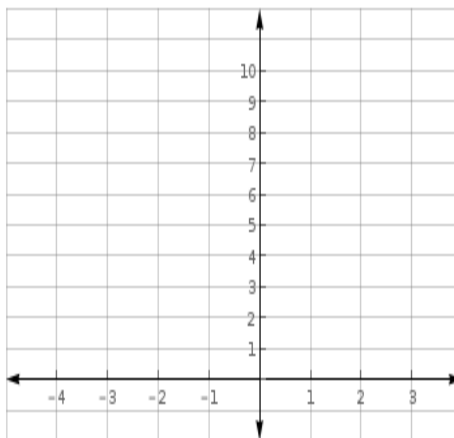# Lesson 4.2.1: Exploring Quadratic Graphs

**Targets:**

1. I understand how to graph quadratic functions.
2. I understand how a, b, and c change the graph of the function $f(x) = ax^2 + bx + c$.

**Warm Up:**

Use this function to complete the warm up:      $f(x) = x^2 + 2x + 3$

1. Create a table of values.                          2. Graph function $f$

| $x$ | $f(x)$ |
|-----|--------|
| -4  |        |
| -3  |        |
| -2  |        |
| -1  |        |
| 0   |        |
| 1   |        |
| 2   |        |

## Vocabulary

Find a definition that you understand for each term, then label your graph using the appropriate terms from below.

| Parabola | Vertex of a Quadratic | Axis of Symmetry |
|----------|----------------------|------------------|
|          |                      |                  |

## Practice 1

Graph each of the following functions on the same coordinate plane.

a. $f(x) = x^2$

b. $g(x) = 4x^2$

c. $h(x) = \frac{1}{4}x^2$

d. $j(x) = -x^2$

e. How does the number in front of the $x^2$ change the graph? What if it is negative?
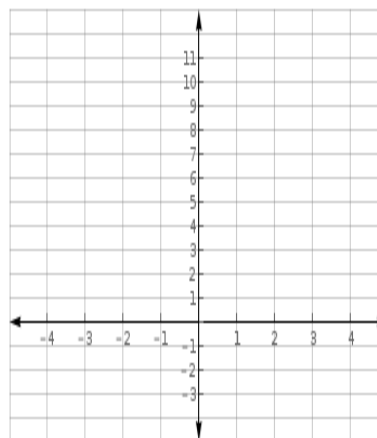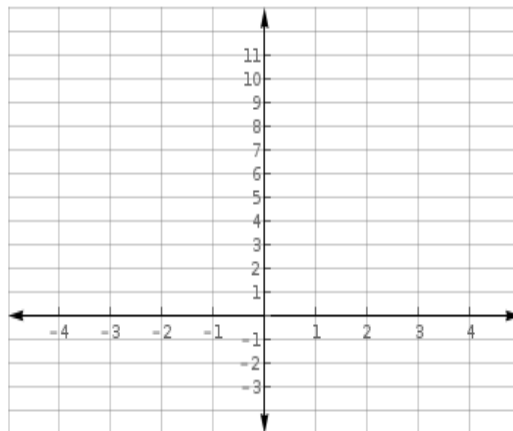
## Practice 2

Graph each of the following functions on the same coordinate plane.

    a.  $f(x) = x^2$

    b.  $g(x) = x^2 + 3$

    c.  $h(x) = x^2 - 3$

    d.  How does the number after $x^2$ change the graph?
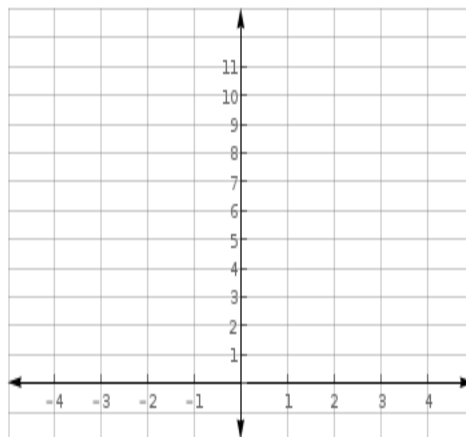
## Practice 3

Graph each of the following functions on the same coordinate plane.

    a.  $g(x) = x^2 + 3$

    b.  $h(x) = x^2 + 2x + 3$

    c.  $j(x) = x^2 - 2x + 3$

    d.  How does the number in front of $x$ change the graph?

## Exit Ticket

    1.  If $f(x) = ax^2 + bx + c$, fill in the table below:

| How does $a$ change the graph of $f$? | How does $b$ change the graph of $f$? | How does $c$ change the graph of $f$? |
|---|---|---|
| | | |

    2.  Given the function $g(x) = -2x^2 + 4x - 5$, describe as many characteristics of the graph as you can without actually looking at the graph.