

Investigating Trigonometric Functions

Name _____

The Basic Functions [TrigFunc.gsp]

I. Click on the section titled “**Sine Function**” (or click the tab at the bottom of the screen.

Answer the following questions:

1. What is the amplitude of the function $f(x) = \sin(x)$? _____
2. What is the approximate decimal length of the period of the function $f(x) = \sin(x)$? _____
3. Click on “*Show Full Function*”.
4. The sliders on the left side of the screen are controlled by moving the right end of the segment slider. As closely as possible, set the following values: $a = 1$; $b = 1$; $c = 0$; $d = 0$. What function do you have with these settings? _____
5. Set $a = 1$; $b = 1$; $c = 0$; $d = 2$. Describe what happens to the graph when d changes. _____

6. Set $a = 1$; $b = 1$; $c = 2$; $d = 0$. Describe what happens to the graph c changes. _____

7. Set $a = 1$; $b = 3$; $c = 0$; $d = 0$. Describe what happens to the graph when b changes. _____

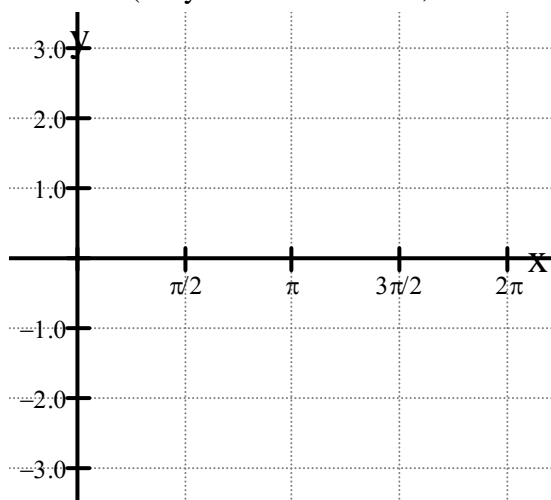
8. Set $a = 3$; $b = 1$; $c = 0$; $d = 0$. Describe what happens to the graph when a changes. _____

This “*Full Function*” equation, $g(x) = a \sin(b(x - c) + d)$, is called a **sinusoidal function**. Sinusoidal functions are used to model real life data such as AC circuits, ocean tides, earthquakes, measured daylight over time, temperatures over time, drought patterns, tsunamis, weights of animals over time, and numerous other examples.

9. Using the grid below, graph the sinusoidal function $f(x) = -2 \sin(2x - 4) - 1$.

Look carefully at this function before you start adjusting the sliders!!

(As you set each slider, look carefully at the graph to see what is happening to it.)



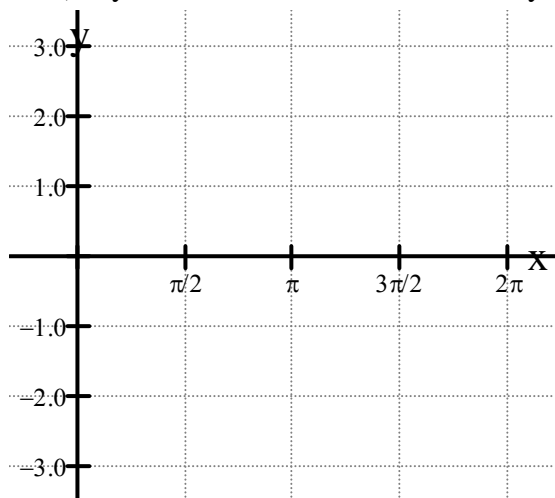
For this new sinusoidal function:

- a.) what is the amplitude? _____
- b.) what is the period? _____
- c.) what is the vertical shift? _____
- d.) what is the phase shift? _____

II. Click on the section titled “Cosine Function” (or click the tab at the bottom of the screen).

Answer the following questions:

1. What is the amplitude of the function $f(x) = \cos(x)$? _____
2. What is the approximate decimal length of the period of the function $f(x) = \cos(x)$? _____
3. Click on “Show Full Function”.
4. As closely as possible, set the sliders so that the “Full Function” and the “Parent Function” are the same. What are your values for : $a =$ _____; $b =$ _____; $c =$ _____; $d =$ _____.
5. Using the grid below, graph the function $f(x) = \cos(x + 2) + 1$. **LOOK Carefully!**
(As you set each slider, look carefully at the graph to see what is happening to it.)



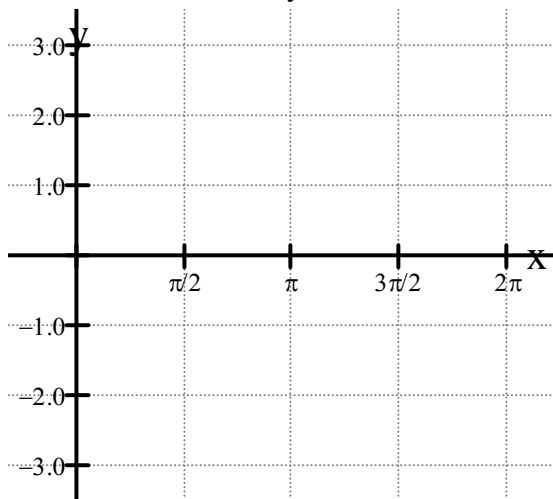
For this new function:

- a.) what is the amplitude? _____
- b.) what is the period? _____
- c.) what is the vertical shift? _____
- d.) what is the phase shift? _____

III. Click on the section titled “Tangent Function” (or click the tab at the bottom of the screen).

Answer the following questions:

1. In the x -interval 0 to 3, what is the decimal approximation of the asymptote of $f(x) = \tan(x)$? _____
2. Click on “Show Full Function”.
3. As closely as possible, set the sliders so that the “Full Function” and the “Parent Function” are the same. What are your values for : $a =$ _____; $b =$ _____; $c =$ _____; $d =$ _____.



4. Using the grid at the left, graph the function $f(x) = -\tan(2(x - 2))$. **LOOK Carefully!**

For this new function:

- a.) what is the decimal approximation of the asymptote on the x -interval 0 to 2.5? _____
- b.) what appears to happen to the graph as “ d ” approaches the value of 10? _____
Explain why this appears to be happening? _____

