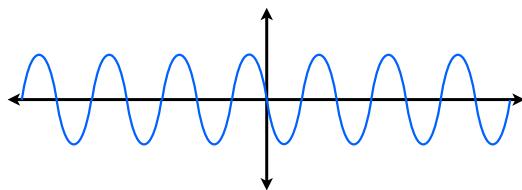


The sinusoid function is a mathematical function that describes a smooth repetitive oscillation.

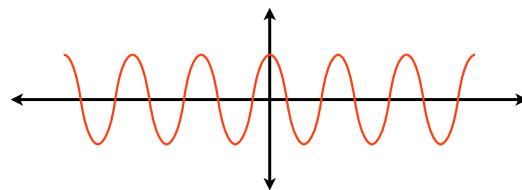
The **Sine** function and **Cosine** function are both sinusoidal functions.

The graph of sinusoidal functions form a wave, often referred to as sine wave.

$$y = \sin x$$



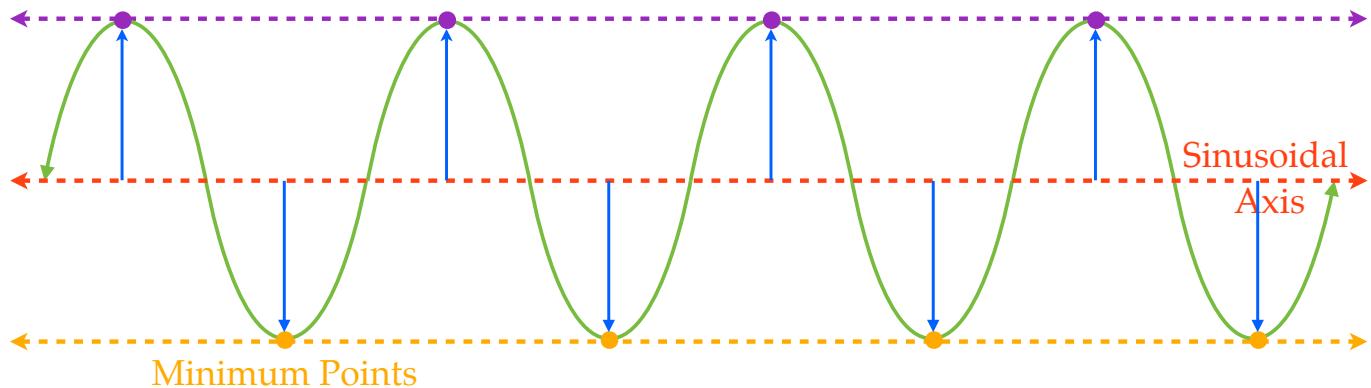
$$y = \cos x$$



Properties of a Sine Wave

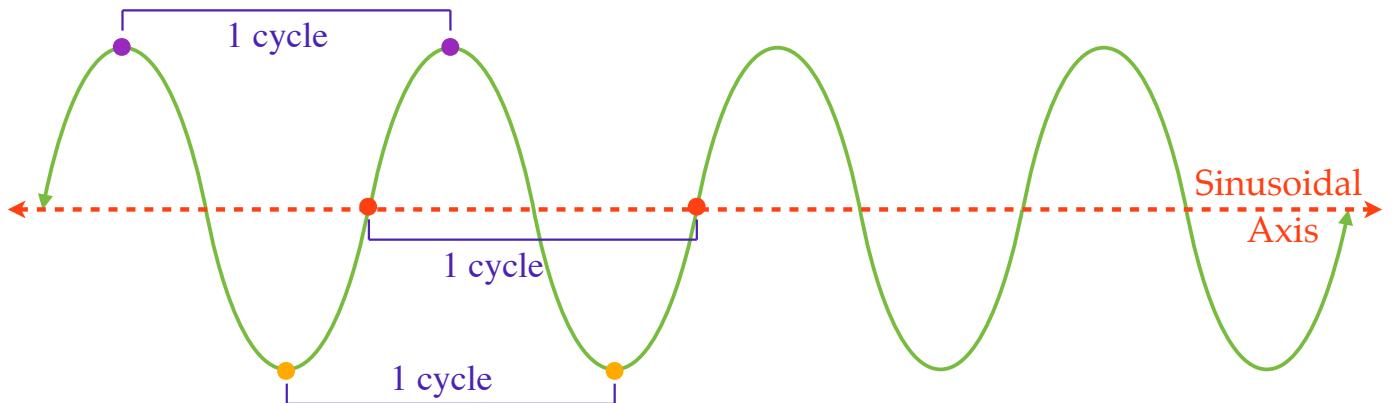
Maximum Points

Amplitude - the **distance** from sinusoidal axis to a **max** or **min** point.



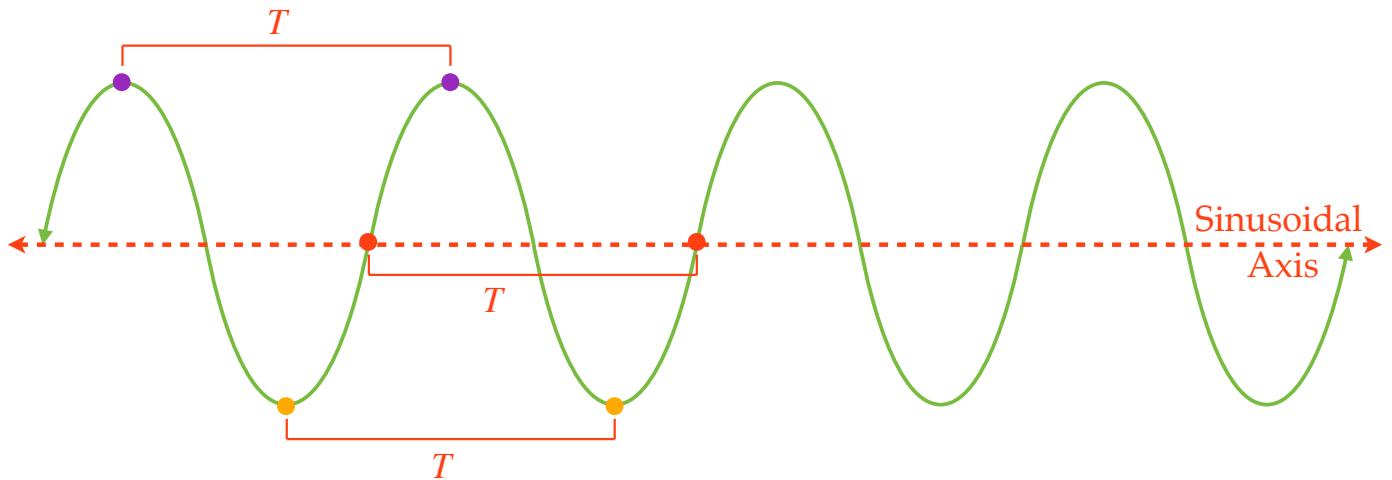
Cycle

A portion of the graph from one point to another point at which the graph starts repeating itself.



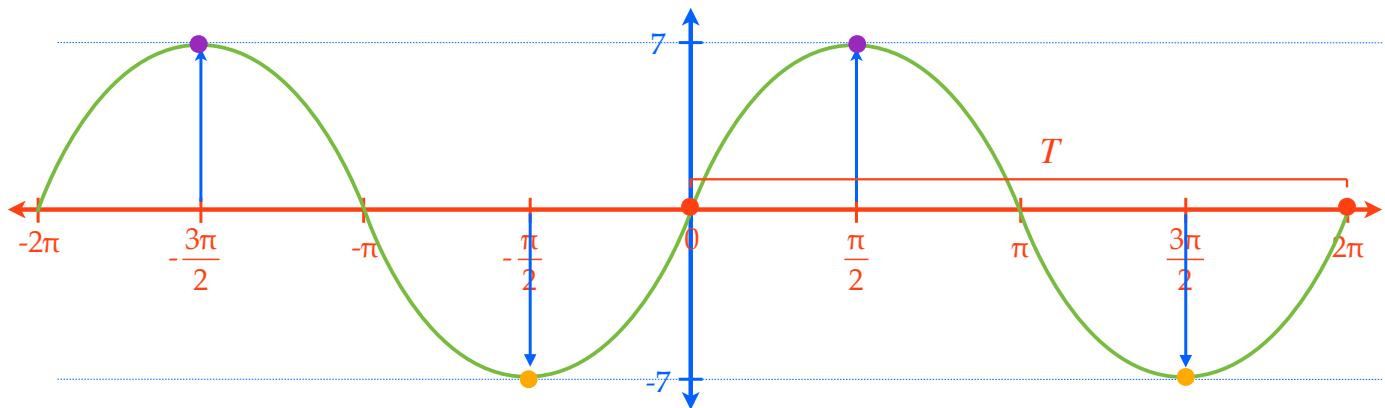
Period

The **measurement**, in degrees or radians, it takes to complete one **cycle**.



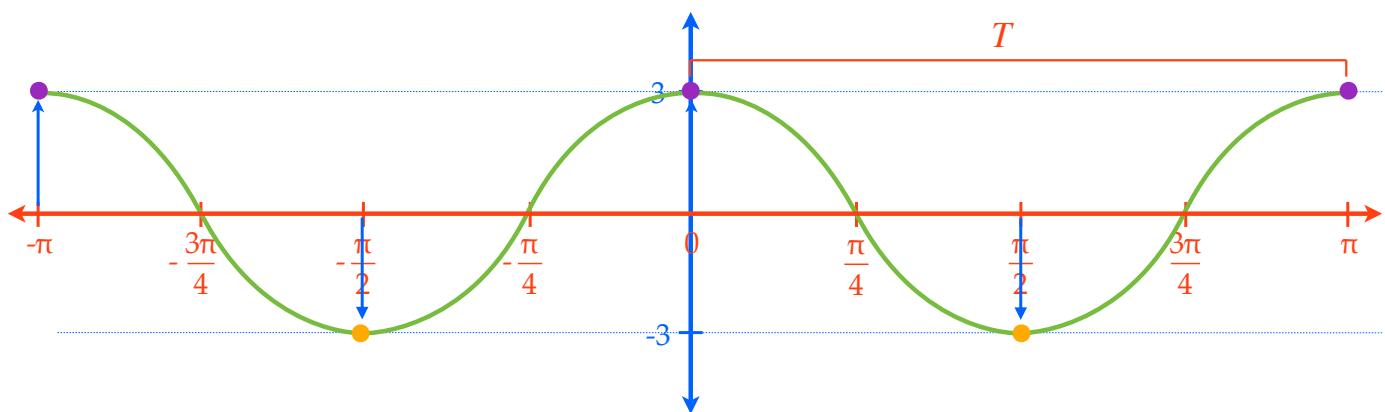
Sinusoidal Axis - x -axis Period = 2π

Amplitude = 7



Sinusoidal Axis - x -axis Period = π

Amplitude = 3



Sinusoidal Equations

$$y = \sin x$$

$$y = \cos x$$

$$y = a \sin (bx - c) + d \quad \longleftrightarrow \quad y = a \cos (bx - c) + d$$

$$y = a \sin [b(x - c)] + d$$

$$y = a \cos [b(x - c)] + d$$

Amplitude = $|a|$ Period = $\frac{2\pi}{b}$ H. Phase Shift = $\frac{c}{b}$ V. Phase Shift = d
 $c > 0$, right; $c < 0$, left $d > 0$, up; $d < 0$, down