



Investigating the Properties of Sinusoidal Functions

Open Desmos.

If there are any functions already present, push the settings button  then delete all.

Click the wrench button  and under Trig Settings, choose the second option for x-axis labels. The button shows $\pi, 2\pi, 3\pi$. This will display our graph in “radians”.

Graph the function $f(x) = \sin x$ by clicking in the first function box, typing “y =”, clicking the “functions” button, selecting sin, then click “x”.

You can zoom in and out along **either** axis in the program. Zoom your y-axis so it runs between -2 and 2. Zoom your x-axis until you see two full cycles of your function.

1. Compare your graph of the sine function with one we have done previously.
What does π seem to represent?

2. Yesterday I mentioned that the equation for the circumference of a circle is $C = 2\pi r$.
Explain why this makes sense in light of your answer to question 1.

3. Graph the function $f(x) = 4 \sin(3x) + 2$ and fill in the blanks below.

- The period is _____

- The equation of the axis is _____

- The amplitude is ____

The max value is ____

The min value is ____

- The domain is { ____ \in ____ }

- The range is { ____ \leq ____ \leq ____ }

- The zeroes are located at _____

4. Compare your answers to question 3 with the results of our minds on.
Explain what effect each value in the equation of question 3 (4, 3 and 2) had on the original graph of $\sin x$. Be specific and use key terms from the unit.

5. Delete all functions.

Graph $f(x) = \cos x$ and $f(x) = \frac{1}{2}\cos(-2x) - 4$. Fill in the blanks below

- The period is _____
- The equation of the axis is _____
- The amplitude is ____
The max value is ____
The min value is ____
- The domain is { ____ \in ____ }
- The range is { ____ \leq ____ \leq ____ }
- The zeroes are located at _____

6. Revisit your answer to question 4.
Do you still agree with what you said? Why or why not?

7. Explain what effect each value in the function equation above had on the original graph of $\cos x$. Be specific and use key terms from the unit.