

9.3 - Graphing Trig. Functions - Day 3

Warm - Up

Find the unknowns first. Set up your x and y axis next. Then graph, in radians, **one complete cycle**.

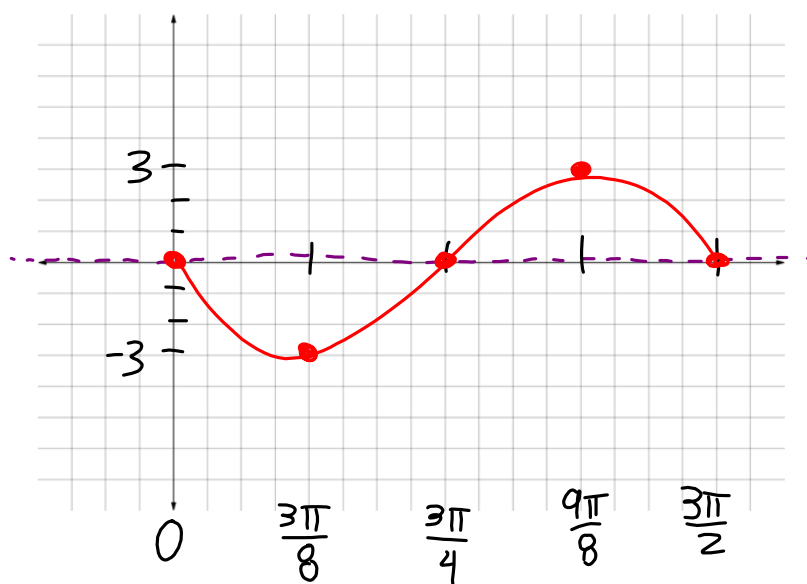
$$y = -3 \sin \frac{4}{3} \theta$$

Amplitude = 3

Reflection? Yes / No (circle one)

Period = $\frac{3\pi}{2}$ $\frac{2\pi}{\frac{4}{3}}$

Midline: $y=0$



Take note

Concept Summary Families of Sine and Cosine Functions

Parent Function

$$y = \sin x$$

$$y = \cos x$$

Transformed Function

$$y = a \sin b(x - h) + k$$

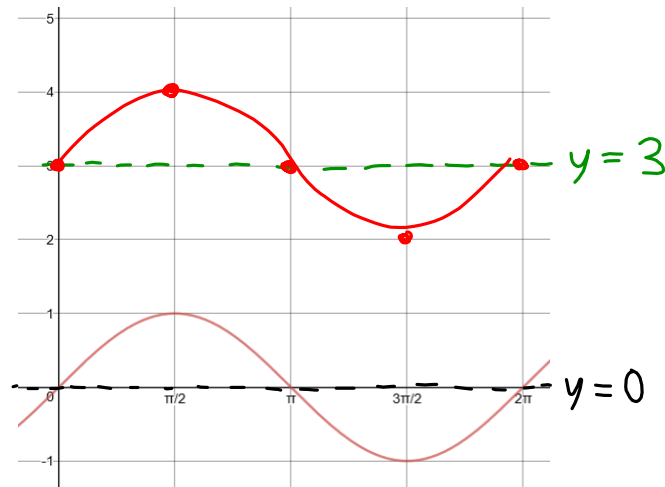
$$y = a \cos b(x - h) + k$$

- $|a|$ = amplitude (vertical stretch or shrink)
- $\frac{2\pi}{b}$ = period (when x is in radians and $b > 0$)
- h = phase shift, or horizontal shift
- k = vertical shift ($y = k$ is the midline)

Only new thing for today!

$$\underline{y = \sin \theta} \quad \text{vs.} \quad y = \sin \theta + 3$$

Also, what is the equation of the **midline** of each ???



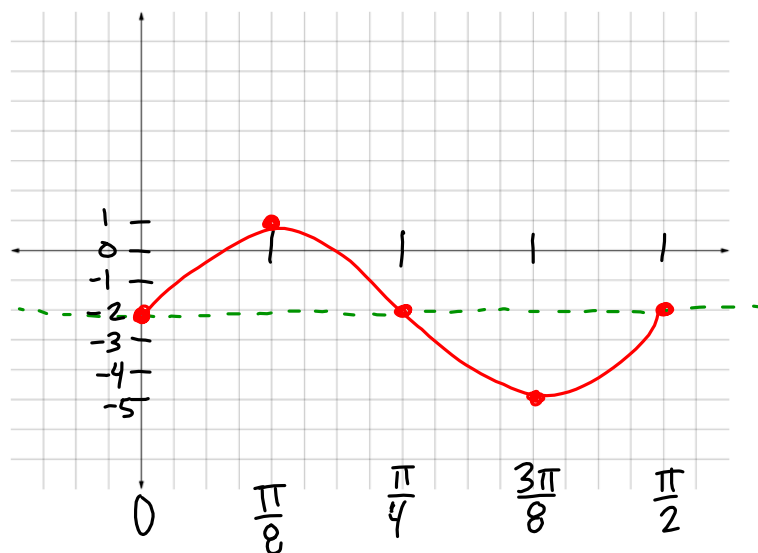
Ex.1 Find the amplitude and period first. Set up the x and y axis next. Then graph, using radians, **one complete cycle**. Finally, state the midline equation.

$$y = 3 \sin 4\theta - 2$$

Amp: (3)

Period: $\frac{2\pi}{4} \rightarrow (\frac{\pi}{2})$

Midline: $(y = -2)$



Ex.2 Find the amplitude and period first. Set up the x and y axis next. Then graph, using radians, **one complete cycle**. Finally, state the midline equation.

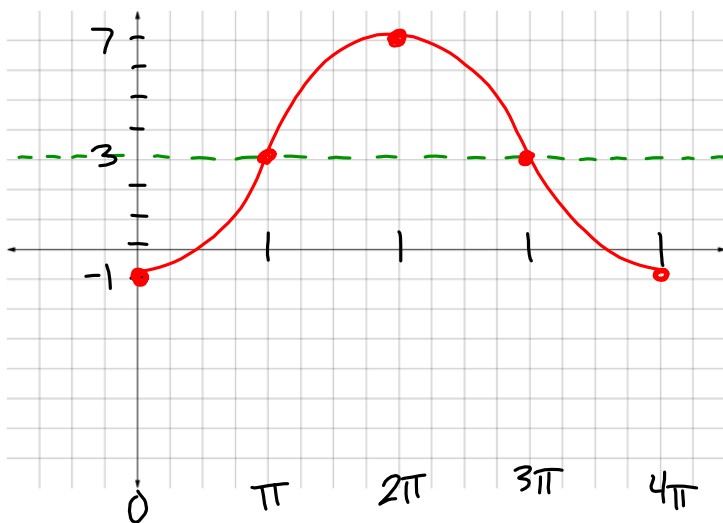
$$y = -4 \cos \frac{\theta}{2} + 3$$

Amp: 4

Reflect? Yes

Period: $\frac{2\pi}{\frac{1}{2}} = 4\pi$

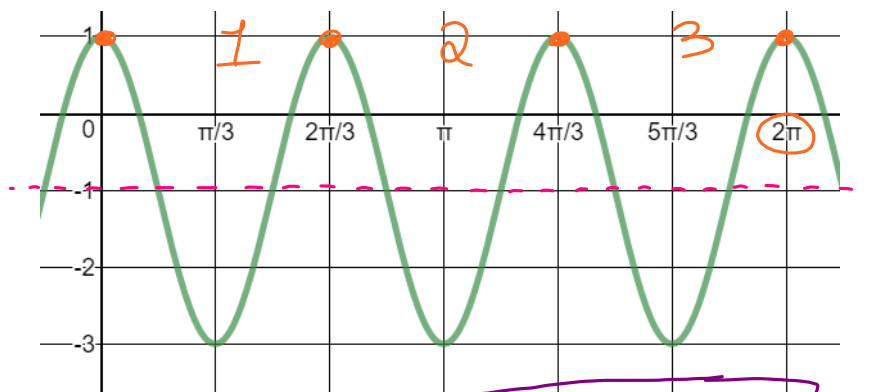
Midline: $y = 3$



General Forms: $y = a \sin b\theta + k$ $y = a \cos b\theta + k$

Ex.3 Given the graph... Find the unknowns... Write the function.

Sine or Cosine?
(circle one)



a - value: 2, b-value: 3,
k - value: -1

Function: $y = 2 \cos 3\theta - 1$

General Forms: $y = a \sin b\theta + k$ $y = a \cos b\theta + k$

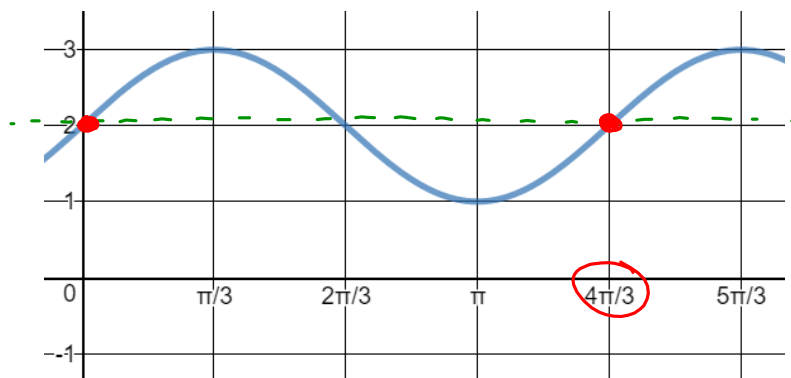
Ex.4 Given the graph... Find the unknowns... Write the function.

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

a - value: 1,

b-value: $\frac{3}{2}$,

k - value: 2



Function:

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

$$\frac{2\pi}{b} \times \frac{4\pi}{3}$$

$$4\pi \cdot b = 6\pi, \quad b = \frac{6\pi}{4\pi} = \frac{3}{2}$$