

**Process Standards:**

Students will be able to:

- Interpret results in ways that are meaningful for the given context.
- Effectively communicate their mathematical knowledge.
- Exhibit characteristics of a cooperative learner.
- Organize class materials so that they are easily accessible and able to be used as an additional resource in problem solving situations.

**Content Standards:**

Students will be able to:

- Use technology to assist in data collection and interpretation of functions.
- Recognize equivalent forms of an expression, equation, function or relation.
- Generate equivalent forms of an expression, equation, function or relation.

In yesterday's task, you were given some quadratic functions and asked to find their vertices. In this task, you will reverse the process where you are given the vertex and use it to form a quadratic equation in vertex form.

1. a. Find an algebraic expression for a quadratic function whose graph has its vertex at  $(3, 4)$ .  
b. Make a table of values for your function and use the table to sketch a graph of the function.  
c. Does your graph seem to confirm that  $(3, 4)$  is the vertex for your function?
2. Repeat steps a through c from Question 1 for the point  $(3, -4)$ .
3. Repeat steps a through c from Question 1 for the point  $(0, 0)$ .
4. For each of these points, find a quadratic function whose graph has its vertex at the given point.

a.  $(-4, 2)$

b.  $(-4, -5)$

5. Generalize your work from Questions 1 through 4. In other words, consider a general point  $(h, k)$  and write an expression for a quadratic function whose vertex is at  $(h, k)$ . Then justify your answer. In other words, explain how you know that your function will have the desired vertex.
6. Find a quadratic function different from the one you used in Question 1 but whose graph also has its vertex at  $(3, 4)$ . Make sure to check your answer with your graphing calculator.