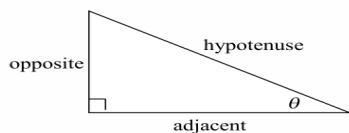# TRIG CHEAT SHEET
DEFINITION OF THE TRIG FUNCTIONS

Right Triangle Definition
For this definition we assume that
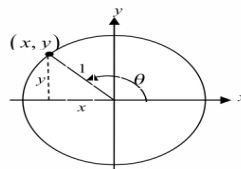
$$0 < \theta < \frac{\pi}{2} \text{ or } 0° < \theta < 90° .$$

$$\sin\theta = \frac{\text{opposite}}{\text{hypotenuse}} \qquad \csc\theta = \frac{\text{hypotenuse}}{\text{opposite}}$$

$$\cos\theta = \frac{\text{adjacent}}{\text{hypotenuse}} \qquad \sec\theta = \frac{\text{hypotenuse}}{\text{adjacent}}$$

$$\tan\theta = \frac{\text{opposite}}{\text{adjacent}} \qquad \cot\theta = \frac{\text{adjacent}}{\text{opposite}}$$

Unit Circle Definition
For this definition θ is any angle.

$$\sin\theta = \frac{y}{1} = y \qquad \csc\theta = \frac{1}{y}$$

$$\cos\theta = \frac{x}{1} = x \qquad \sec\theta = \frac{1}{x}$$

$$\tan\theta = \frac{y}{x} \qquad \cot\theta = \frac{x}{y}$$

FACTS AND PROPERTIES

Domain
The domain is all the values of θ that can be plugged into the function.

$$\sin\theta , \quad \theta \text{ can be any angle}$$
$$\cos\theta , \quad \theta \text{ can be any angle}$$
$$\tan\theta , \quad \theta \neq \left(n + \frac{1}{2}\right)\pi , \quad n = 0, \pm 1, \pm 2, \ldots$$
$$\csc\theta , \quad \theta \neq n\pi , \quad n = 0, \pm 1, \pm 2, \ldots$$
$$\sec\theta , \quad \theta \neq \left(n + \frac{1}{2}\right)\pi , \quad n = 0, \pm 1, \pm 2, \ldots$$
$$\cot\theta , \quad \theta \neq n\pi , \quad n = 0, \pm 1, \pm 2, \ldots$$

Range
The range is all possible values to get out of the function.

$$-1 \leq \sin\theta \leq 1 \qquad \csc\theta \geq 1 \text{ and } \csc\theta \leq -1$$
$$-1 \leq \cos\theta \leq 1 \qquad \sec\theta \geq 1 \text{ and } \sec\theta \leq -1$$
$$-\infty < \tan\theta < \infty \qquad -\infty < \cot\theta < \infty$$

Period
The period of a function is the number, T, such that $f(\theta + T) = f(\theta)$. So, if ω is a fixed number and θ is any angle we have the following periods.

$$\sin(\omega\theta) \rightarrow \quad T = \frac{2\pi}{\omega}$$
$$\cos(\omega\theta) \rightarrow \quad T = \frac{2\pi}{\omega}$$
$$\tan(\omega\theta) \rightarrow \quad T = \frac{\pi}{\omega}$$
$$\csc(\omega\theta) \rightarrow \quad T = \frac{2\pi}{\omega}$$
$$\sec(\omega\theta) \rightarrow \quad T = \frac{2\pi}{\omega}$$
$$\cot(\omega\theta) \rightarrow \quad T = \frac{\pi}{\omega}$$