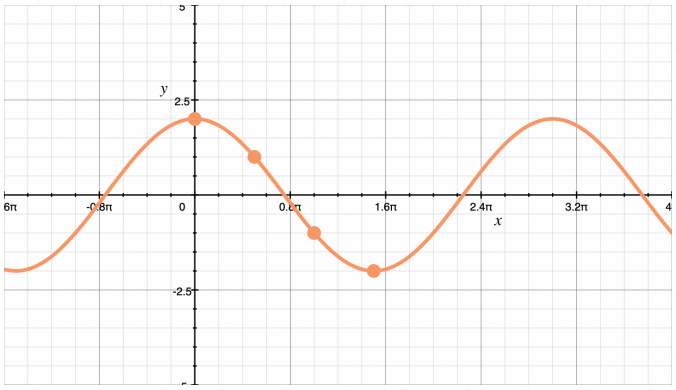
Topic: Sketching sine and cosine

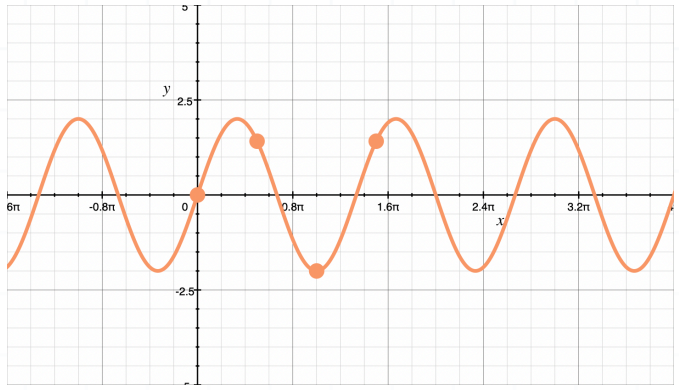
Question: Identify the graph of $y = -2\sin(2\theta/3)$.

Answer choices:

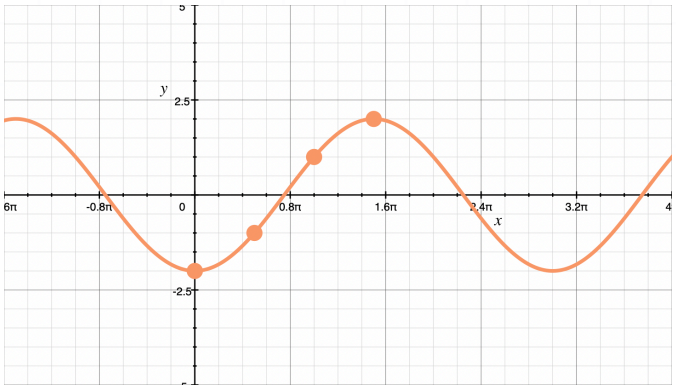
A



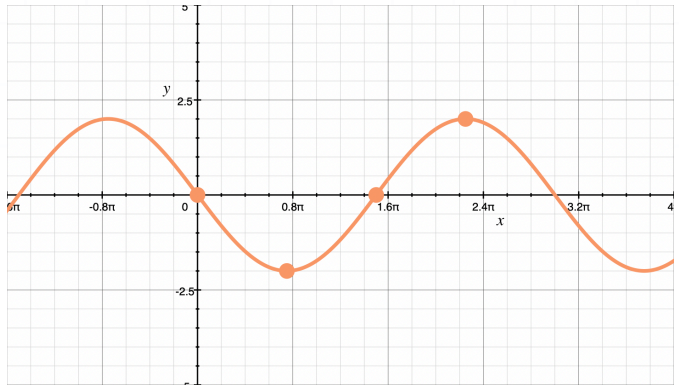
B



C



D



Solution: D

Setting $b = 2/3$ means we'll compress $y = \sin\theta$ horizontally by a factor of $2/3$. Pick a few points on $y = \sin\theta$,

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

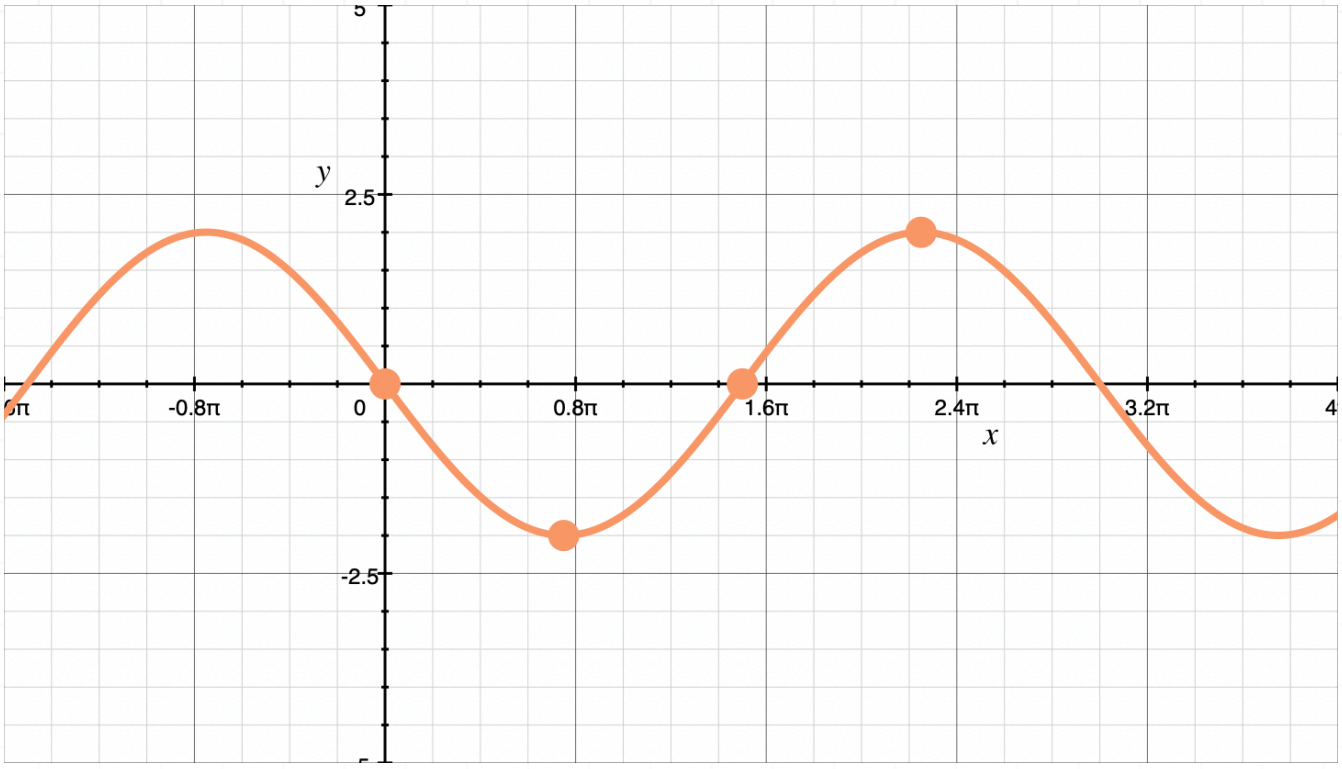
then horizontally compress the x-values by a factor of $2/3$, which means we'll multiply each x-value by $3/2$, while keeping the y-values the same.

$$(0,0) \qquad \left(\frac{3\pi}{4},1\right) \qquad \left(\frac{3\pi}{2},0\right) \qquad \left(\frac{9\pi}{4},-1\right)$$

Then setting $a = -2$ means we'll stretch $y = \sin\theta$ vertically by a factor of 2, and reflect it over the x-axis. So we'll take these points and multiply the y-values by -2.

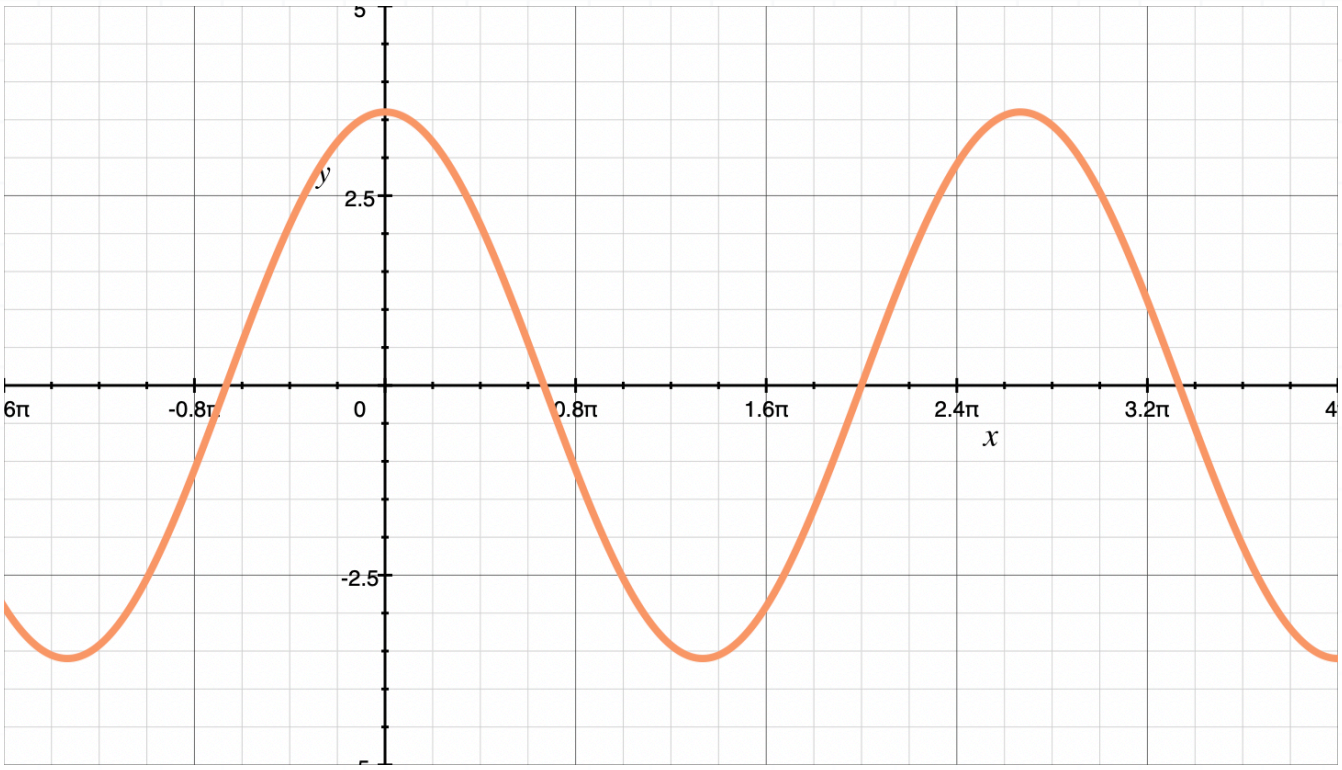
$$(0,0) \qquad \left(\frac{3\pi}{4},-2\right) \qquad \left(\frac{3\pi}{2},0\right) \qquad \left(\frac{9\pi}{4},2\right)$$

Then these four points are on the graph of $y = -2\sin(2\theta/3)$. If we plot the points and connect them, we get



Topic: Sketching sine and cosine

Question: Which function is represented by the curve?



Answer choices:

A $3.6\cos\left(\frac{3\theta}{4}\right)$

B $3.6\sin\left(\frac{6\theta}{5}\right)$

C $-3.6\cos\left(\frac{4\theta}{3}\right)$

D $-3.6\sin\left(\frac{3\theta}{2}\right)$

Solution: A

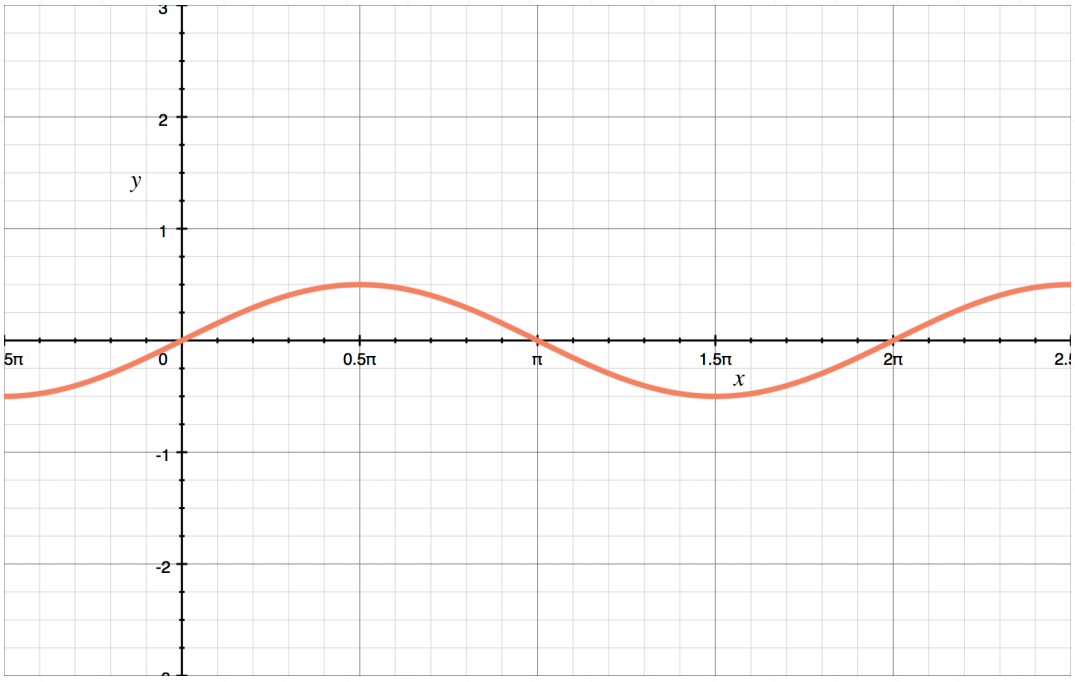
Because the value of the function at $\theta = 0$ isn't 0, the curve can't be the graph of either sine function. So we'll only need to determine which cosine function the graph represents.

When $\theta = 0$, the cosine function will always be 1, which means the graph of the curve in answer choice A will have a value of $3.6(1) = 3.6$, and the curve in answer choice C will have a value of $-3.6(1) = -3.6$.

So the function in answer choice A is the only one that could be represented by the graph.

Topic: Sketching sine and cosine

Question: Which function is represented by the curve?



Answer choices:

A $\frac{1}{2}\cos\left(\frac{\theta}{2}\right)$

B $2\sin\left(\frac{\theta}{2}\right)$

C $\frac{1}{2}\sin\theta$

D $2\cos(2\theta)$

Solution: C

Because the value of the function at $\theta = 0$ is 0, the curve can't be the graph of either cosine function. So we'll only need to determine which sine function the graph represents.

When $\theta = \pi/2$, the sine function will always be 1, which means the graph of the curve in answer choice B will have a value of $2(1) = 2$, and the curve in answer choice C will have a value of $1/2(1) = 1/2$.

So the function in answer choice C is the only one that could be represented by the graph.