

Math Virtual Learning

Precalculus with Trigonometry

Students will graph sine and cosine functions and identify amplitude and midline.

April 15, 2020



Precalculus with Trigonometry

Lesson: April 15th, 2020

Objective/Learning Target:

Students will graph sine and cosine functions and identify amplitude and midline.

Let's Get Started:

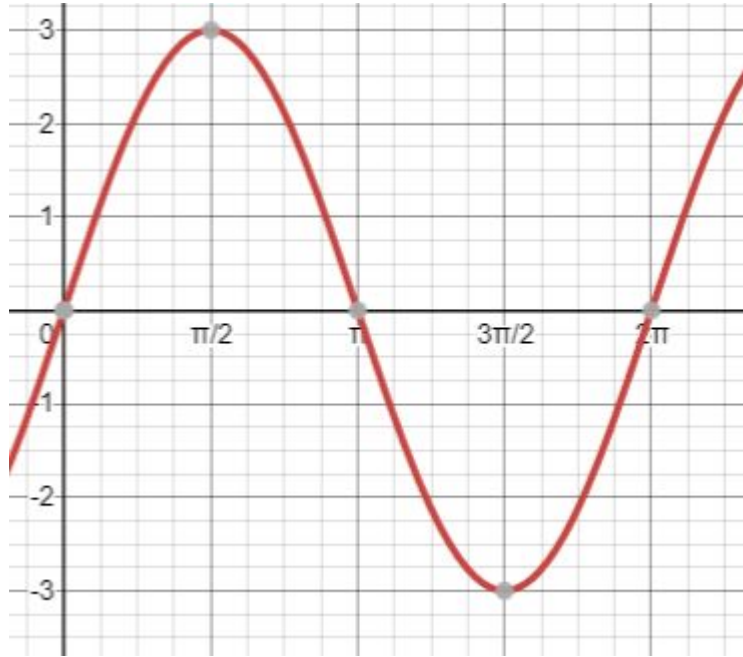
Watch Video: [Graphing \$y = \sin\(x\)\$](#)

Example

There are many ways to transform the sine function. One way is to multiply the function by a constant. Go to [Desmos](#) and graph the function $y = 3\sin(x)$. Next, graph the function $y = \frac{1}{2}\sin(x)$. How were the domain and range affected by multiplying by a constant?

Answers to example:

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



$$y = \frac{1}{2}\sin(x)$$

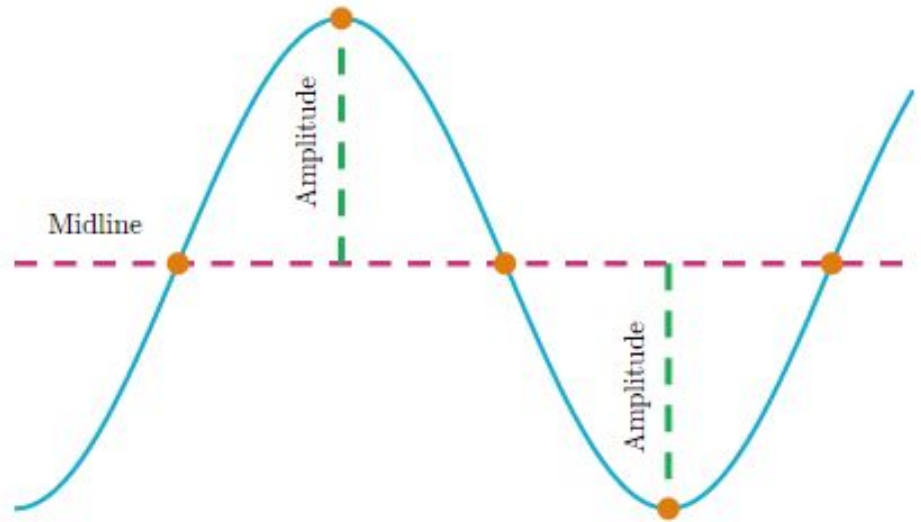


The domain remains all real numbers, but the range is affected. For $y = 3\sin(x)$, the range is $[-3, 3]$ and for $y = \frac{1}{2}\sin(x)$, the range is $[-\frac{1}{2}, \frac{1}{2}]$

MULTIPLYING BY A CONSTANT CREATES AN AMPLITUDE CHANGE FOR $Y = \sin(X)$

For $y = 3\sin(x)$, the amplitude is 3,
with a midline of $y = 0$.

For $y = \frac{1}{2}\sin(x)$, the amplitude is $\frac{1}{2}$
with a midline of $y = 0$



Midline is the horizontal line that passes exactly in the middle between the graph's maximum and minimum points.

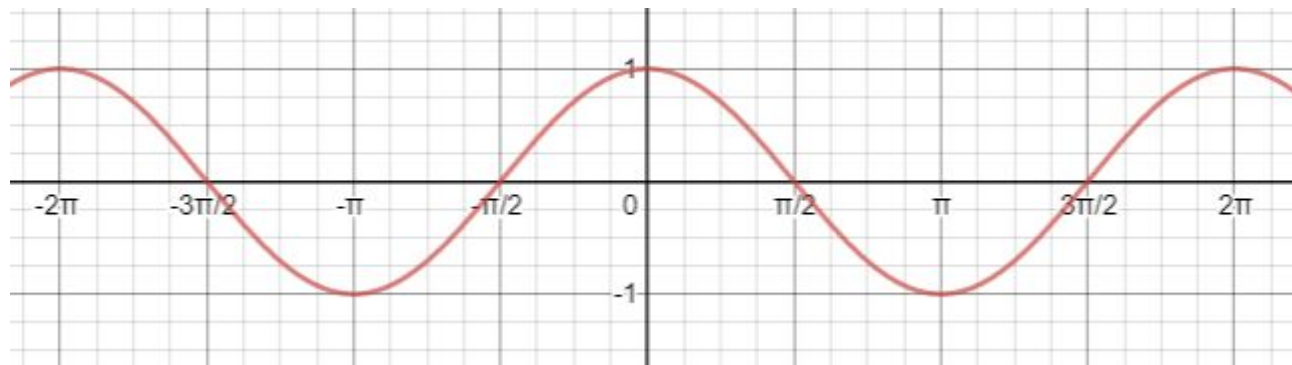
Amplitude is the vertical distance between the midline and one of the extremum points.

Practice

1. After watching the video covering how to graph $y = \sin(x)$, try graphing $y = \cos(x)$ on your own. Remember, that the cosine function will be the x values for the ordered pairs on the unit circle.
2. What is the domain and range of $y = \cos(x)$?
3. What is the amplitude and midline of $y = 5\cos(x)$? What is the domain and range?

Answer key

1.



2. Domain: all real numbers, Range: $[-1, 1]$

3. Amplitude is 5 with a midline of $y = 0$. The domain is all real numbers and the range is $[-5, 5]$

Additional Resources:

Additional practice from Khan Academy on identifying amplitude and midline of sine functions.

[Amplitude practice](#)

[Midline practice](#)