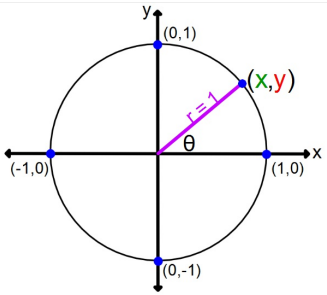
Thursday, April 30, 2020

Finish: The Unit Circle



For every point on the Unit Circle:

(x,y)

(Cosθ,Sinθ)

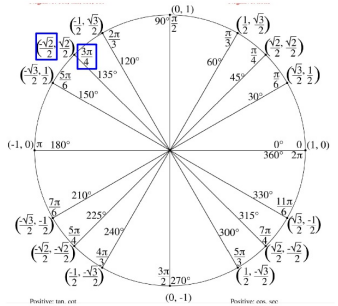
To find Cosθ and Sinθ using the Unit Circle:

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. $\cos\frac{11\pi}{4} = \cos\frac{3\pi}{4} = \boxed{\frac{-\sqrt{2}}{2}}$

$\frac{11\pi}{4} - 2\pi = \frac{11\pi}{4} - \frac{8\pi}{4} = \frac{3\pi}{4}$

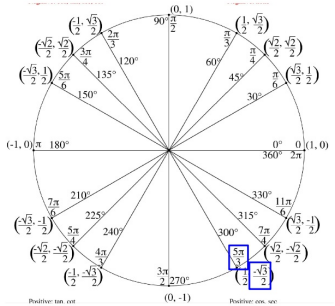


Use the Unit Circle to find the EXACT value of each.

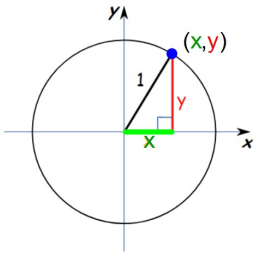
2. $\sin\frac{-7\pi}{3} = \sin\frac{5\pi}{3} = \boxed{\frac{-\sqrt{3}}{2}}$

$\frac{-7\pi}{3} + 2\pi = \frac{-7\pi}{3} + \frac{6\pi}{3} = \frac{-\pi}{3}$

$\frac{-\pi}{3} + \frac{6\pi}{3} = \frac{5\pi}{3}$



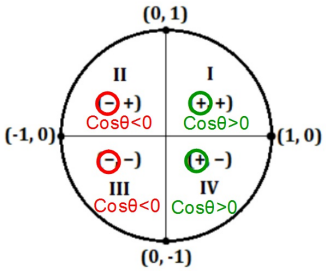
Finding Tanθ using the Unit Circle



$\text{Tan}\theta = \frac{\text{Opp}}{\text{Adj}} = \frac{y}{x}$

$\text{Tan}\theta = \frac{y\text{ -coord}}{x\text{ - coord}}$

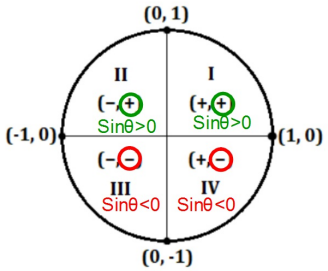
You may end up with complex fractions to simplify and denominators to rationalize.



Since Cosθ = x-coord at θ

Cosθ will be **positive** in Quadrants I and IV
(where x-coord is pos)

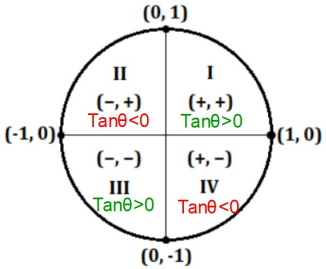
Cosθ will be **negative** in Quadrants II and III
(where x-coord is neg)



Since Sinθ = y-coord at θ

Sinθ will be **positive** in Quadrants I and II
(where y-coord is pos)

Sinθ will be **negative** in Quadrants III and IV
(where y-coord is neg)



Since $\text{Tan}\theta = \frac{\text{y-coord}}{\text{x-coord}}$

Tanθ will be positive
when x & y have the same sign -
in Quadrants I and III
(x & y are both pos or both neg)

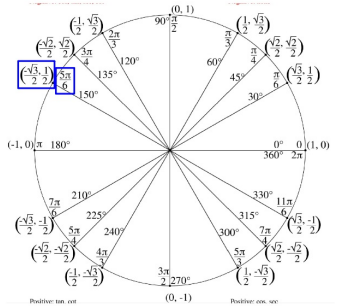
Tanθ will be negative
when x & y have different signs -
in Quadrants II and IV

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

1. $\tan\frac{5\pi}{6} = \frac{\frac{1}{2}}{\frac{-\sqrt{3}}{2}}$

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

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



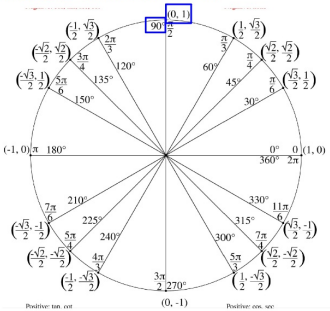
Use the Unit Circle to find the EXACT value of each.

2. $\tan 450°$

$450° - 360° = 90°$

$\tan 450° = \tan 90°$

$= \frac{1}{0} = \boxed{\text{Undefined}}$



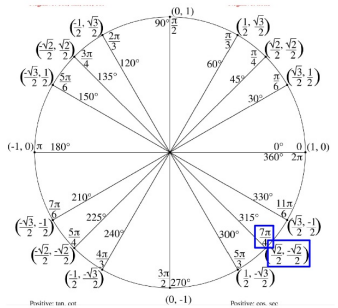
Use the Unit Circle to find the EXACT value of each.

3. $\tan\frac{15\pi}{4}$

$\frac{15\pi}{4} - 2\pi = \frac{15\pi}{4} - \frac{8\pi}{4} = \frac{7\pi}{4}$

$\tan\frac{15\pi}{4} = \tan\frac{7\pi}{4}$

$= \frac{\frac{-\sqrt{2}}{2}}{\frac{\sqrt{2}}{2}} = \boxed{-1}$



You can now finish the rest of Practice #23.

Practice #23 will be due
on Saturday, May 2 by 10:00pm.