) Determine Pos/Neg  
 4.) PIAT

$\sin 135^\circ = +\frac{\sqrt{2}}{2}$

Feb 19-12:06 PM

cos  $150^\circ$

①  $\theta' = 30^\circ$   
 ② Trig  $\theta'$   $\cos 30^\circ = \frac{\sqrt{3}}{2}$   
 ③ +/-  
 ④ PIAT  $\cos 150^\circ = -\frac{\sqrt{3}}{2}$

Feb 19-12:18 PM

tan  $240^\circ$

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sin  $\frac{5\pi}{6}$

①  $\theta' = \frac{\pi}{6}$  think  $\rightarrow \frac{\pi}{6} = 30^\circ$   
 ②  $\sin \theta' = \sin \frac{\pi}{6} = \frac{1}{2}$   
 ③ +/-  
 ④  $\sin \frac{5\pi}{6} = +\frac{1}{2}$

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$\sin \frac{3\pi}{2}$   $\tan 6\pi$

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$\cot 300^\circ$

①  $\theta' = 60^\circ$   
 ②  $\cot 60^\circ = \frac{1}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{3}}{3}$   
 $\tan 60 = \frac{\sqrt{3}}{1}$   
 ③  $\pm/\ominus$   
 ④  $\cot 300 = -\frac{\sqrt{3}}{3}$

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EVALUATE THE FOLLOWING...

1.  $\sin 120$       2.  $\cos 135$       3.  $\tan 225$

4.  $\sin 5\pi/6$       5.  $\cos 5\pi/3$       6.  $\tan 3\pi/4$

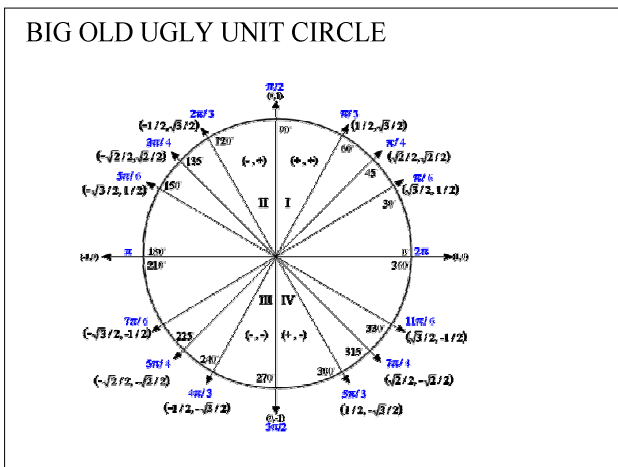
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EVALUATE THE FOLLOWING...

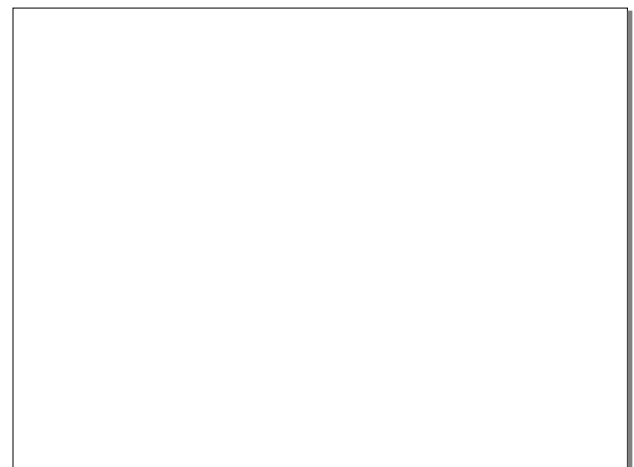
1.  $\cot 120$       2.  $\csc 135$       3.  $\sec 225$

4.  $\csc 5\pi/6$       5.  $\sec 5\pi/3$       6.  $\cot 3\pi/4$

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