



Trigonometry Workbook

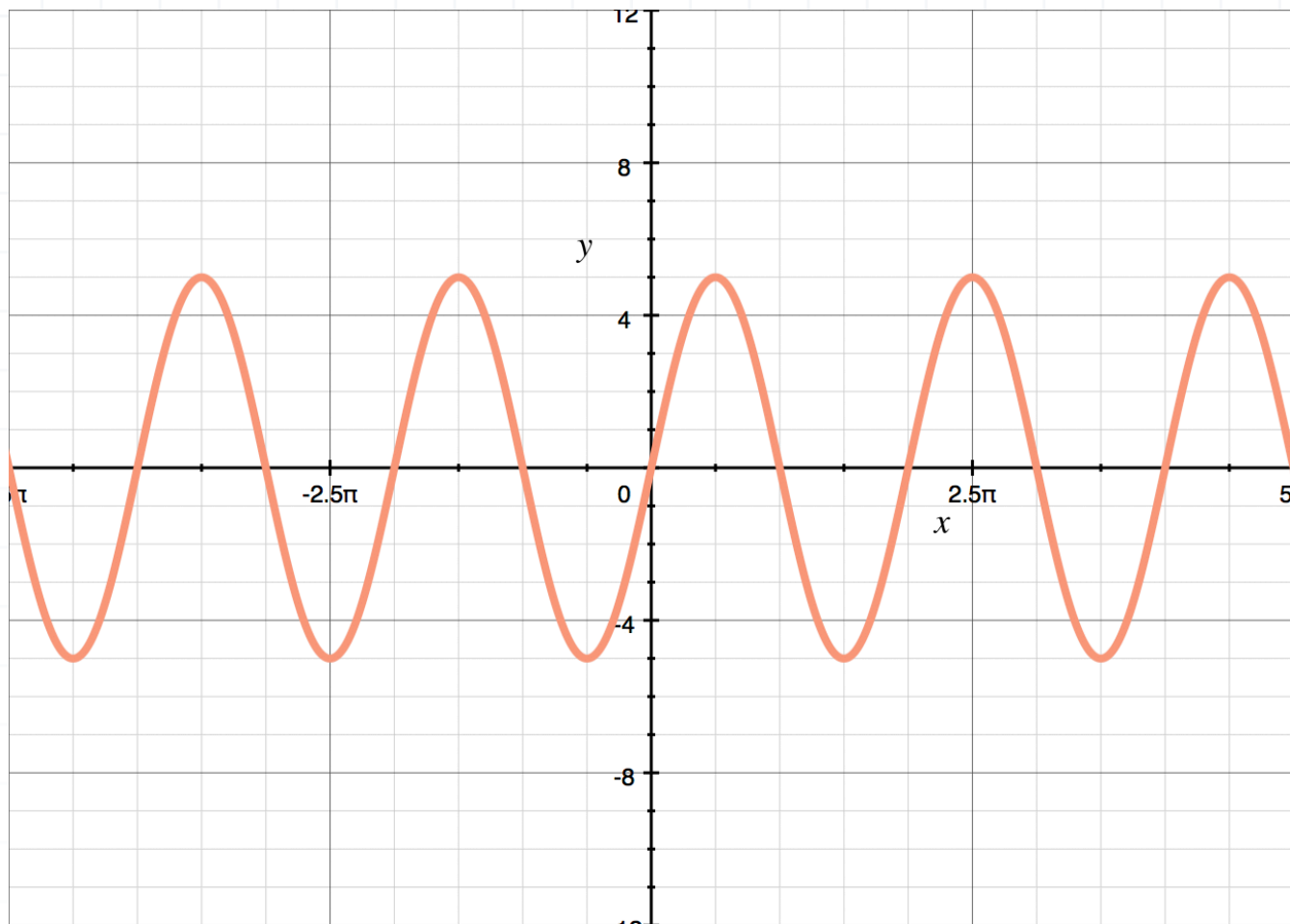
Graphing trig functions

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MATH

SKETCHING SINE AND COSINE

- 1. Sketch the graph of $y = 3 \sin(\theta/2)$.
 - 2. Sketch the graph of $y = 2.6 \cos(3\theta)$.
 - 3. Sketch the graph of $y = -4 \cos(\theta/3)$.
 - 4. On the same set of axes, graph $y = 2 \cos \theta$ and $y = \sin 2\theta$.
 - 5. Which function is represented by the curve?
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■ 6. Graph $y = -4 \cos(\theta/2)$ and $y = 3 \sin \theta$ on the same set of axes.



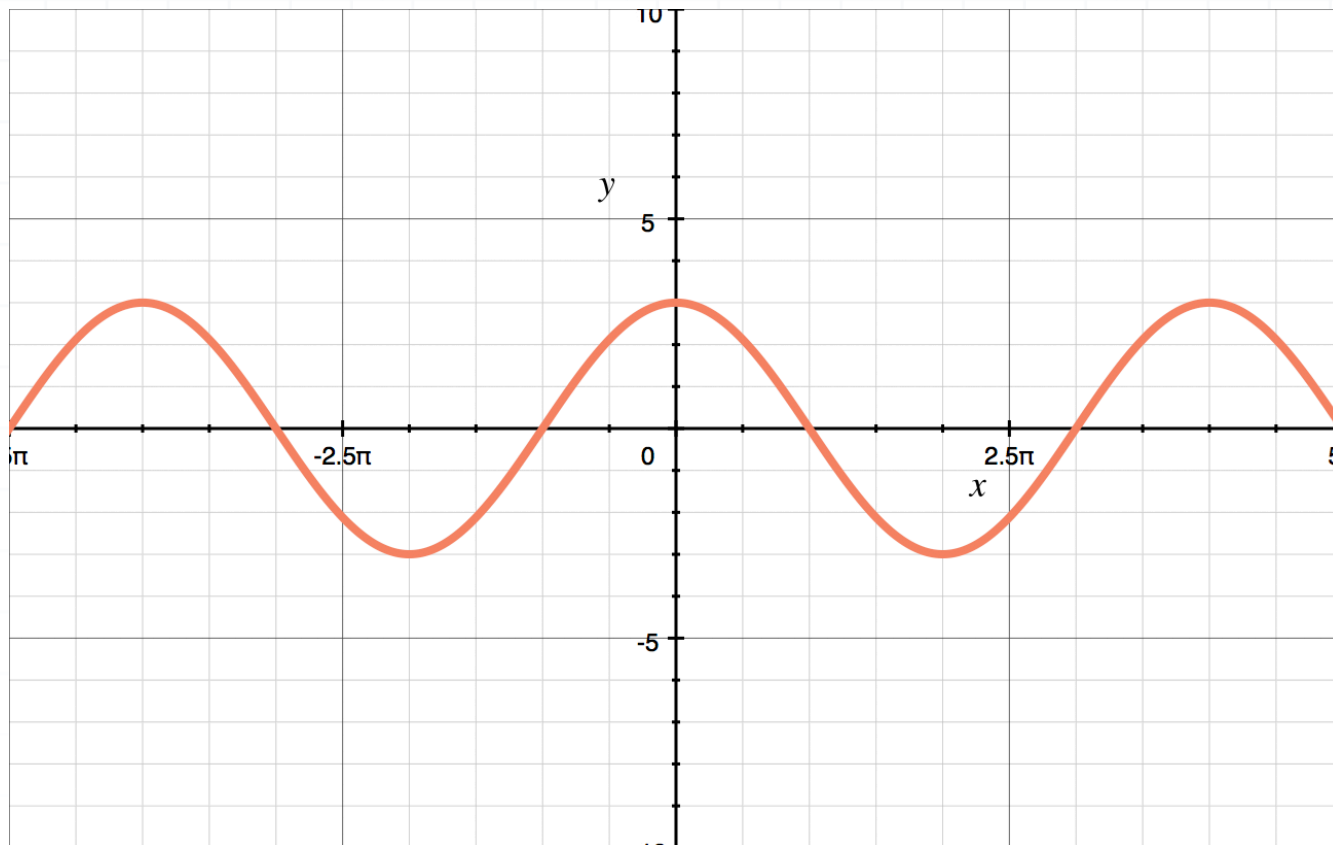
SKETCHING COSECANT AND SECANT

- 1. Sketch the graph of $y = \csc(\theta/2)$.
- 2. Sketch the graph of $y = -\sec(2\theta)$.
- 3. Sketch the graph of $y = 5 \csc(2\theta)$.
- 4. Sketch the graph of $y = (1/4)\sec(\theta/2)$.
- 5. Sketch the graph of $y = (1/2)\csc(-\theta)$.
- 6. Sketch the graph of $y = -2 \sec(\theta/4)$.



PERIOD AND AMPLITUDE

- 1. Find all possible cosine functions that could represent the graph.



- 2. Modify the basic sine function so that it has a period of 60° and an amplitude of 3.

- 3. Which one of these functions does not have a period of 3π ?

$$y = -7 \tan \left(\frac{x}{3} \right)$$

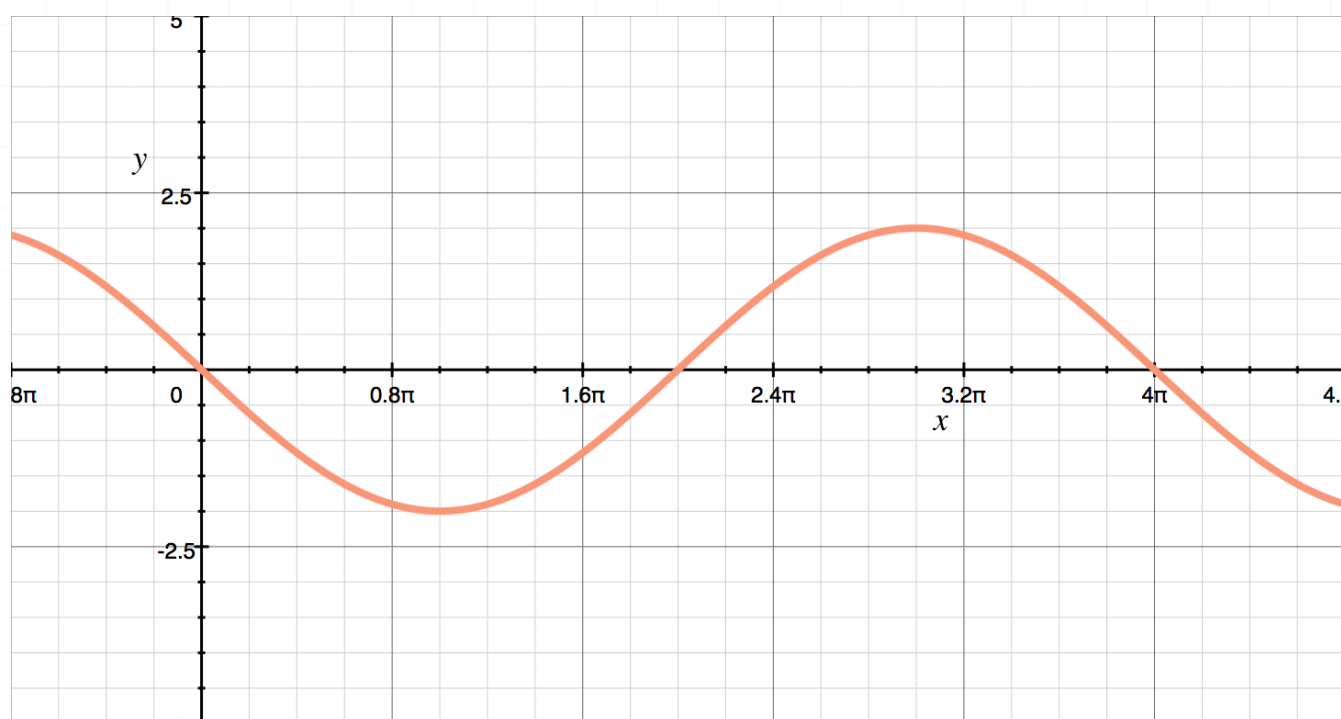
$$y = -7 \sec \left(\frac{2x}{3} \right)$$

$$y = 7 \tan \left(\frac{2x}{3} \right)$$

$$y = 7 \sec \left(\frac{2x}{3} \right)$$

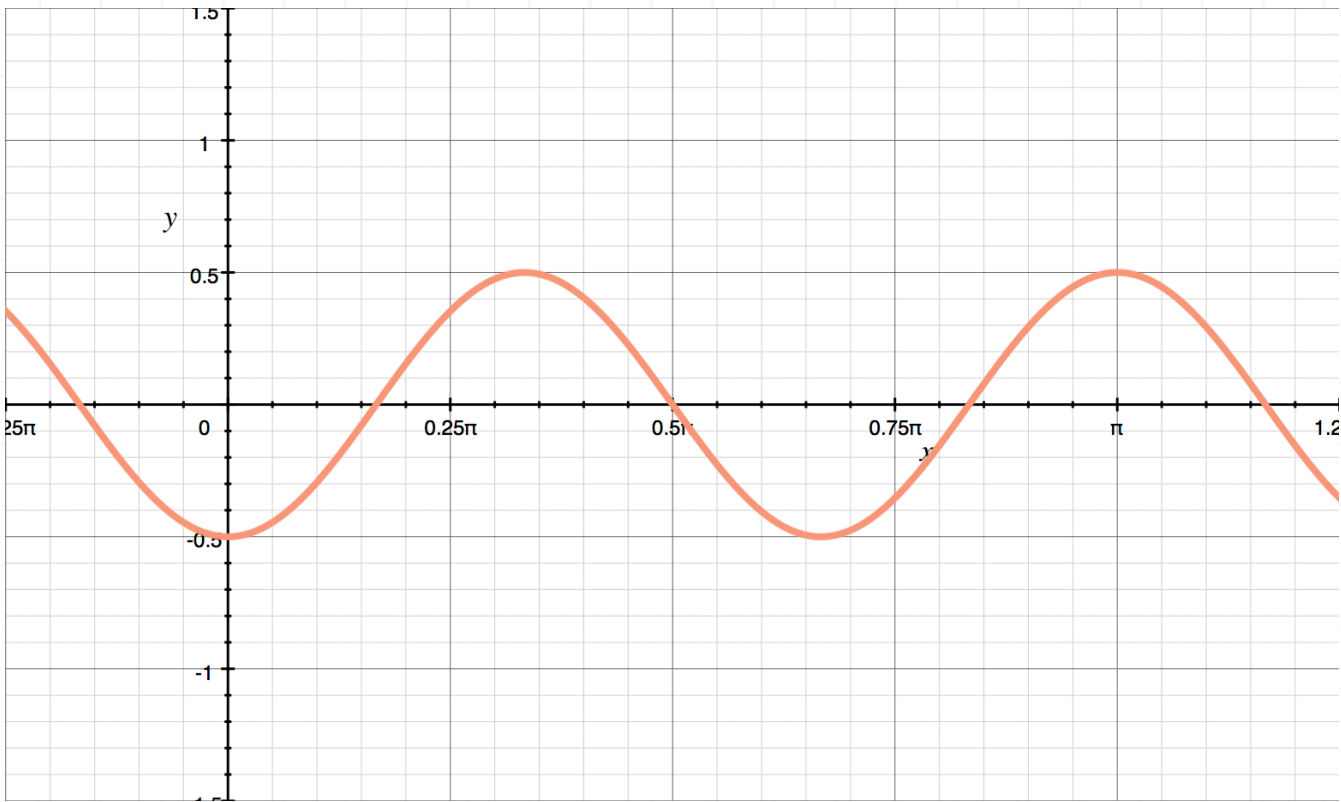


- 4. Find all possible sine and cosine functions $y = a \sin(bx)$ and $y = a \cos(bx)$ which have a period of 135° and an amplitude of 10.
- 5. Give the amplitude and period of the function in the graph, then write an equation for the curve.



- 6. Give the amplitude and period of function in the graph, then write the equation of the graph if we know that the function is not flipped across the y -axis.



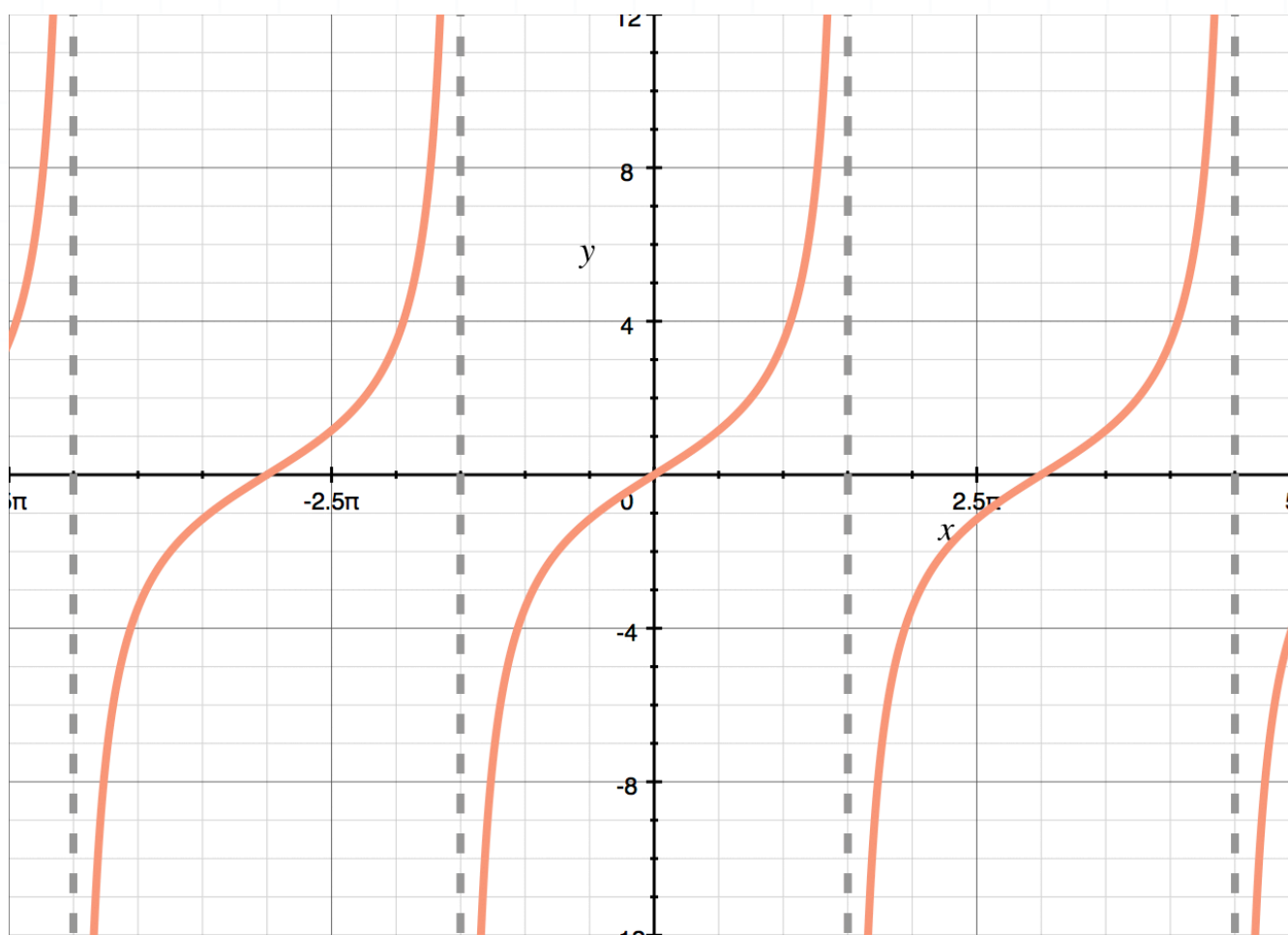


SKETCHING TANGENT AND COTANGENT

■ 1. What are the vertical asymptotes of $y = -2 \cot(3x)$?

■ 2. Sketch the graph of $y = -3 \tan(2x)$.

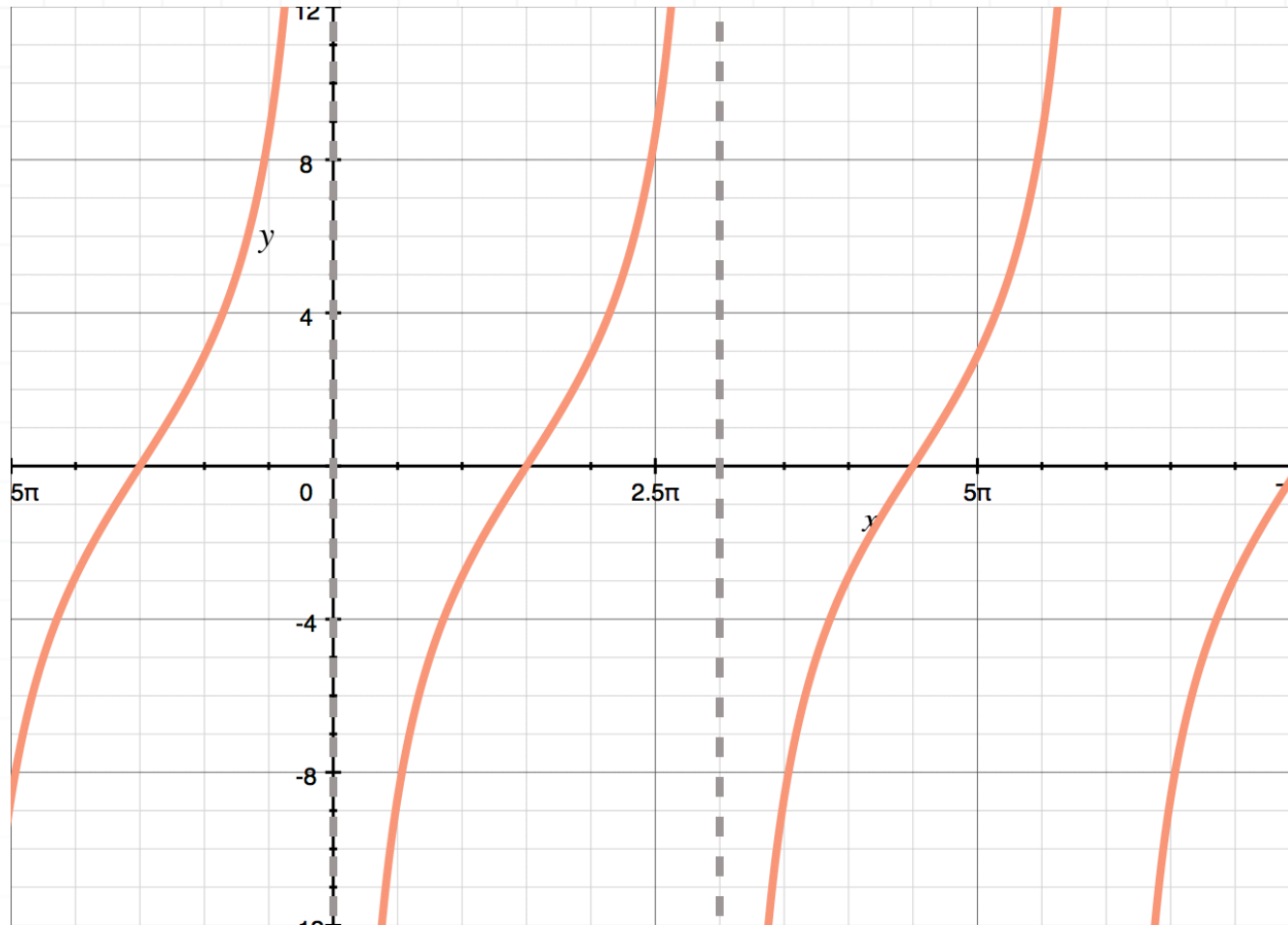
■ 3. Which function is represented by the curve if $a = 2$?



■ 4. Sketch the graph of $y = 2 \cot(-x/2)$.

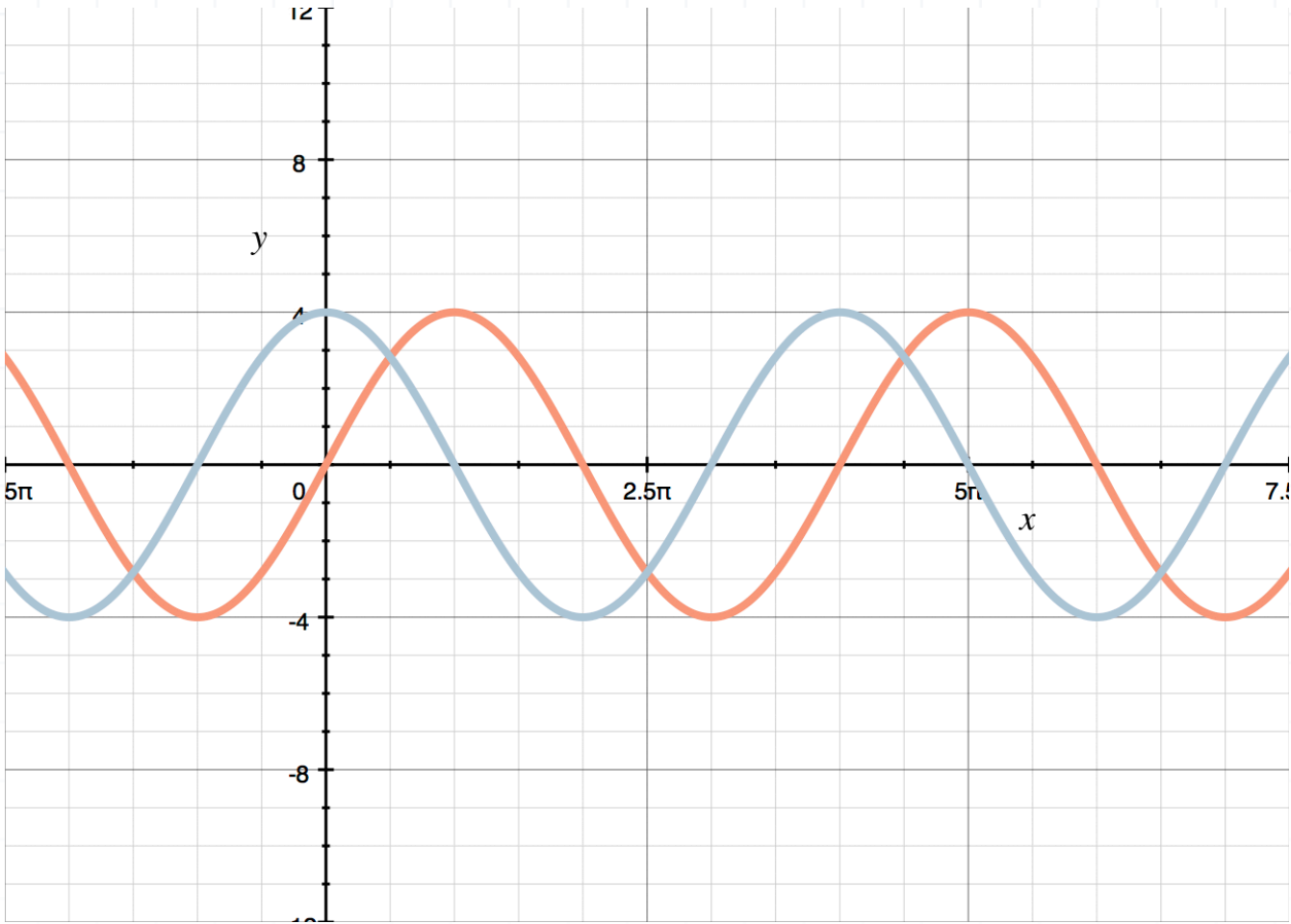


- 5. Which function is represented by the curve if $a = -5$?



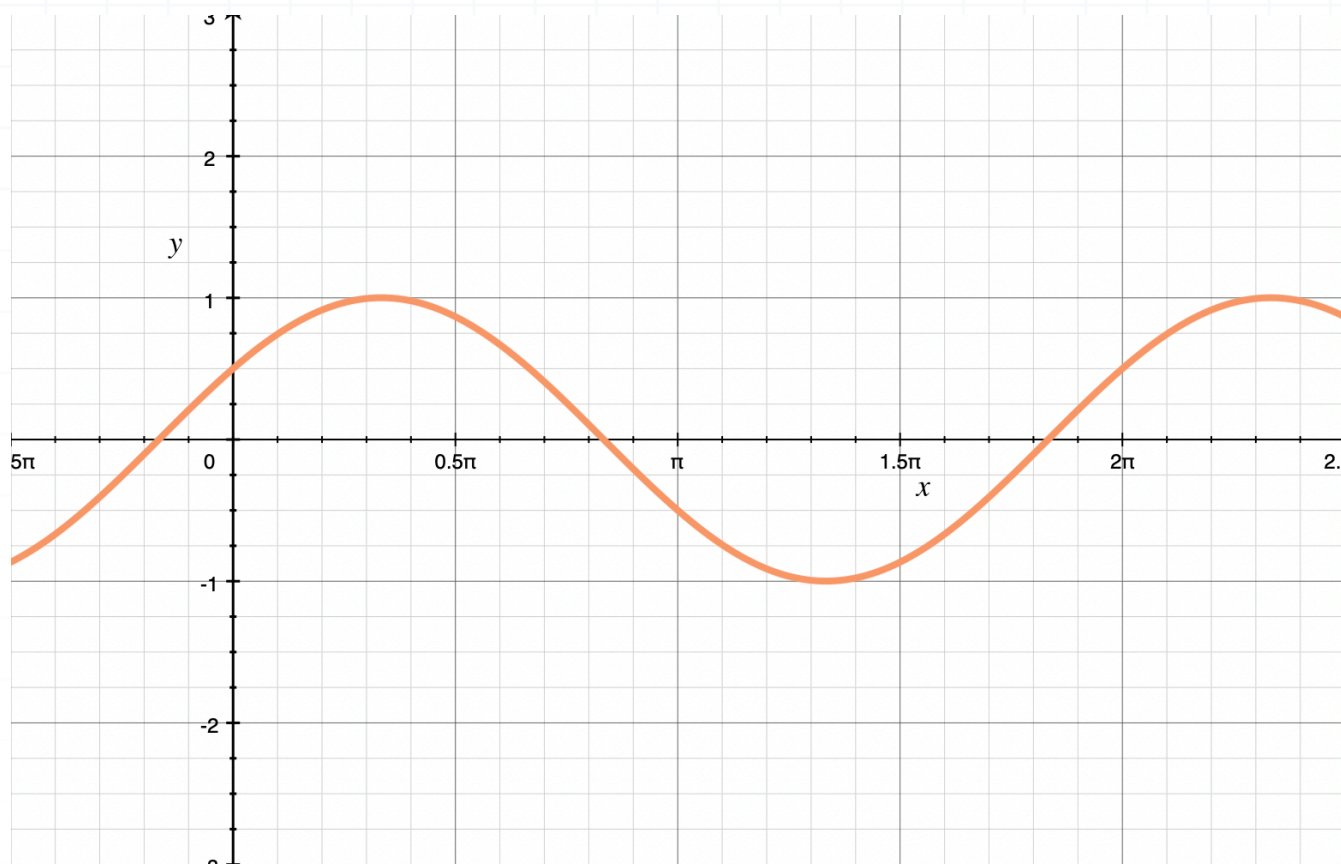
- 6. Sketch the graph of $y = 4 \tan(x/2)$, using the graph of $y = 4 \sin(x/2)$ in red and $y = 4 \cos(x/2)$ in blue.





HORIZONTAL AND VERTICAL SHIFTS

- 1. Determine the equation of the cosine function shown in the graph.



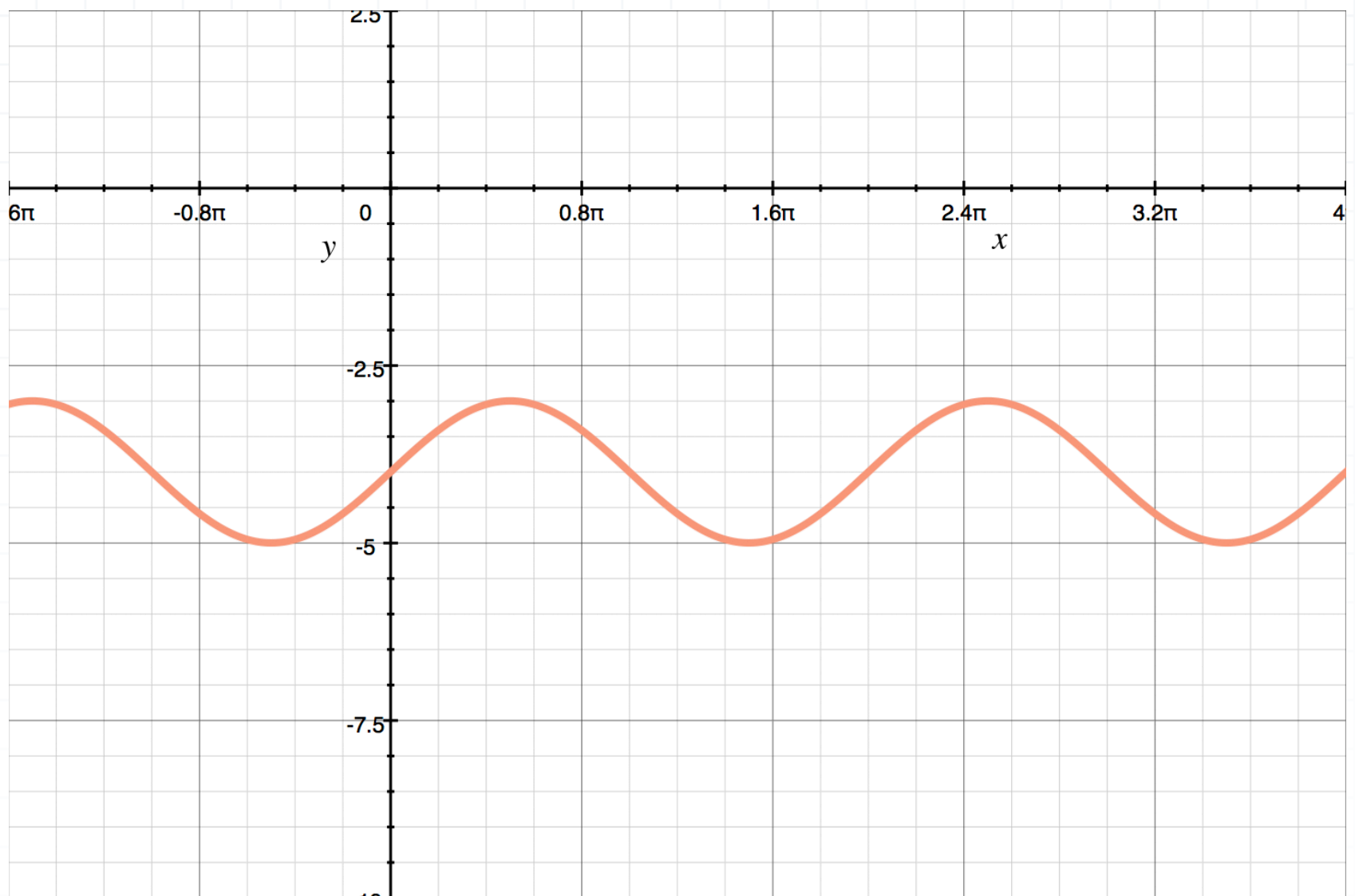
- 2. Determine the phase shift and the vertical shift of the sine function.

$$y = 2 \sin \left(x + \frac{\pi}{6} \right) - 2$$

- 3. Sketch the graph of $y = \sin(\theta - \pi)$.

- 4. Determine the equation of the sine function shown in the graph.





■ 5. A trigonometric function has an amplitude of 3 units, a horizontal shift to the left by $\pi/4$, a vertical shift down by 7 units, and no reflections. Represent the curve with a cosine function.

■ 6. Sketch the graph of $y = \cos \theta - 5$.



GRAPHING TRANSFORMATIONS

- 1. What are the period, amplitude, and range of the function?

$$y = -3 \cos(2\pi x - 1) + 4$$

- 2. Find the equation of the curve that's the result of applying the following sequence of transformations to $f(x) = \sin(x - \pi)$.

1. A horizontal compression by a factor of 2
2. A horizontal shift to the right by 3π
3. A vertical stretch by a factor of 5
4. A reflection over the x -axis
5. A vertical shift down by 2

- 3. Which function has an amplitude of 2 and a range of $[-3, 1]$?

$$-2 \sin(5x - 3\pi) - 2$$

$$2 \sin(3x - 3\pi) - 1$$

$$-4 \cos(2x + 3\pi) - 2$$

$$4 \cos(2x + 3\pi) - 1$$



■ 4. Find the equation of the curve that's the result of applying the following sequence of transformations to $f(x) = 2 \sin(3x)$.

1. A horizontal shift to the left by $\pi/12$
2. A reflection over the y -axis
3. A reflection over the x -axis

■ 5. What will be the zeros of the function $f(x) = \cos x$ after the following sequence of transformations?

1. A horizontal compression by a factor of 2
2. A horizontal shift to the right by $\pi/6$
3. A vertical stretch by a factor of 5

■ 6. What transformations are applied to transform $y = \sin \theta$ into the given function?

$$y = 3 \sin \left(3\theta + \frac{3\pi}{2} \right)$$



GRAPHING COMBINATIONS

- 1. Find the period of the function.

$$\tan(3\theta - \pi) - \sin(6\theta)$$

- 2. Find the period of the function.

$$\frac{\sin\left(5\theta - \frac{\pi}{2}\right)}{\cos(2\theta)}$$

- 3. Graph the combination function $2\cos(3\theta) + \sin(2\theta)$.

- 4. Graph the combination function.

$$\cos\left(\theta - \frac{\pi}{2}\right) - 5\sin\left(4\theta + \frac{3\pi}{2}\right)$$

- 5. Graph the combination function $(2\cos(3\theta - 2\pi))(\sin\theta + 2)$.

- 6. Graph the combination function.



$$\frac{\cos\left(3\theta + \frac{3\pi}{4}\right)}{3 \sin\left(\theta - \frac{\pi}{2}\right)}$$



