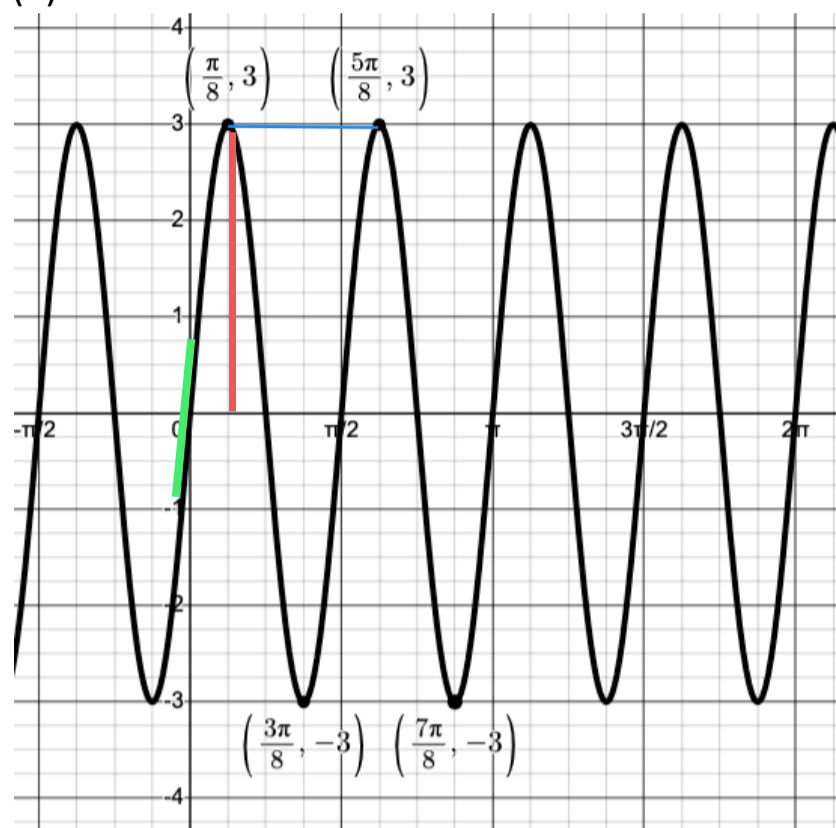


Finding an Equation if Given a Graph Worksheet

Find an Equation Satisfying the Given Graph. There are many possible answers. I suggest that you check one or two of the given points in your equation.

(1)

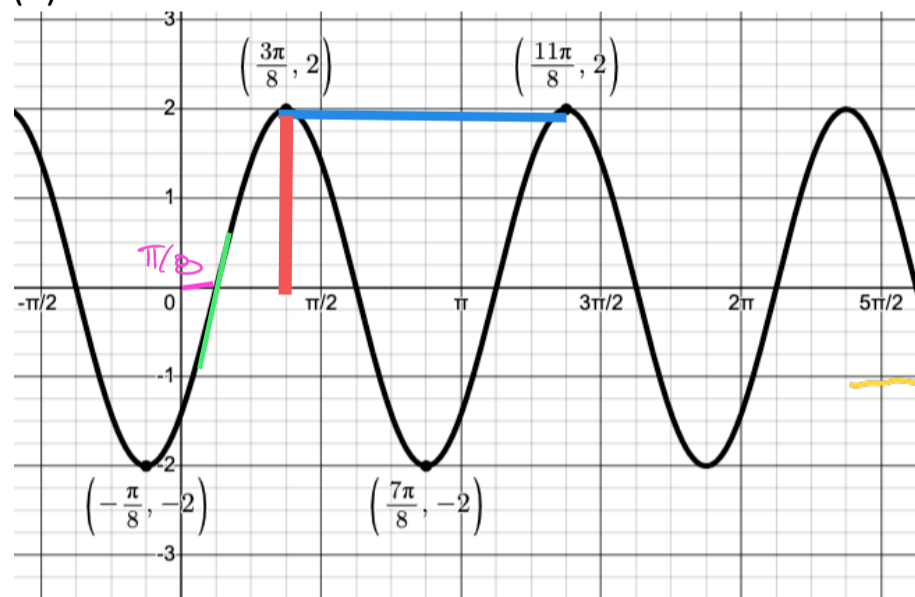


Amplitude = 3 $\Rightarrow a = 3$
 Period = $\frac{5\pi}{8} - \frac{\pi}{8} = \frac{\pi}{2} \Rightarrow \frac{2\pi}{k} = \frac{\pi}{2}$
 sine with no shift $k = 4$

$$y = 3 \sin(4x)$$

check a point
 $(\frac{\pi}{8}, 3)$ $3 \sin(4 \cdot \frac{\pi}{8}) =$
 $3 \sin \frac{\pi}{2} = 3 \checkmark$

(2)



Amplitude = 2 = a
 Period = $\frac{11\pi}{8} - \frac{3\pi}{8} = \pi$
 $\Rightarrow \frac{2\pi}{k} = \pi$
 $k = 2$

Sine graph shifted $\frac{\pi}{8}$ to the right
 $\Rightarrow (x - \frac{\pi}{8})$

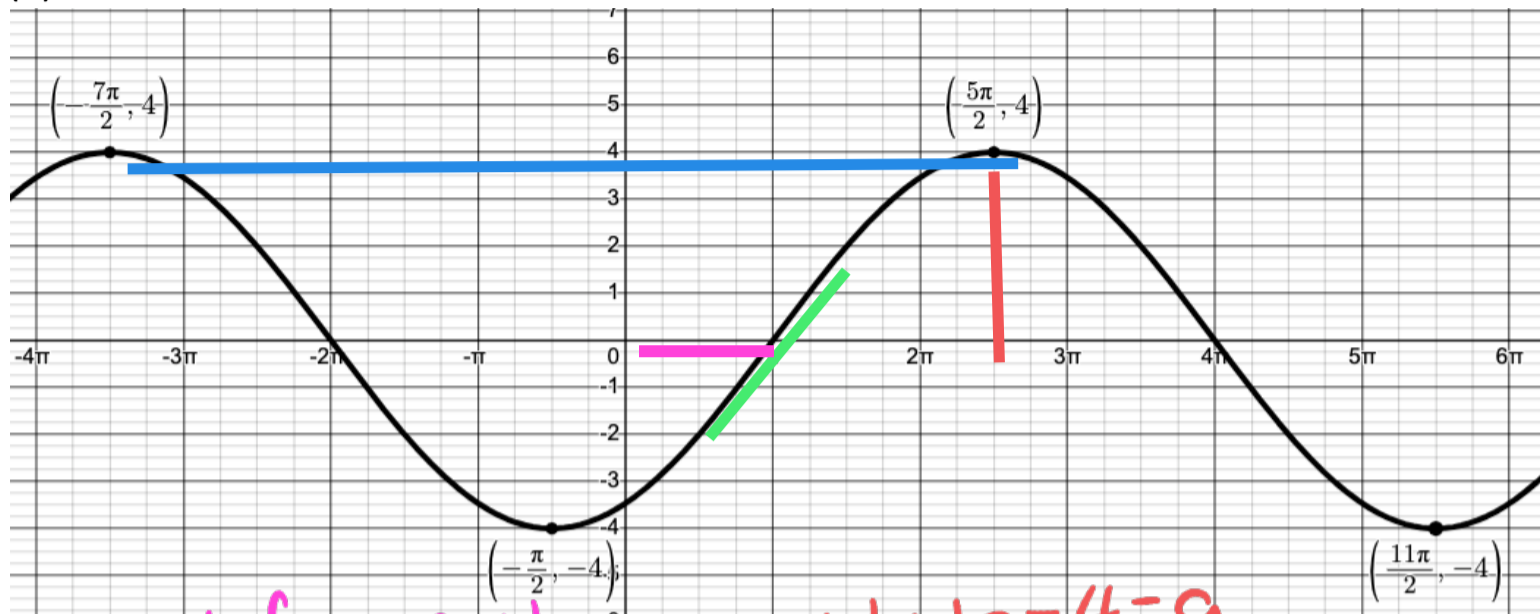
$$y = 2 \sin(2(x - \frac{\pi}{8}))$$

$$y = 2 \sin(2x - \frac{\pi}{4})$$

check point

$(\frac{11\pi}{8}, 2)$ $y = 2 \sin(2 \cdot \frac{11\pi}{8} - \frac{\pi}{4}) = 2 \sin \frac{5\pi}{2} = 2(1) = 2 \checkmark$

(3)



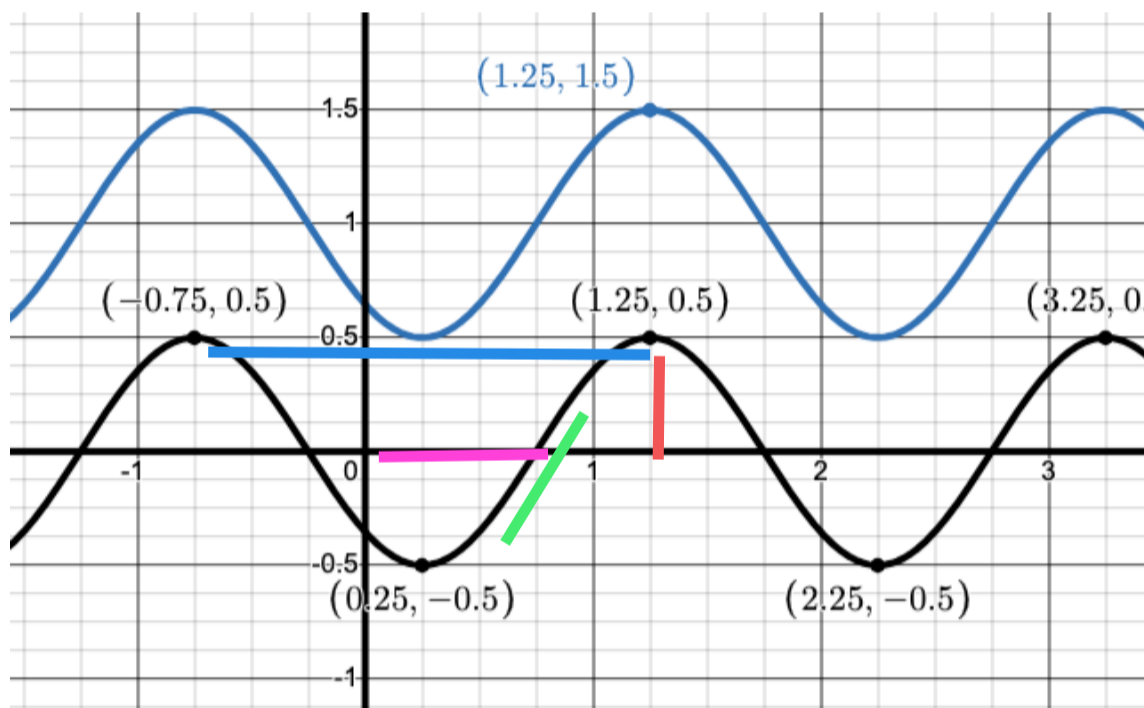
Sine shift π right

Amplitude = $4 = a$

Period = $\frac{5\pi}{2} - \frac{-7\pi}{2} = \frac{12\pi}{2} = 6\pi \Rightarrow$

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

(4). Give equations of both graphs



$$y = 4 \sin\left(\frac{1}{3}(x - \pi)\right)$$

$$y = 4 \sin\left(\frac{1}{3}x - \frac{\pi}{3}\right)$$

Black graph

Amplitude = $\frac{1}{2} = a$

Period = $1.25 - (-0.75) = 2$ $\frac{2\pi}{k} = 2 \Rightarrow k = \pi$

sine shift $\frac{3}{4}$ right

$$y = \frac{1}{2} \sin\left(\pi\left(x - \frac{3}{4}\right)\right)$$

$$y = \frac{1}{2} \sin\left(\pi x - \frac{3\pi}{4}\right)$$



Blue graph
Shift up 1

$$y = \frac{1}{2} \sin\left(\pi x - \frac{3\pi}{4}\right) + 1$$

check
 $\left(\frac{5}{4}, \frac{1}{2}\right)$

$$y = \frac{1}{2} \sin\left(\pi \cdot \frac{5}{4} - \frac{3\pi}{4}\right)$$

$$= \frac{1}{2} \sin \pi/2 = 1/2$$