Objective: Graph sine and cosine using 5 key points

Graphs of Sine and Cosine

$$y = a\sin(bx - c) + d$$

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Graphs of Sine and Cosine

$$y = a\sin(bx - c) + d$$

The equation above is the standard form of sine. Cosine has a similar equation.

The next slides will explain what each variable means. We will start by graphing changes to one or two variables at a time.

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Graphs of Sine and Cosine

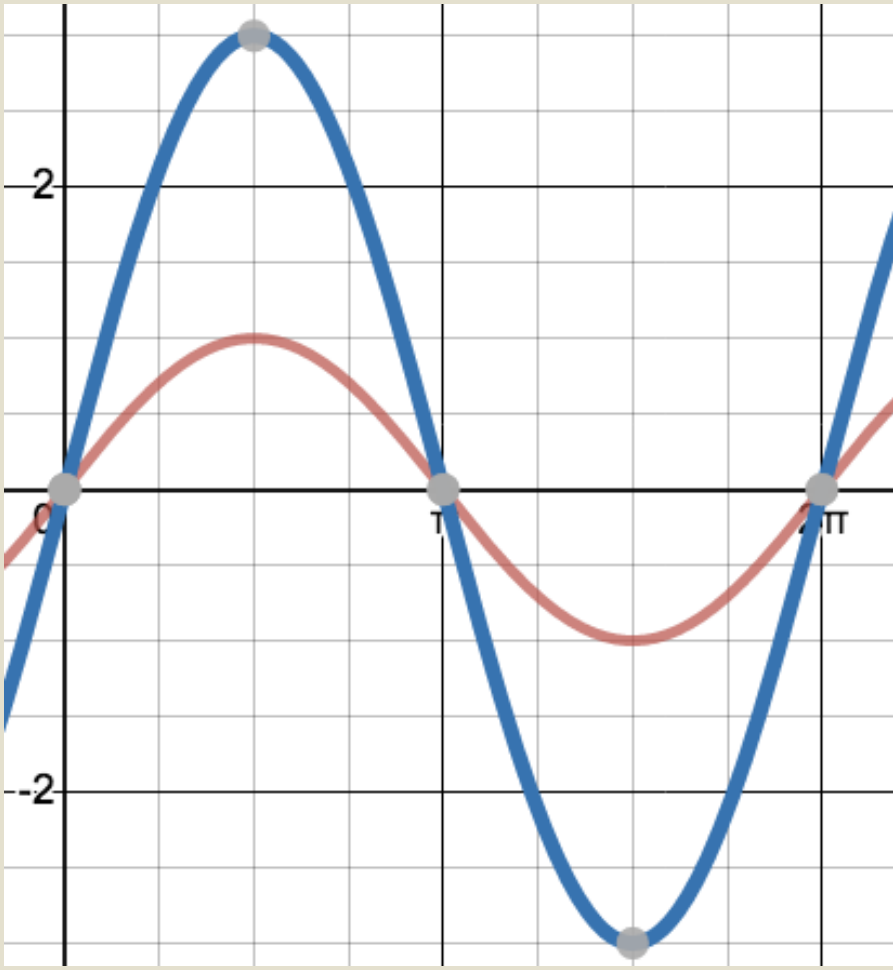
$$y = a\sin(bx - c) + d$$

a is the amplitude. It represents the vertical stretch or shrink of a graph compared to the one from the unit circle, which had an amplitude of 1 unit.

a is the amount up or down from the midline, or the center of the graph.

Objective: Graph sine and cosine using 5 key points

The midline for both these graphs is the x-axis. The red graph is y = sinx and the blue graph is y = 3sinx.



Objective: Graph sine and cosine using 5 key points

Graphs of Sine and Cosine

$$y = a\sin(bx - c) + d$$

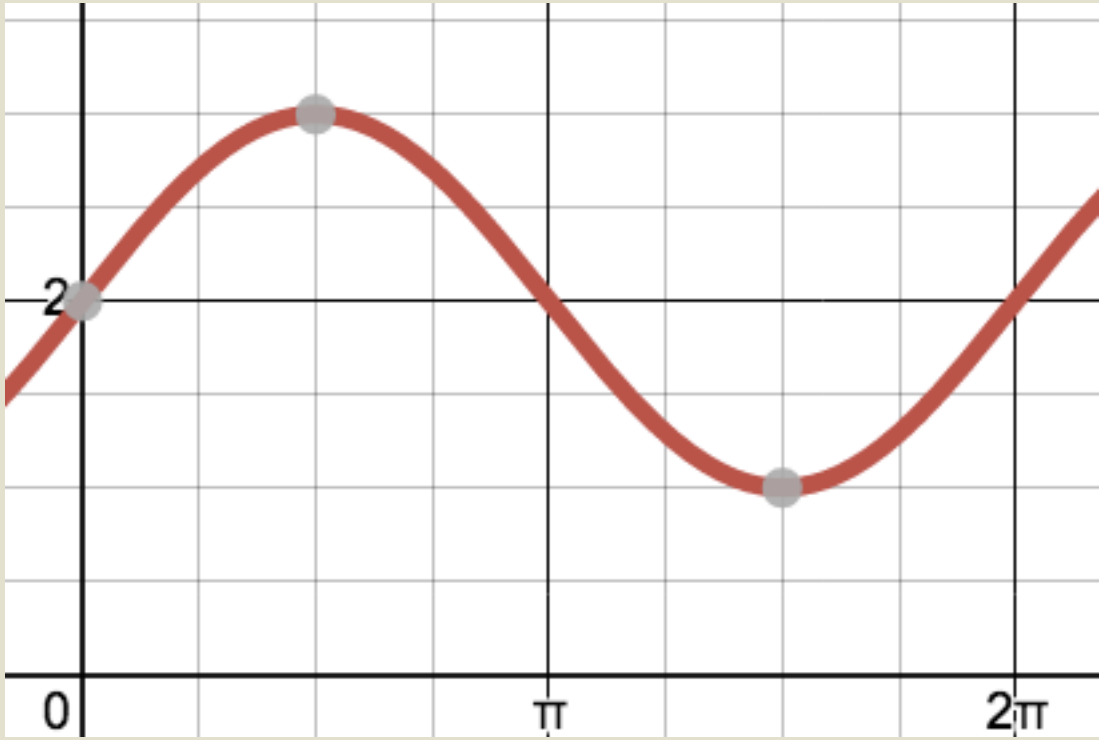
d is the vertical shift. It represents how much the entire graph is shifted up or down.

d can also be thought of as how much the midline is shifted up or down.

Objective: Graph sine and cosine using 5 key points

This is the graph of y = sinx + 2. The entire graph is shifted up 2, which means the midline is also at 2.

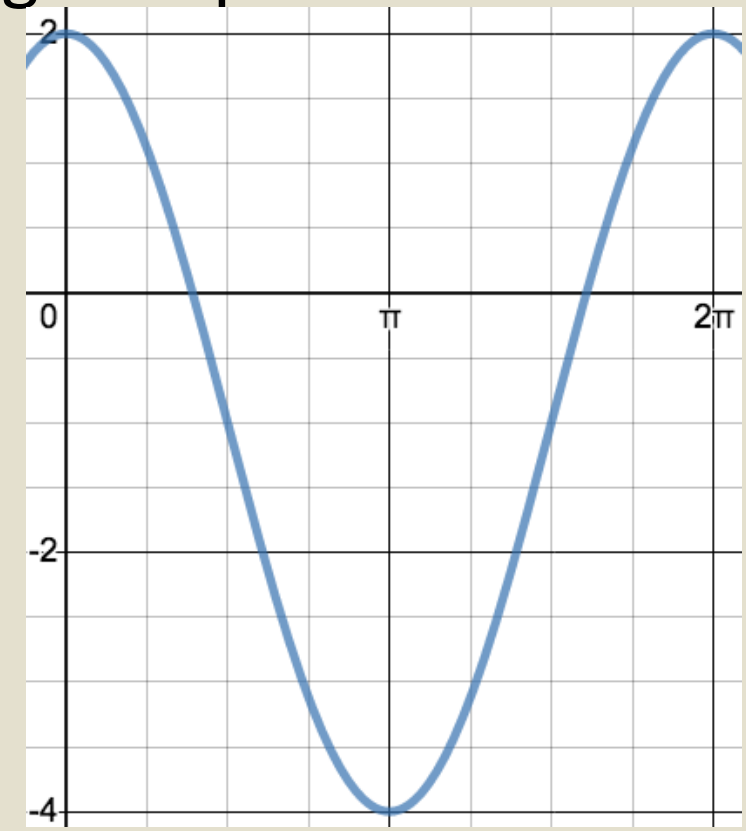
The amplitude is 1 (it goes up or down one unit from the midline)



Objective: Graph sine and cosine using 5 key points

This is the graph of y = 3cosx – 1. The entire graph is shifted down 1, which means the midline is also at –1.

The amplitude is 3 (it goes up or down three units from the midline)

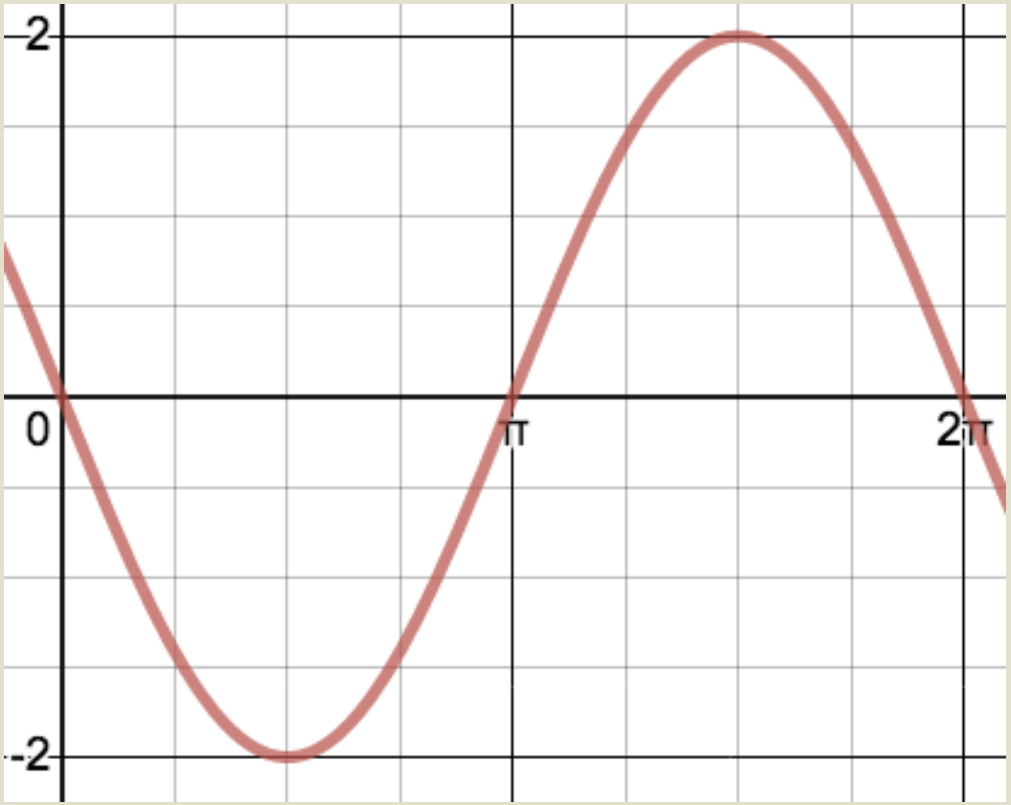


Objective: Graph sine and cosine using 5 key points

This is the graph of $y = -2\sin x$..

The amplitude is still given as 2 (not negative) because it is just the distance from the peak or valley of the graph to the midline.

The negative sign just makes a reflection over the x-axis just like any of the graphs we have seen this year.



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Graphs of Sine and Cosine

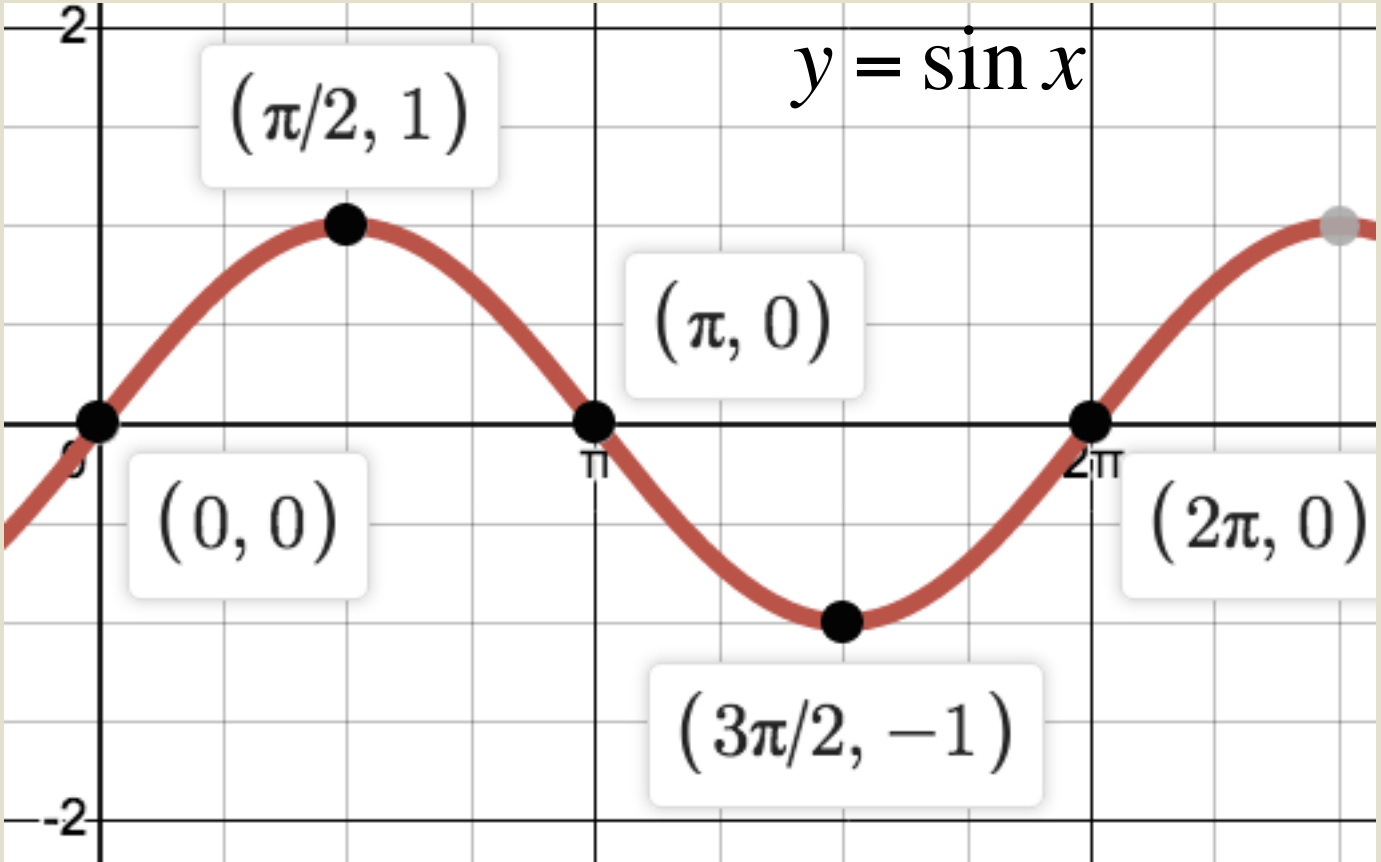
$$y = a\sin(bx - c) + d$$

We will go over b and c next time as they are a little more complicated. For now, we will practice graphing with a and d and using the 5 key points.

Objective: Graph sine and cosine using 5 key points

The five keys points:

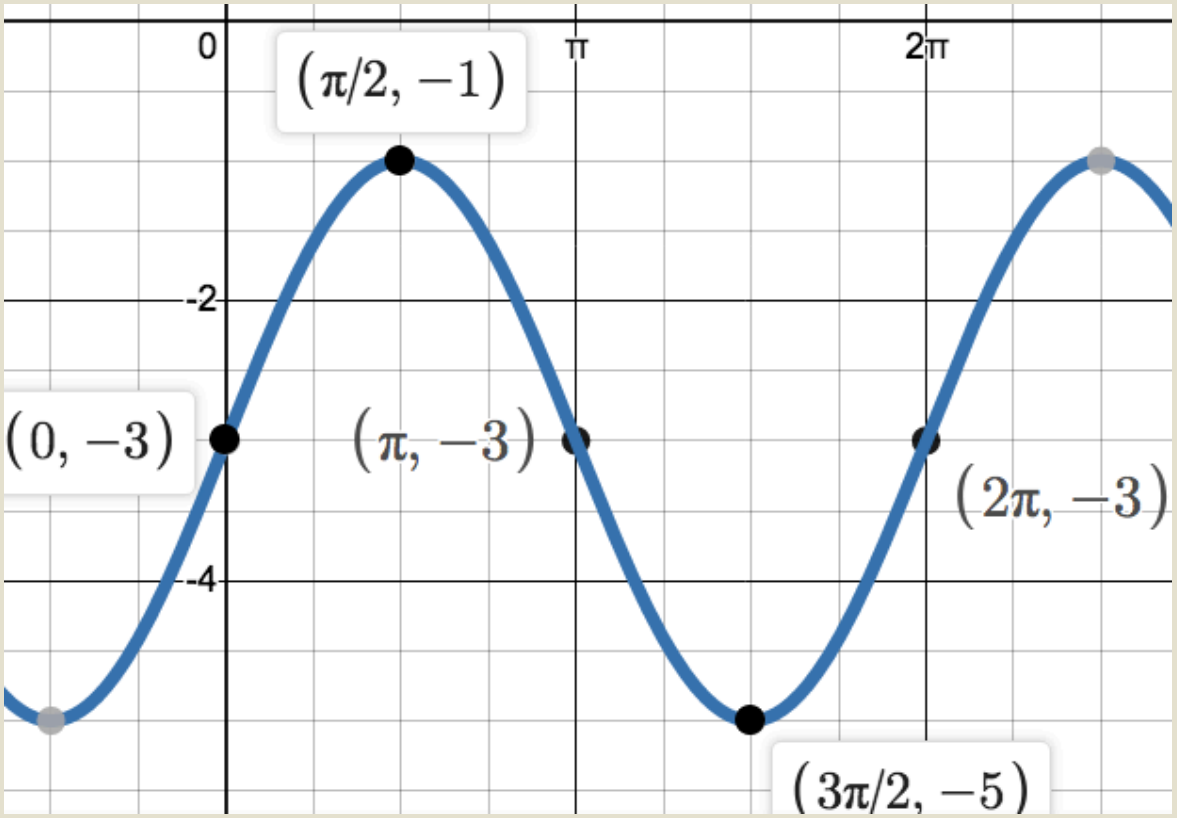
These are 5 points that are typically used to graph an accurate sine or cosine function. They show one full cycle of the graph.



Objective: Graph sine and cosine using 5 key points

The five keys points:

If we are only changing a and d, the x value will always be the same and only the y-value will change. Here is $y = 2\sin x - 3$ with the 5 key points labeled.



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Domain and Range

Reminder:

Domain gives the possible x-values of the graph

Range gives the possible y-values of the graph

Objective: Graph sine and cosine using 5 key points

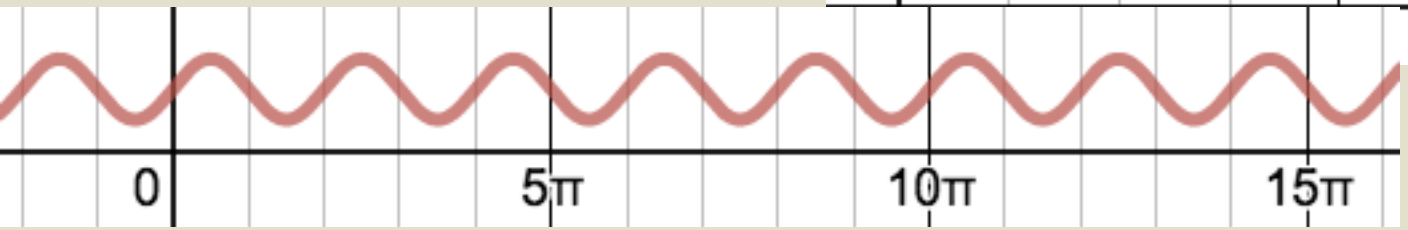
Domain and Range

Domain: The furthest left the graph goes to the furthest right the graph goes. It just keeps going forever because you can keep going around the circle to create more cycles.

Here is $y = \sin x + 2$

Domain: $-\infty \leq x \leq \infty$

This is the same graph zoomed out



Objective: Graph sine and cosine using 5 key points

Domain and Range

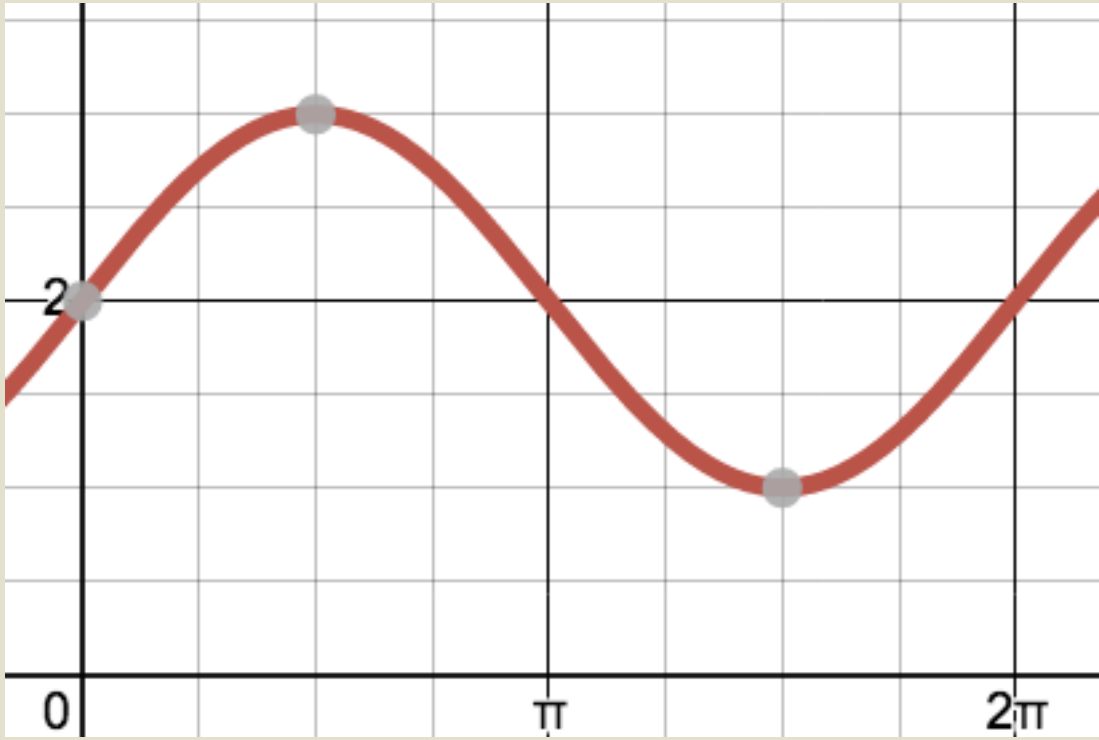
Range:

The lowest the graph ever goes to the highest it ever goes.

Here is $y = \sin x + 2$

Range:

$1 \leq y \leq 3$



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Assignment:

Log in to Office 365/Teams

Complete the assignment:

Graphing Sine and Cosine_changing a and d_ (Week 5, Day 2)

SHOW ALL YOUR WORK!

NO WORK = NO CREDIT