

## Formula Sheet: Trigonometric Functions

### Definitions:

- **Periodic Function:**  
*A function whose outputs repeat at a certain interval.*
- **Period:**  
*Distance between two peaks*
- **Midline:**  
*Horizontal line which the periodic function oscillates*
- **Amplitude:**  
*Vertical distance from the midline to the peak*
- **Reference Angle:**  
*Smallest angle creating by drawing a line to the x-axis at a given point*
- **Domain:**  
*All the possible inputs in a function*
- **Range:**  
*All the possible outputs in a function*

### Formulas:

- **Pythagorean Theorem:**  
$$c^2 = a^2 + b^2$$
- **How to find  $x$  with  $\theta$  and radius  $r$**   
$$x = r\cos(\theta)$$
- **How to find  $y$  with  $\theta$  and radius  $r$**   
$$y = r\sin(\theta)$$
- **Radius:**  
$$r = \sqrt{x^2 + y^2}$$
- **Convert Degrees to Radians**  
$$\text{deg} \left( \frac{\pi}{180} \right) = \text{rad}$$
- **Convert Radians to Degrees**  
$$\text{rad} \left( \frac{180}{\pi} \right) = \text{deg}$$
- **Arc Length:**  
$$S = r\theta \quad (\theta \text{ is in radians})$$
- **Cosine and Sine in Standard Form:**  
$$y = A\sin(B(x - h)) + k$$
$$y = A\cos(B(x - h)) + k$$
- **Period:**  
$$\text{Period} = \frac{2\pi}{B}$$