

Investigate the graphs of sine waves.

Investigation: For each of the forms of sine functions below, you will explore the graph, its location on the coordinate plane, and how the new graphs are related to the graph of the parent function.

$$y = a\sin x$$

$$y = \sin x + c$$

$$y = a\sin x + c$$

Before you start, individually predict how you think the parameters will affect the graphs. Test your predictions using your graphing calculator. Substitute different values for  $a$  and/or  $c$ . Use a variety of values including ones that are greater than 1, between 0 and 1, positive and negative. Record your observations.

Next, you will share your observations and work on this with your group.

As a group, use your graphs to answer these questions:

- a) Were your predictions correct? State clearly what you expected and what your experiments showed you.
- b) How do changes in the values of  $a$  and  $c$  affect the parent function  $y = \sin x$ ?