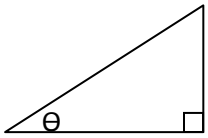
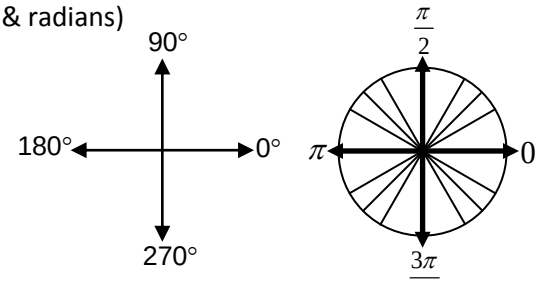
PRE-CALCULUS REVIEW, Part 3 (Trigonometry)
Concepts/Skills to know:



- Sketch and label a **right triangle**, mark the **right angle** and identify the **hypotenuse**.
- Find values of trig ratios: $\sin\theta = \frac{opposite}{hypotenuse}$ $\cos\theta = \frac{adjacent}{hypotenuse}$ $\tan\theta = \frac{opposite}{adjacent}$ (fraction & decimal)
- Use Pythagorean theorem $\mathbf{a^2 + b^2 = c^2}$ for any right triangle (**c** is the hypotenuse).
- Identify **initial side** and **terminal side** of **angle θ** (degrees & radians) on the coordinate plane and the **quadrant**.
- Define **radian** measure of angle.
- Sketch angles with various measures (degrees & radians) on the coordinate plane & identify how **radian** measure and **degree** measure are related to each other.

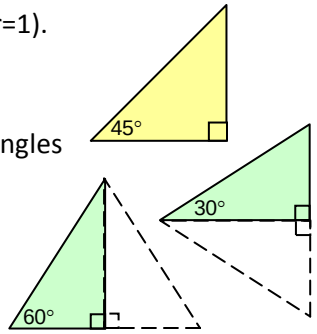


- Given point **(x, y)**, find trig values for **angle θ** and **r** (distance from **origin**) on coordinate plane (Unit Circle, r=1).

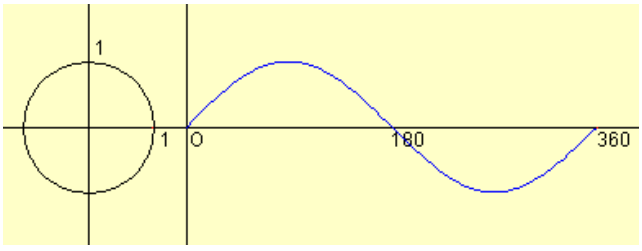
$$\sin\theta = \frac{y}{r} \qquad \cos\theta = \frac{x}{r} \qquad \tan\theta = \frac{y}{x}$$

- Use Pythagorean Theorem $\mathbf{x^2 + y^2 = r^2}$ for reference triangle of angle θ on coordinate plane (Unit circle: $x^2+y^2=1$).
- Given **angle θ** and **r**, find **x** and **y** values, and **slope** in the coordinate plane (Unit Circle, r=1).

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



- Find **exact values** of sides of special **30°-60°** right triangles and special **45°-45°** right triangles by using **Pythagorean Theorem** and by **simplifying radicals**.
- Sketch reference right triangles for given angles in the **unit circle**.
- Find **exact values** for **sinθ**, **cosθ**, and **tanθ** of the unit circle on the coordinate plane. (Identify positive & negative coordinates.)
- Find **(cosθ, sinθ)** coordinate values for given angles (radians and degrees) in the unit circle.
- Complete a **table** of key values and graph **sine** and **cosine function waves** and their transformations. Use radian and degree angle measure, identify y-intercept, x-intercepts, and maximum & minimum values.



- Find angle measure by using **inverse** trig function and by graph (**x** is angle measure, degrees or radians, **y** is trig function value):

$$\sin(x) = y \Leftrightarrow x = \sin^{-1}(y)$$
$$\cos(x) = y \Leftrightarrow x = \cos^{-1} y$$
$$\tan(x) = y \Leftrightarrow x = \tan^{-1} y$$
$$\csc(x) = y \Leftrightarrow x = \csc^{-1}(y) = \sin^{-1}\left(\frac{1}{y}\right)$$
$$\sec(x) = y \Leftrightarrow x = \sec^{-1}(y) = \cos^{-1}\left(\frac{1}{y}\right)$$
$$\cot(x) = y \Leftrightarrow x = \cot^{-1}(y) = \tan^{-1}\left(\frac{1}{y}\right)$$