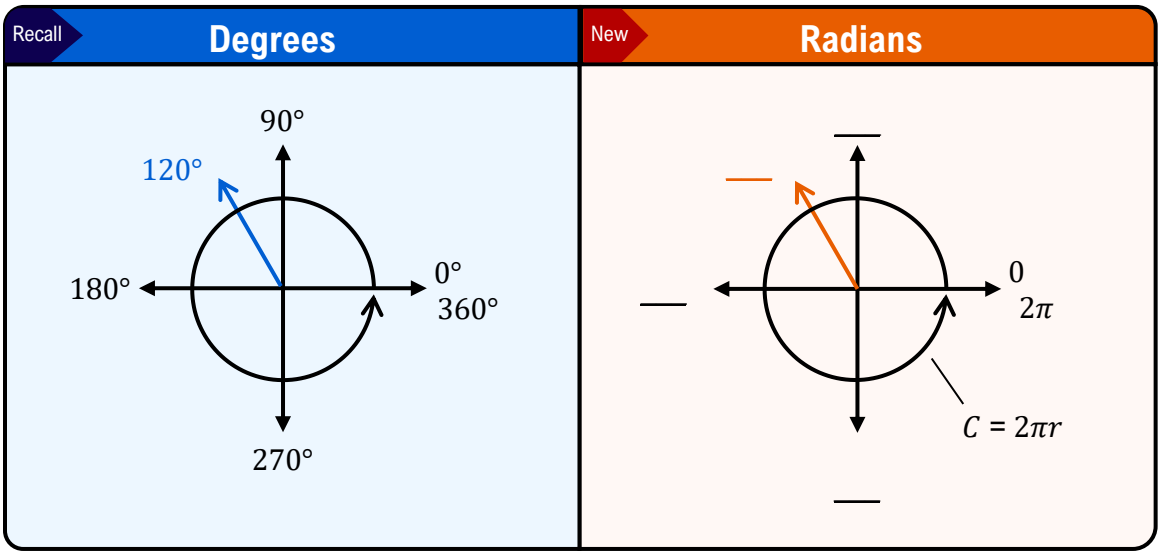
Converting between Degrees & Radians

◆ **Radians:** A different unit for measuring angles, based on a circle's circumference. Full circle = 360° = ____ radians



$\theta_{rad} = \frac{\pi}{180} \cdot \theta_{deg}$

(degrees to radians)

$\theta_{deg} = \frac{180}{\pi} \cdot \theta_{rad}$

(radians to degrees)

EXAMPLE Convert the angle from degrees to radians or from radians to degrees.

$(\boldsymbol{A})$

$120°$

$(\boldsymbol{B})$

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

TOPIC: RADIANS

PRACTICE Convert the angle $540°$ from degrees to radians.

Recall

$$\theta_r = \frac{\pi}{180°} \cdot \theta_d$$
(*degrees to radians*)

$$\theta_d = \frac{180°}{\pi} \cdot \theta_r$$
(*radians to degrees*)

PRACTICE Convert the angle $-\frac{5\pi}{6}$ from radians to degrees.

Recall

$$\theta_r = \frac{\pi}{180°} \cdot \theta_d$$
(*degrees to radians*)

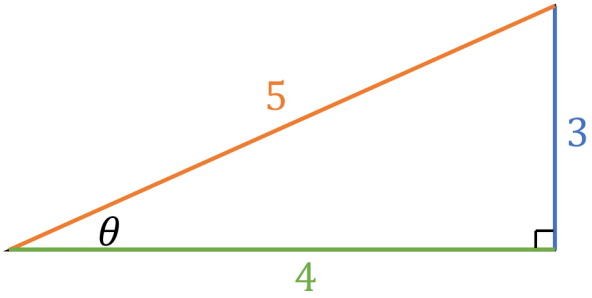
$$\theta_d = \frac{180°}{\pi} \cdot \theta_r$$
(*radians to degrees*)

TOPIC: RIGHT TRIANGLE TRIGONOMETRY

Introduction to Trigonometric Functions

◆ **Trig Functions** relate _____ to side lengths in right triangles.

- The three main trig functions are Sine, Cosine, & Tangent which are _____.



SOH-CAH-TOA

New **Trig Functions**

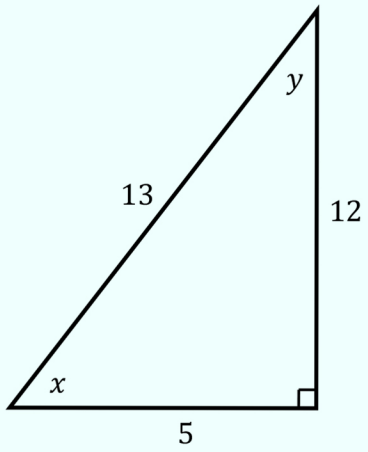
SOH	CAH	TOA
$\sin\theta = \frac{Opposite\ Side}{Hypotenuse}$	$\cos\theta = \frac{Adjacent\ Side}{Hypotenuse}$	$\tan\theta = \frac{Opposite\ Side}{Adjacent\ Side} = \frac{\sin\theta}{\cos\theta}$
$\sin\theta = \frac{\quad}{\quad}$	$\cos\theta = \frac{\quad}{\quad}$	$\tan\theta = \frac{\quad}{\quad}$

EXAMPLE Find the value of the trig function indicated, given the triangle.

(***A***) $\sin x$

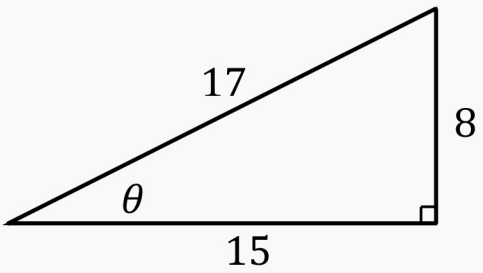
(***B***) $\tan x$

(***C***) $\cos y$

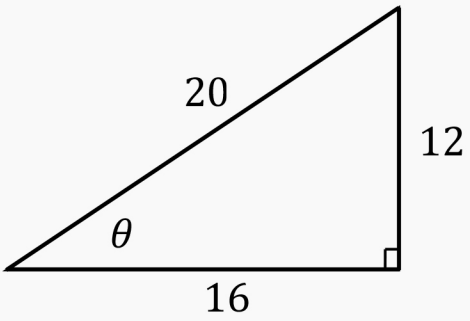


TOPIC: RIGHT TRIANGLE TRIGONOMETRY

PRACTICE Given the right triangle below, evaluate $\cos(\theta)$.



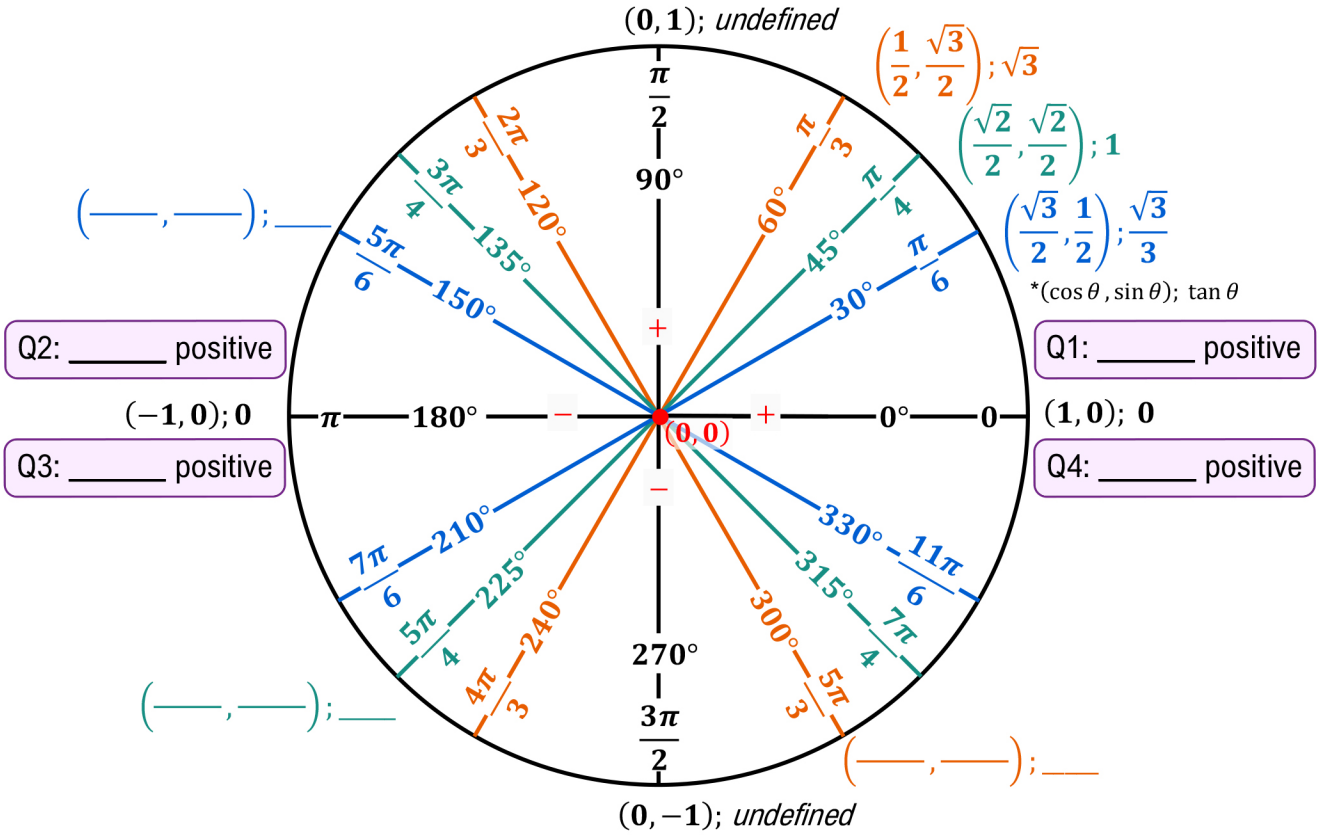
PRACTICE Given the right triangle below, evaluate $\tan(\theta)$.



TOPIC: REFERENCE ANGLES

Trig Values in Quadrants II, III, & IV

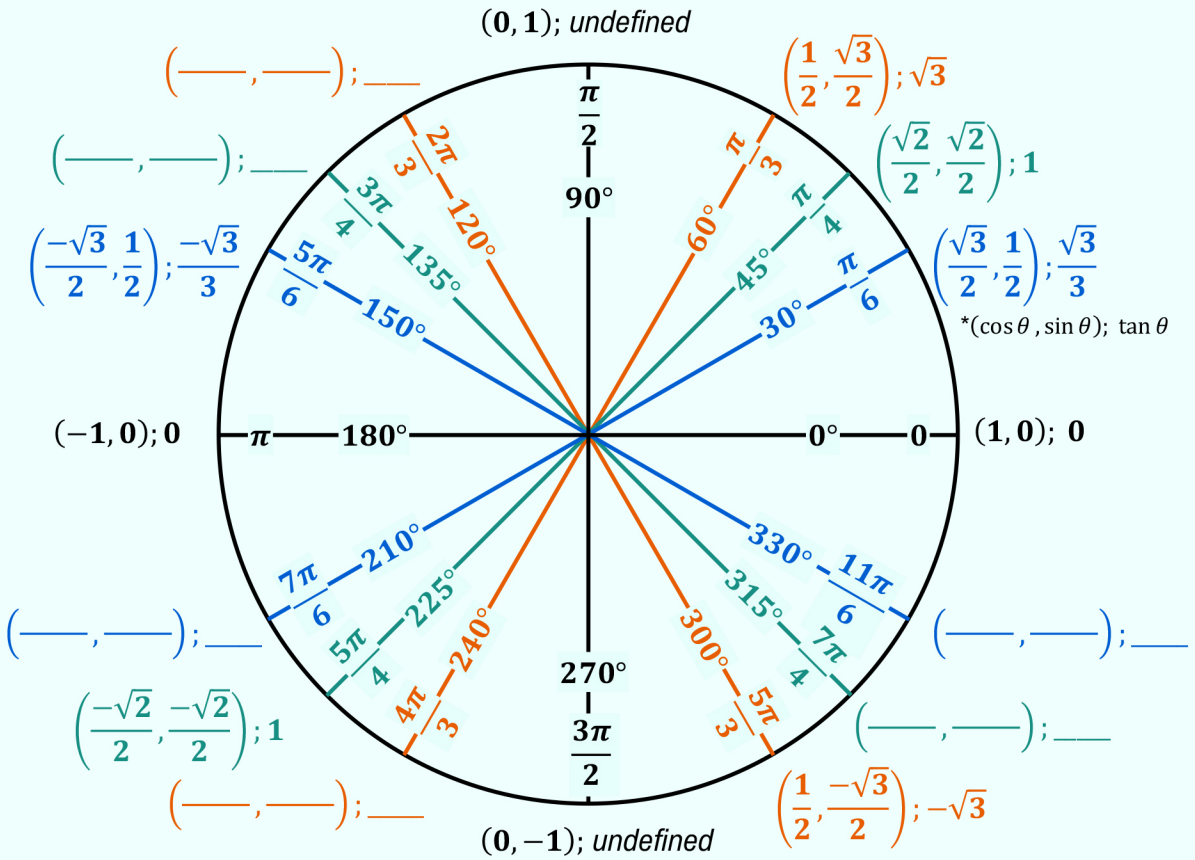
- The sin, cos, & tan of angles *NOT* in Q1 have the same **value** as the sin, cos, & tan of their reference angles.
  - *HOWEVER*, the _____ of the values will change based on their quadrant.



ASTC (All Students Take Calculus)

TOPIC: REFERENCE ANGLES

EXAMPLE Use reference angles to complete the missing trig values in quadrants II, III, & IV of the unit circle.



PRACTICE Identify what angle, θ, satisfies the following conditions.

(***A***)

$\sin\theta = \frac{1}{2}; \tan\theta < 0$

$\theta =$ _____

(***B***)

$\cos\theta = \frac{\sqrt{3}}{2}; \sin\theta < 0$

$\theta =$ _____

(***C***)

$\tan\theta = -1; \cos\theta > 0$

$\theta =$ _____

TOPIC: REFERENCE ANGLES

EXAMPLE Fill in all missing information in the unit circle below.