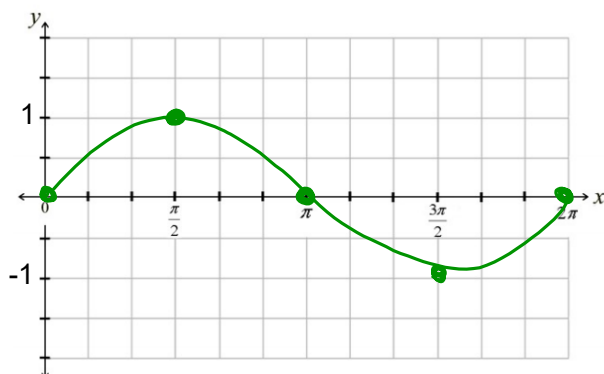


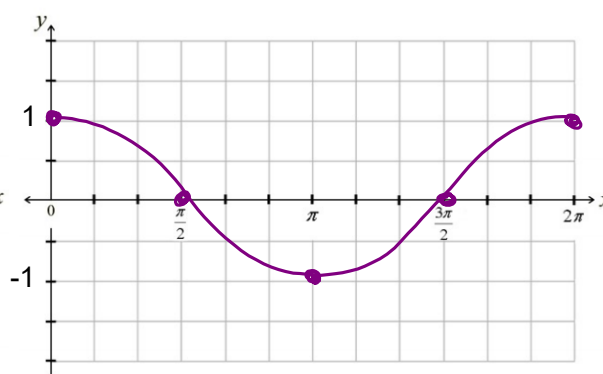
9.3 - Graphing Trig. Functions - Day 2

Warm - Up: Graph one cycle of each.

$$y = \sin \theta$$



$$y = \cos \theta$$



Take note

Concept Summary Properties of Sine Functions

Suppose $y = a \sin b\theta$, with $a \neq 0$, $b > 0$, and θ in radians.

- $|a|$ is the amplitude of the function.
- b is the number of cycles in the interval from 0 to 2π .
- $\frac{2\pi}{b}$ is the period of the function.

You can use five points equally spaced through one cycle to sketch a sine curve. For $a > 0$, this five-point pattern is zero-max-zero-min-zero.

Take note

Concept Summary Properties of Cosine Functions

Suppose $y = a \cos b\theta$, with $a \neq 0$, $b > 0$, and θ in radians.

- $|a|$ is the amplitude of the function.
- b is the number of cycles in the interval from 0 to 2π .
- $\frac{2\pi}{b}$ is the period of the function.

To graph a cosine function, locate five points equally spaced through one cycle. For $a > 0$, this five-point pattern is max-zero-min-zero-max.

Steps:

1. Identify the amplitude and period. (*Also, state if there is a reflection*)
2. Find the x-values for the five key points (*starting at zero*), by dividing the period by four. Then adding quarter periods.
3. Label the x and y-axis.
4. Graph using either a sine or cosine curve (*smooth*).
5. If there is a midline change (vertical shift), apply that last by moving each point appropriately. (*We will add this in tomorrow!*)

Ex.1) Find the unknowns and graph **one cycle**.

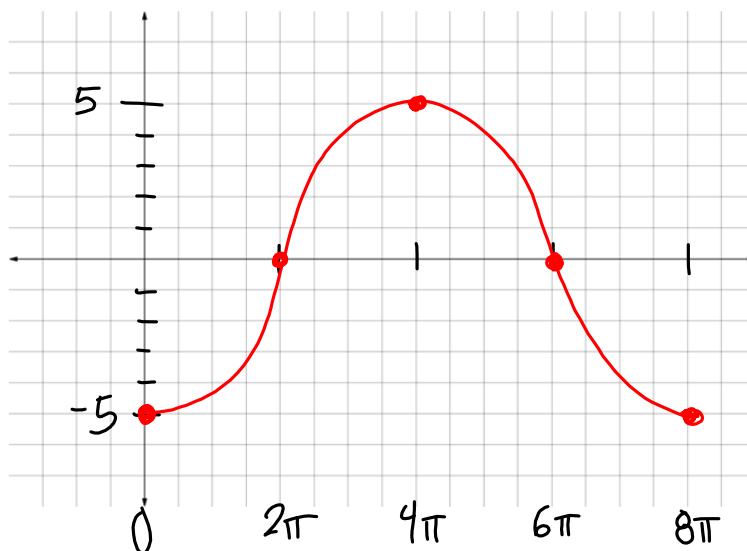
$$y = -5 \cos \frac{\theta}{4}$$

Amplitude = 5

Reflection? Yes / No (circle one)

Period = $\frac{8\pi}{4} = 2\pi$

$$8\pi \cdot \frac{1}{4} = 2\pi, 4\pi, 6\pi, 8\pi$$



Ex.2) Find the unknowns and graph **one cycle**.

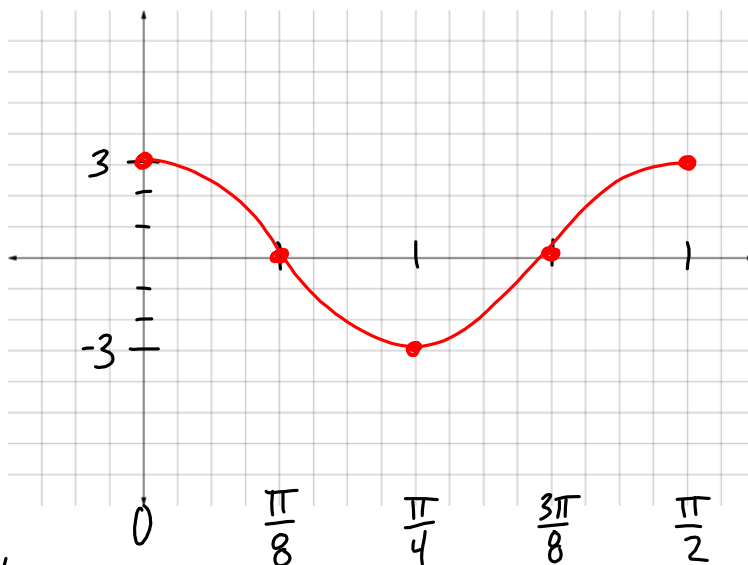
$$y = 3\cos 4\theta$$

Amplitude = 3

Reflection? Yes No (circle one)

Period = $\frac{\pi/2}{4} = \frac{2\pi}{4}$

$$\frac{\pi/2}{4} = \frac{\pi}{8}, \frac{2\pi}{8}, \frac{3\pi}{8}, \frac{4\pi}{8}$$



Ex.3) Find the unknowns and graph **one cycle**.

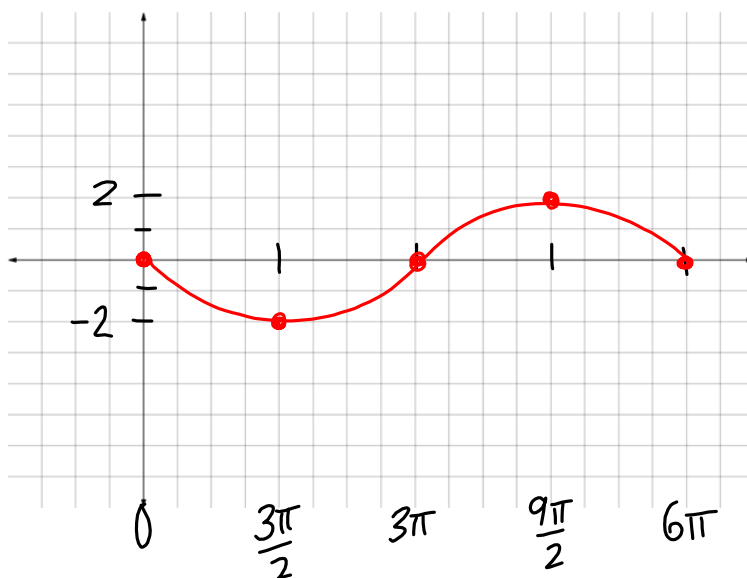
$$y = -2\sin \frac{\theta}{3}$$

Amplitude = 2

Reflection? Yes No (circle one)

Period = $\frac{6\pi}{1/3} = 2\pi$

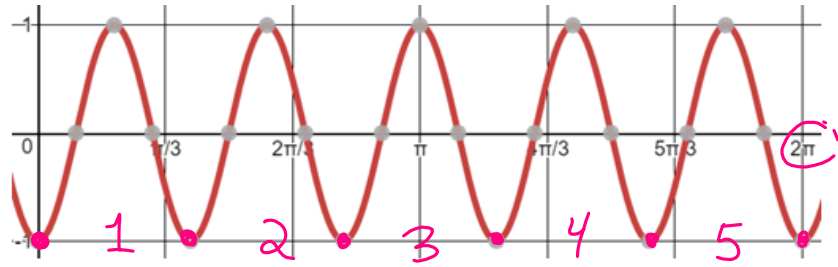
$$6\pi \cdot \frac{1}{4} = \frac{3\pi}{2}, \frac{6\pi}{2}, \frac{9\pi}{2}, \frac{12\pi}{2}$$



General Form: $y = a \sin b\theta$ $y = a \cos b\theta$

Ex.4) Given the graph... Find the unknowns... Write the function.

Sine or **Cosine**?
(circle one)



a - value: -1, b-value: 5, Function: $y = -\cos 5\theta$

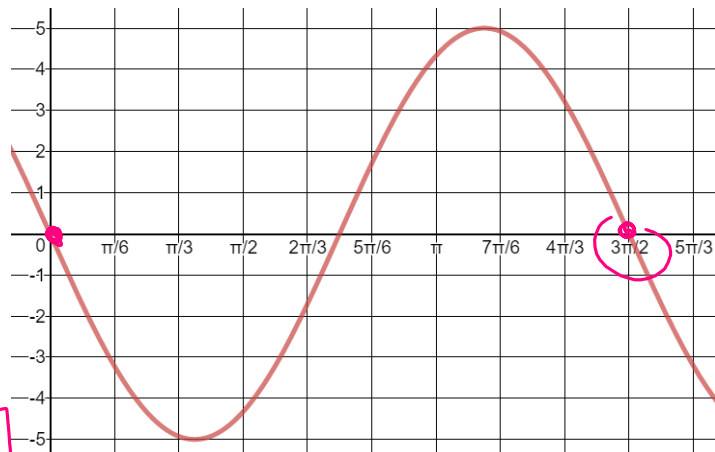
General Form: $y = a \sin b\theta$ $y = a \cos b\theta$

Ex.5) Given the graph... Find the unknowns... Write the function.

Sine or Cosine?
(circle one)

a - value: -5,

b-value: 4/3,



Function:

$y = -5 \sin \frac{4\theta}{3}$

$\frac{2\pi}{b} = \frac{3\pi}{2}$ $3\pi \cdot b = 4\pi$
 $b = \frac{4}{3}$