

Name: _____

Unit 6 Practice Test: Unit Circle

Objectives: I can convert from degrees to radians and radians to degrees. I can use the unit circle to evaluate trigonometric functions. I can find other trigonometric functions given a trigonometric function.

1. What is the radian measure of a 120° angle?

$$\frac{120^\circ}{180^\circ} = \frac{12}{18} = \frac{2}{3}$$

120° is $\frac{2}{3}$ of semicircle,
so radian measure is $\frac{2}{3}$ of π

or $\left(\frac{2}{3}\pi\right)$

2. What is the degree measure of an angle of $\frac{\pi}{3}$ radians?

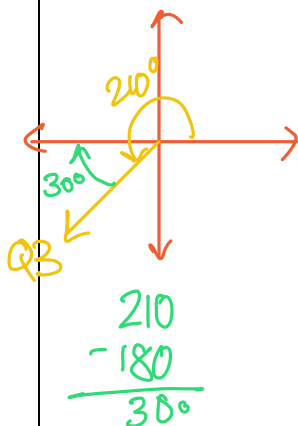
$$\frac{\pi}{3} = \frac{1}{3}\pi$$

$\swarrow$ $\frac{1}{3}$ of semicircle

$$\frac{1}{3}(180) = 60^\circ$$

3. Determine the coterminal angle from $0^\circ \leq \theta < 360^\circ$, the quadrant and the reference angle of -150° .

$$-150 + 360 = 210^\circ$$

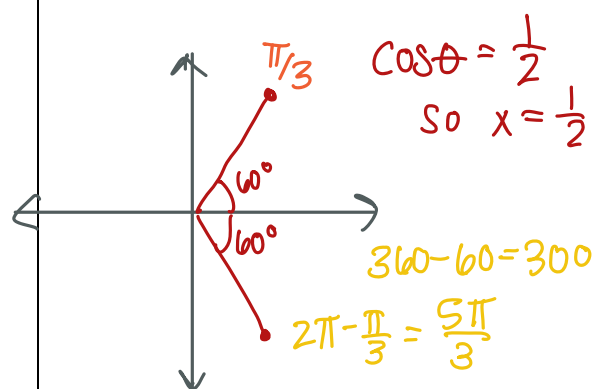


Coterminal Angle: 210°

Quadrant: Q3

Reference Angle: 30°

4. If $\cos \theta = \frac{1}{2}$ and the reference angle of θ is 60° find both angles in degrees from $0^\circ \leq \theta < 360^\circ$ and both angles in radians from $0 \leq \theta < 2\pi$



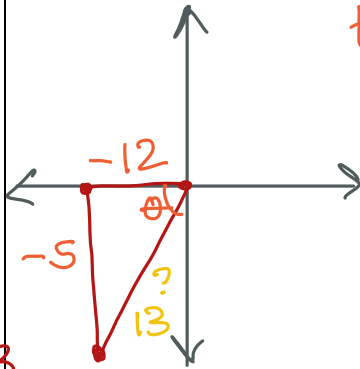
60° or $\frac{\pi}{3}$ radians

300° or $\frac{5\pi}{3}$ radians

5. If $\tan \theta = 5/12$, find $\cos \theta$, when θ is in Q3.
(Hint: draw a picture).

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

Q3



$$c^2 = (-5)^2 + (-12)^2$$

$$c^2 = 25 + 144$$

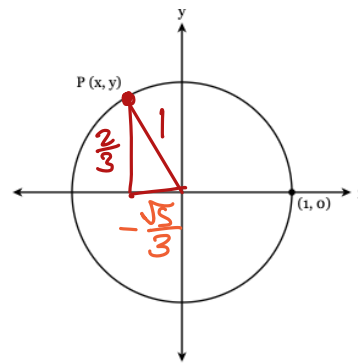
$$\sqrt{c^2} = \sqrt{169}$$

$$c = 13$$

$$\cos \theta = \frac{-12}{13}$$

*Note $\cos \theta$ is negative if Q3!

6. The point $P = (x, \frac{2}{3})$ lies on the unit circle shown below. What is the value of x in simplest form?



(Note: the figure is not drawn to scale)

x is negative in Q2

$$1^2 = (\frac{2}{3})^2 + b^2$$

$$1 = \frac{4}{9} + b^2$$

$$1 - \frac{4}{9} = b^2$$

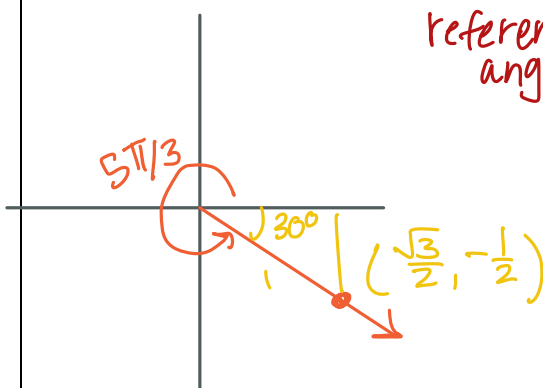
$$\frac{5}{9} = b^2 \quad b = \frac{-\sqrt{5}}{3}$$

$$x = \frac{-\sqrt{5}}{3}$$

7. Evaluate $\cot(\frac{5\pi}{3})$.

$$2\pi - \frac{5\pi}{3} = \frac{6\pi}{3} - \frac{5\pi}{3} = \frac{\pi}{3}$$

reference angle

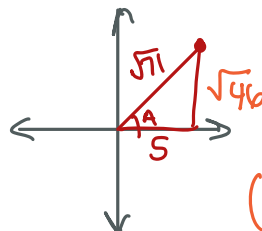


$$\cot(\frac{5\pi}{3}) = \frac{\cos(\frac{5\pi}{3})}{\sin(\frac{5\pi}{3})} = \frac{\frac{\sqrt{3}}{2}}{-\frac{1}{2}} = \frac{\sqrt{3}}{2} \cdot -\frac{2}{1} = -\sqrt{3}$$

$$\cot(\frac{5\pi}{3}) = -\sqrt{3}$$

8. Given $\sec A = \frac{\sqrt{71}}{5}$ and A is in Q1, find the exact value of $\csc A$ in simplest radical form using a rational denominator.

$$\sec A = \frac{\text{hyp}}{\text{adj}}$$



$$(\sqrt{71})^2 = 5^2 + a^2$$

$$71 = 25 + a^2$$

$$71 - 25 = a^2$$

$$46 = a^2$$

$$a = \sqrt{46}$$

$$\csc A = \frac{\text{hyp}}{\text{opp}}$$

$$\csc A = \frac{\sqrt{71}}{\sqrt{46}} = \frac{\sqrt{71}\sqrt{46}}{46}$$

positive since we are in Q1

$$= \frac{\sqrt{3266}}{46}$$