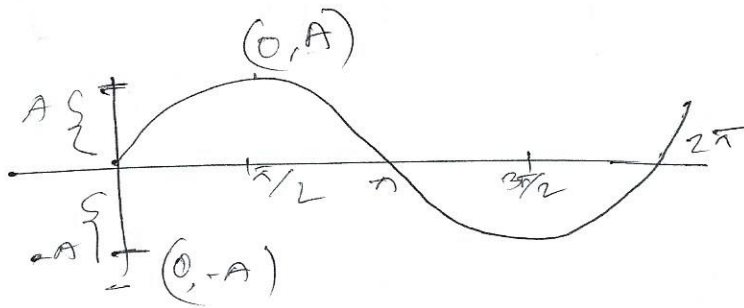


10/10/18

$$y = 2A \sin(\omega x)$$



$$[0, 2\pi] \rightarrow \left[0, \frac{2\pi}{\omega}\right]$$

$$\frac{2\pi}{\omega} = T$$

$$T = \frac{2\pi}{1} = 2\pi$$

$$[0, 2\pi] \rightarrow \left[0, \frac{2\pi}{\omega}\right]$$

graphing \rightarrow

Determine $|A|, T$ for

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

$$|A| = |3| = 3$$

$$\omega = 4$$

$$T = \frac{2\pi}{4} = \frac{\pi}{2}$$

distance the graph rises or falls above one midline.

Graphing by key points.

Partition the period into 4 subintervals.

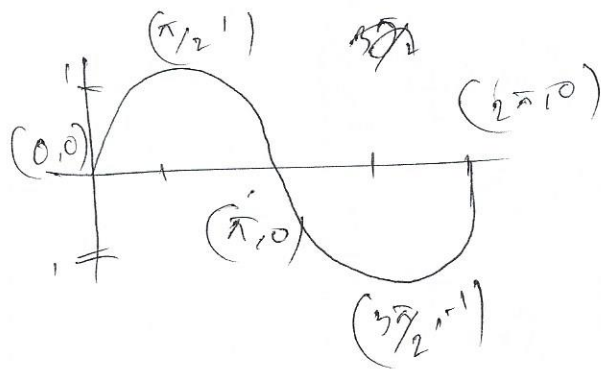
$$T/4$$

$$\left[0, \frac{\pi}{2}\right] \quad \left[\frac{\pi}{2}, \pi\right] \quad \left[\pi, \frac{3\pi}{2}\right] \quad \left[\frac{3\pi}{2}, 2\pi\right]$$

endpoints
x-values

$$\left(0, 0\right) \quad \left(\frac{\pi}{2}, 1\right) \quad \left(\pi, 0\right) \quad \left(\frac{3\pi}{2}, -1\right) \quad \left(2\pi, 0\right)$$

trig values
y coordinate



$$T = \frac{\pi}{4} \cdot 4$$

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

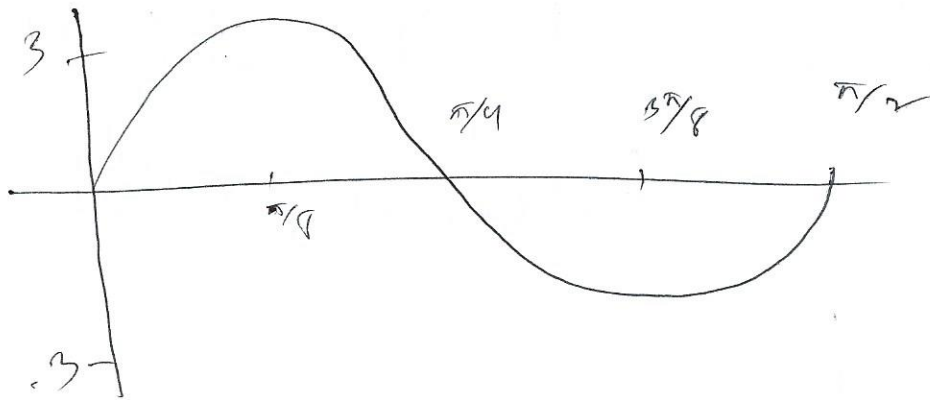
$$\left[0, \frac{\pi}{8}\right] \quad \left[\frac{\pi}{8}, \frac{\pi}{4}\right] \quad \left[\frac{\pi}{4}, \frac{3\pi}{8}\right] \quad \left[\frac{3\pi}{8}, \frac{\pi}{2}\right]$$

$$(0, 0) \quad \left(\frac{\pi}{8}, 3\right) \quad (\pi/4, 0) \quad \left(\frac{3\pi}{8}, -3\right) \quad \left(\frac{\pi}{2}, 0\right)$$

$$\sin x$$

$$|A| = 3$$

multiplying by $|A|$ changing y -coordinate



$$[0, \pi/4]$$

$$T = \frac{\pi}{2} \quad |A| = 3$$

Domain: $(-\pi, \pi)$

Range: $[-3, 3]$

Graph by key points!

$$y = 2 \sin\left(-\frac{\pi}{2}x\right) \quad \rightarrow \quad y = -2 \sin\left(\frac{\pi}{2}x\right)$$

$$T = \frac{2\pi}{\omega}$$

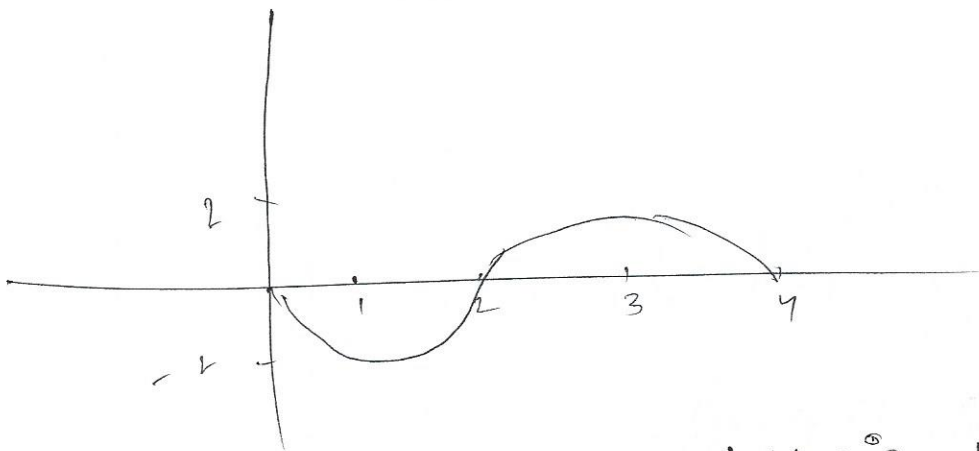
$$\frac{2\pi}{\pi/2} = 4$$

$$T \div 4 = 1$$

$$|A| = |-2| = 2$$

$$[0, 1] \quad [1, 2] \quad [2, 3] \quad [3, 4]$$

$$(0, 0) \quad (1, -2) \quad (2, 0) \quad (3, 2) \quad (4, 0)$$



$$y = -4 \cos(\pi x) - 2 \quad \rightarrow \quad \text{horizontal stretch/compression}$$

by key points
reflected vertically then

$$|A| = |-4| = 4$$

$$T = \frac{2\pi}{\omega} = \frac{2\pi}{\pi} = 2$$

$$\frac{T}{4} = \frac{1}{2}$$

$$\frac{-1 \times -4}{4-2}$$

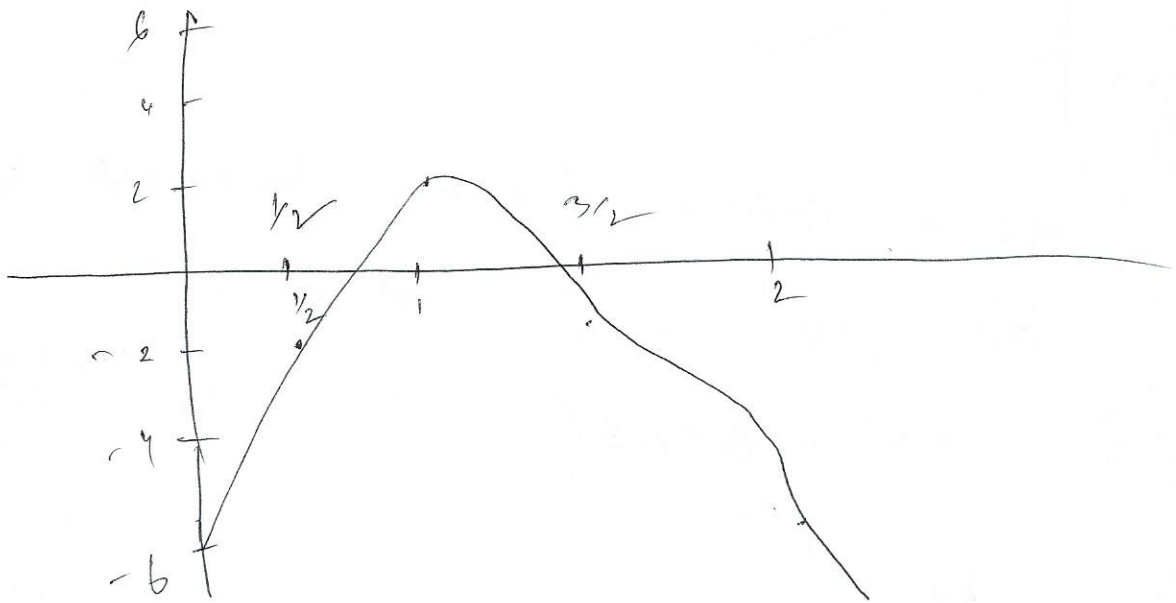
$$-1(4-2) \quad 4-2$$

$$\left[0, \frac{1}{2}\right] \left(\frac{\pi}{2}, 1\right) \left(1, \frac{3}{2}\right) \left(\frac{3}{2}, 2\right)$$

$$\left[(-6, 0)\right] \left(\frac{1}{2}, -2\right) \left(1, -2\right) \left(\frac{3}{2}, -2\right) \left(2, -6\right)$$

$$(0, 1) \left(\frac{\pi}{2}, 0\right) (\pi, -1) \left(\frac{3\pi}{2}, 0\right) (2\pi, 1)$$

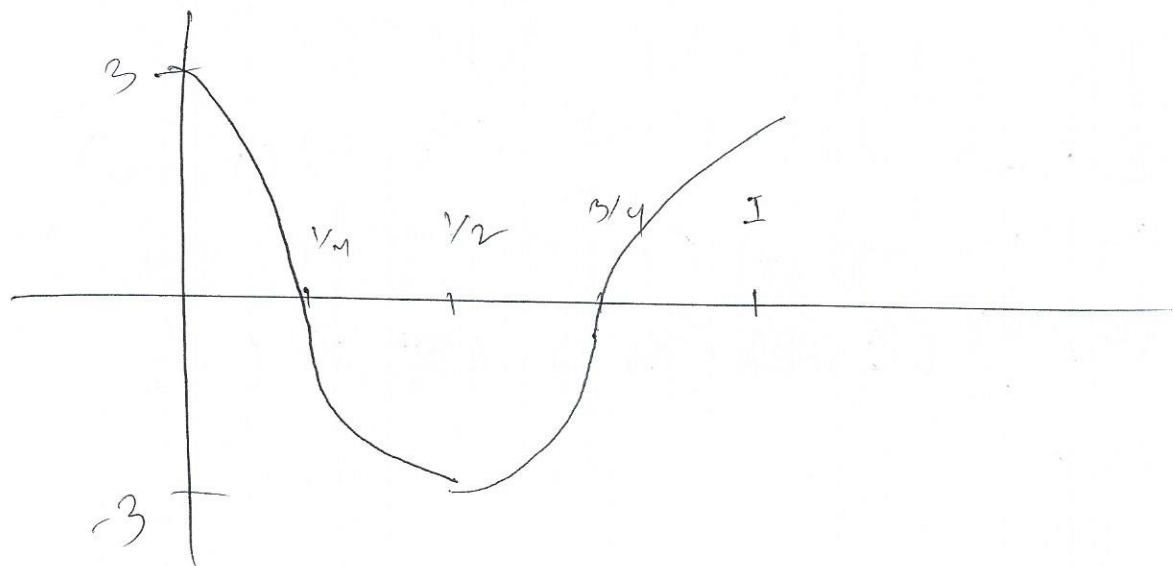
$$(0, -6) \left(\frac{\pi}{2}, -2\right) (\pi, 2) \left(\frac{3\pi}{2}, 0\right) ($$



$$D: (-\pi, \pi)$$

$$R: (-6, 2)$$

ex: Find an equation for the graph.



we are cosine function because graph
doesn't start at origin.

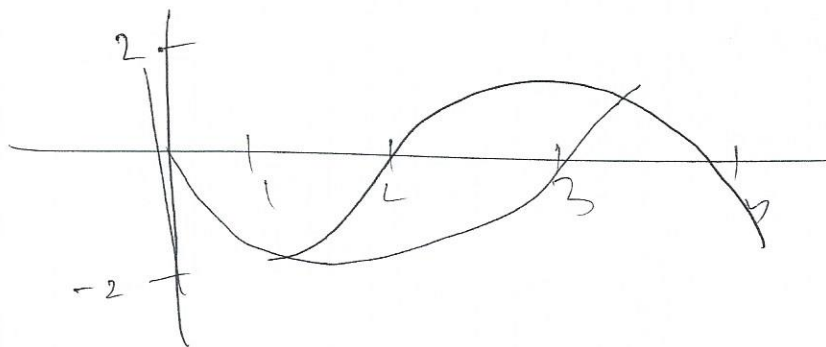
$$f(x) = 3 \cos(2\pi x)$$

$$T = \frac{2\pi}{\omega}$$

$$1 = \frac{2\pi}{\omega}$$

$$\omega = 2\pi$$

for



$$g(x) = -2 \sin\left(\frac{\pi}{2}x\right)$$

~~$$T = \frac{2\pi}{\omega}$$~~

$$4 = \frac{2\pi}{\omega}$$