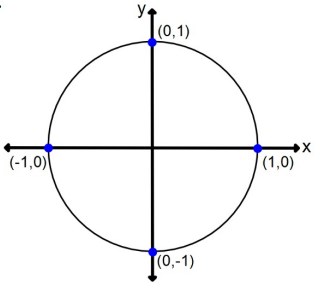
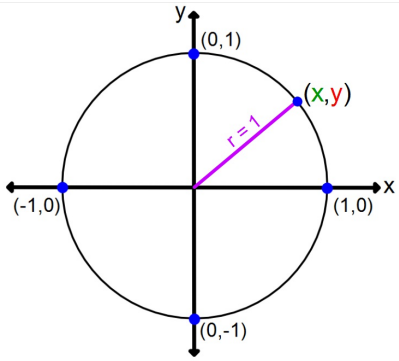
Wednesday, April 29, 2020

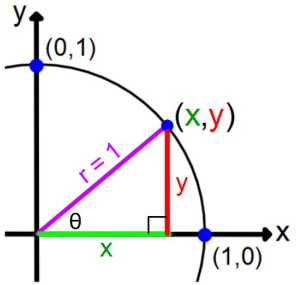
The Unit Circle

The Unit Circle: A circle on the x-y plane.

- A circle whose radius = 1 Unit.
- The center is at the origin.







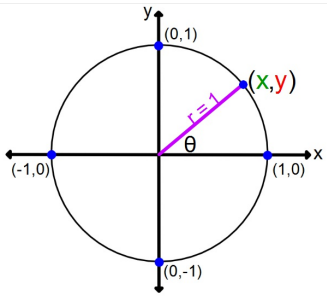
SOHCAHTOA

$\sin\theta = \frac{\text{Opp}}{\text{Hyp}} = \frac{y}{1}$

$\sin\theta = y$

$\cos\theta = \frac{\text{Adj}}{\text{Hyp}} = \frac{x}{1}$

$\cos\theta = x$

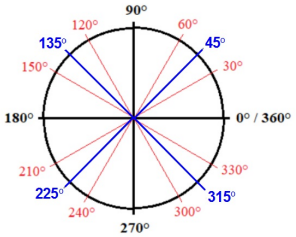


For every point
on the Unit Circle:

(x,y)

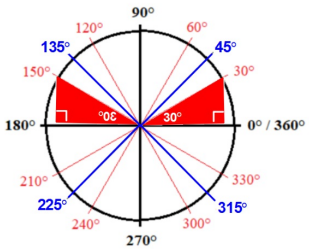
(Cosθ,Sinθ)

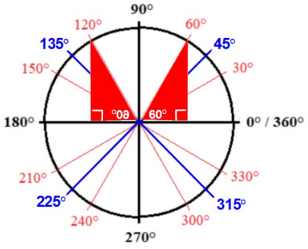
Unit Circle with degrees:



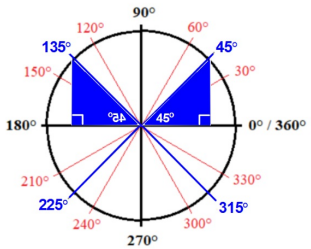
With the exception of the four axes every angle on the Unit Circle is related to one of the Special Right Triangles.

The angles in **red** are all related to a 30° - 60° - 90° Δ





The angles in **blue** are all related to a 45° - 45° - 90° Δ

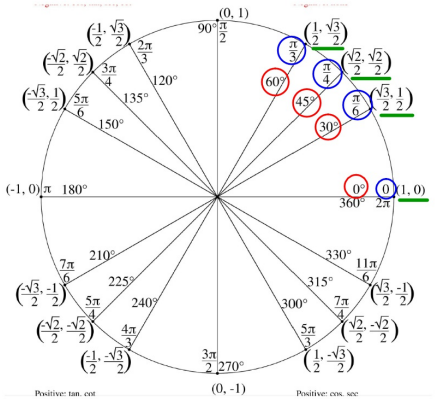


The Full Unit Circle:

Angles is Degrees

Angles is Radians

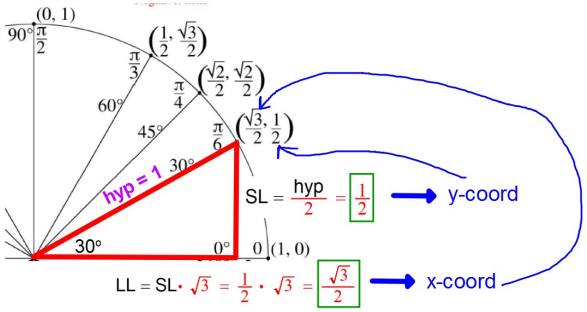
Coordinates of pts at the end of each radius.



With the exception of the four axes the coordinates of points on the Unit Circle come from

the legs of the Special Right Δ's when the Hypotenuse = 1 (r=1).

To demonstrate where these coordinates come from we'll focus on θ = 30°



To find Cosθ and Sinθ using the Unit Circle:

1. Locate θ on the Unit Circle
   (you may have to use the concept of Coterminal angles so that θ is between 0° and 360° or 0 and 2π)
2. Cosθ = x-coord at point corresponding to the location of θ
3. Sinθ = y-coord at point corresponding to the location of θ

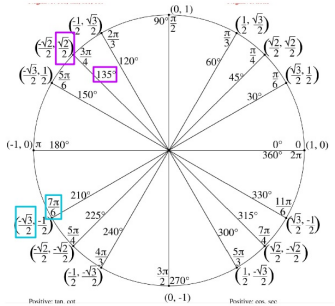
Use the Unit Circle to find the EXACT value of each.

1. $\sin 135° = \boxed{\frac{\sqrt{2}}{2}}$

y-coord at 135°

2. $\cos \frac{7\pi}{6} = \boxed{\frac{-\sqrt{3}}{2}}$

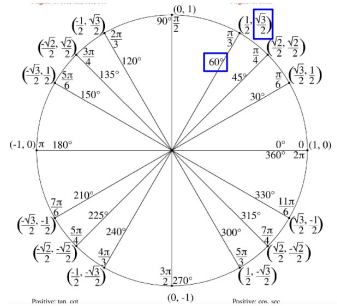
x-coord at $\frac{7\pi}{6}$



Use the Unit Circle to find the EXACT value of each.

3. $\sin 780° = \sin 60° = \boxed{\frac{\sqrt{3}}{2}}$

$780° - 720° = 60°$



You can now finish the first few problems of Practice #23.

Tomorrow we'll finish the rest of the material for Practice #23 and it will be due on Saturday, May 2 by 10:00pm.