

# Graphs of $\sin \theta$ , $\cos \theta$ , $\tan \theta$

also called trig functions

Recall:  $\sin \theta$

$\sin(0)$	$\sin(\frac{\pi}{6})$	$\sin(\frac{\pi}{4})$	$\sin(\frac{\pi}{3})$	$\sin(\frac{\pi}{2})$
$= 0$	$= \frac{1}{2}$	$= \frac{\sqrt{2}}{2}$	$= \frac{\sqrt{3}}{2}$	$= 1$
	$= 0.50$	$\approx 0.7$	$\approx 0.9$	

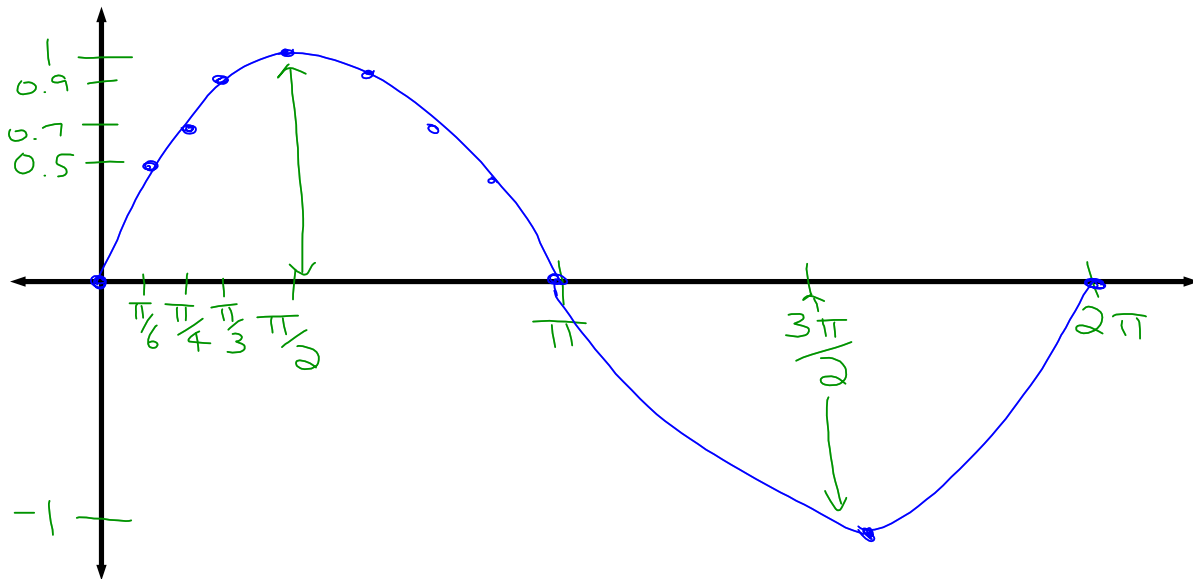
Note: as we change  $\theta$ , different values of  $\sin \theta$  result

Let  $\theta = x$

$\theta$  is an Independent Variable, ie. x

Resulting values are Dependent variable, ie. y

Let's graph  $y = \sin \theta$  over  $[0, 2\pi]$



## Definitions

Periodic Function = function whose graph has a pattern that repeats itself over and over.

Period = the length of one full pattern.  
ex. in sine graph its  $2\pi$

Amplitude = vertical deviation of graph from middle (sinusoidal axis).  
ex. for sine Amp = 1

Sinusoidal Axis = horizontal axis above and below which the graph fluctuates. It defines the amplitude.

## Characteristics of sine function

$$y = \sin \theta$$

Period:  $2\pi$

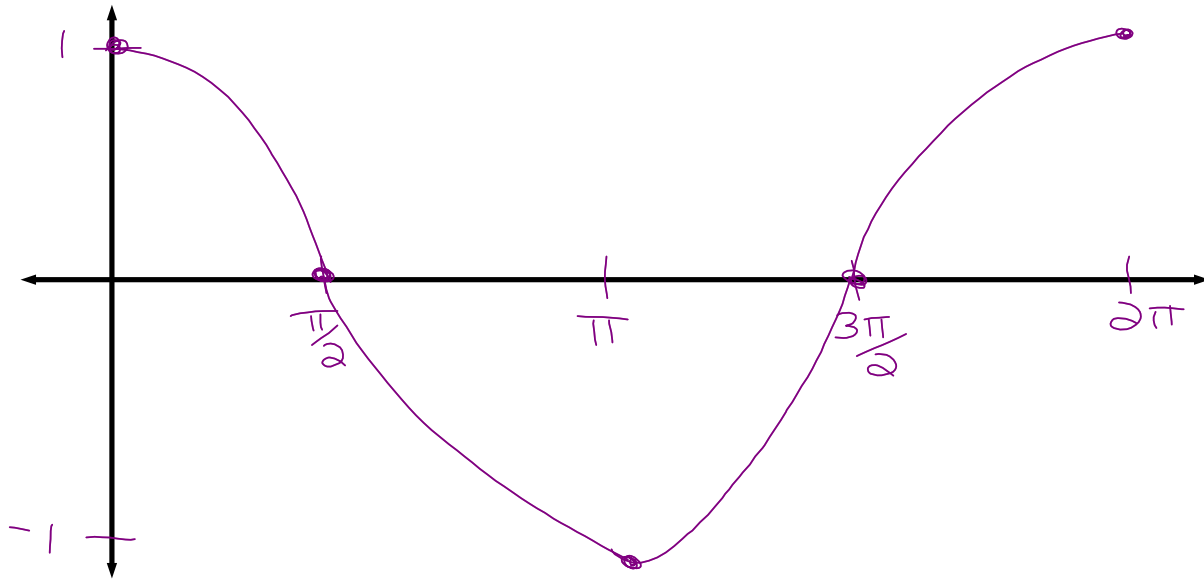
Amp: 1

Domain: In general  $(-\infty, \infty)$

Range: In general  $[-1, 1]$

Zeroes: In general  $x = k\pi$ ,  $k \in \mathbb{I}$   
(x-ints)

ex. Graph  $y = \cos \theta$  over  $[0, 2\pi]$



## Characteristics of cosine function

$$y = \cos \theta$$

Period:  $2\pi$

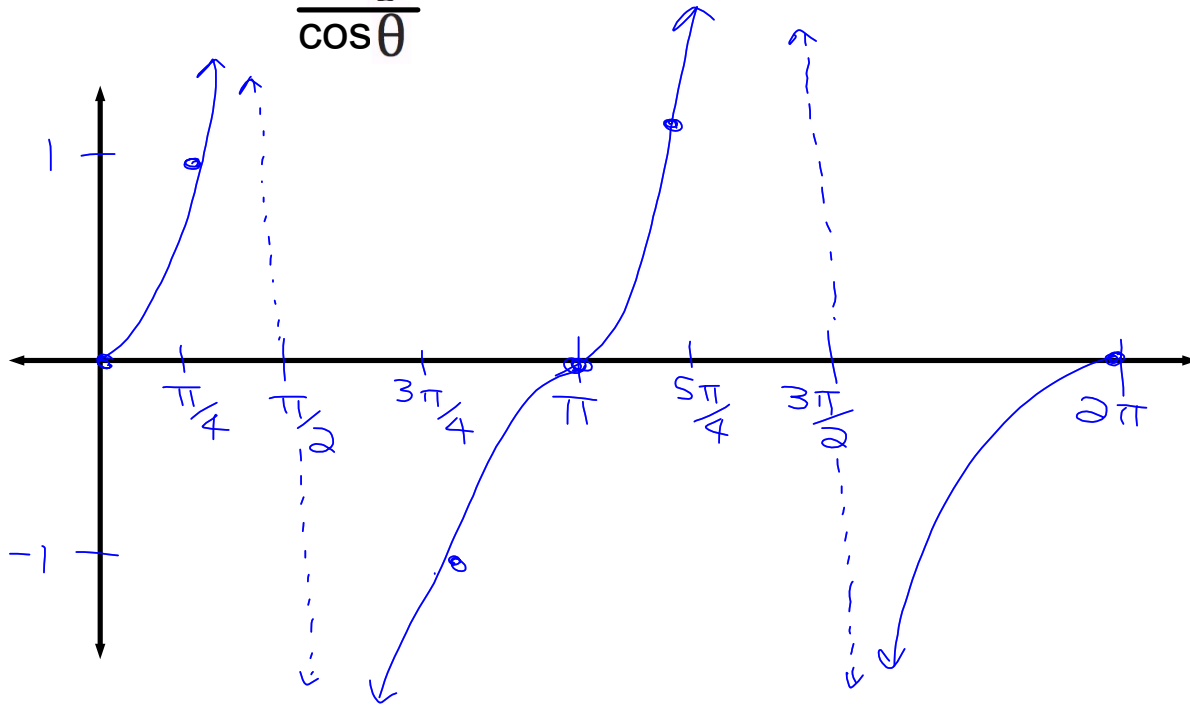
Amp: 1

Domain: In general  $(-\infty, \infty)$

Range: In general  $[-1, 1]$

Zeros: In general  $x = \frac{\pi}{2} + \pi k$ ,  $k \in \mathbb{I}$   
(x-ints)

ex. Graph  $y = \tan \theta$  over  $[0, 2\pi]$   
 $= \frac{\sin \theta}{\cos \theta}$



## Characteristics of tangent function

$$y = \tan \theta$$

Period:  $\pi$

Amp: none

Domain: In general  $x \neq \frac{\pi}{2} + k\pi$ ,  $k \in \mathbb{I}$

Range: In general  $(-\infty, \infty)$

Equations for asymptotes:  $x = \frac{\pi}{2} + k\pi$ ,  $k \in \mathbb{I}$

Zeroes: In general  $x = k\pi$ ,  $k \in \mathbb{I}$