

# Lesson 16: Finding the Zeros of Quadratics

Objectives	Terms
<ul style="list-style-type: none"><li>To factor quadratics and identify zeros.</li><li>To check zeros of quadratics.</li><li>To graph a quadratic from different forms.</li><li>To identify the zeros of a quadratic from a graph.</li></ul>	<ul style="list-style-type: none"><li>Roots/zeros</li><li>Vertex Form</li><li>Parabola</li><li>x-intercepts</li><li>Real Zeros</li><li>Axis of Symmetry</li></ul>

**Think about this: What are the zeros of a quadratic function?**

## Definitions:

- There are different formats for writing a quadratic function. Each form provides different information.

<b>Standard Form:</b> _____  Gives you:  Example:	<b>Factored Form:</b> _____  Gives you:  Example:
<b>Vertex Form:</b> _____  Gives you:  This is where:  Example:	<b>Graph:</b>

- Axis of Symmetry:**
  - Is a \_\_\_\_\_ line, with the equation of: \_\_\_\_\_
  - It is the \_\_\_\_\_ of the vertex.
  - It cuts the graph of a quadratic into \_\_\_\_\_ halves.
- Zeros:** The zero of a quadratic is when the equation is \_\_\_\_\_ and you solve for \_\_\_\_\_.
  - Zeros are also known as \_\_\_\_\_.
  - Can find the zeros by graphing or using the Quadratic Formula.
    - Quadratic Formula:
- Check:** To check if the zeros are correct, you evaluate the quadratic with the \_\_\_\_\_ found while solving when  $y = 0$ . If the result is \_\_\_\_\_, then the value is an x-intercept or a zero of the quadratic function.

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- **Graph:** The graph of a quadratic is called a \_\_\_\_\_.
  - The \_\_\_\_\_ of the quadratic are where the parabola crosses the \_\_\_\_\_.
    - If the graph crosses the x-axis and represents a real solution.
    - There are:
      - **2 real zeros**
      - **1 real zero**
      - **No real zero**

**Examples:** Use the space provided to find the x-intercepts and the vertex of each quadratic. Sketch your graph in the space provided.

1. **2 real zeros:**  $y = (x + 5)(x - 3)$

a. x-intercept(s):

Sketch your graph here.

b. Vertex:

2. **1 real zero:**  $y = 3(x + 4)^2$

a. x-intercept(s):

Sketch your graph here.

b. Vertex:

3. **No real zeros:**  $y = 3x^2 + 4x + 5$

a. x-intercept(s):

Sketch your graph here.

b. Vertex:

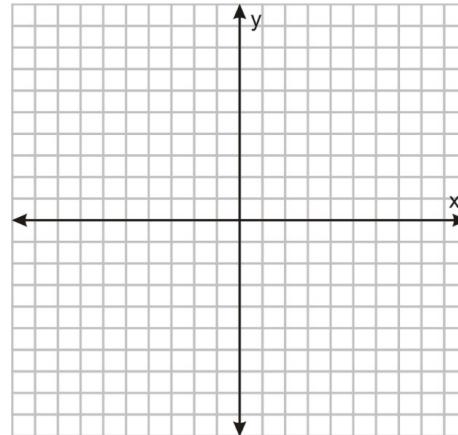
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**Example:** Use your graphing calculator to graph each quadratic.

**Graph each of the following quadratics.**

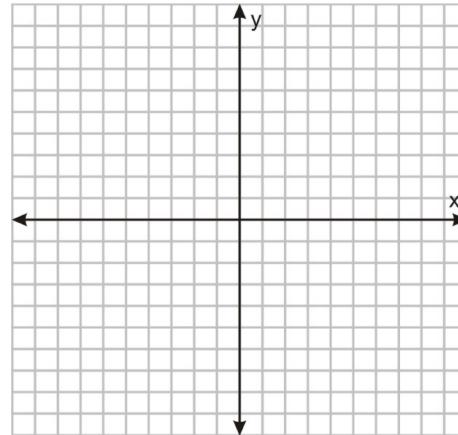
1.  $y = \underline{\hspace{2cm}}$

- Sketch the graph.
- Where does the graph cross the x-axis?



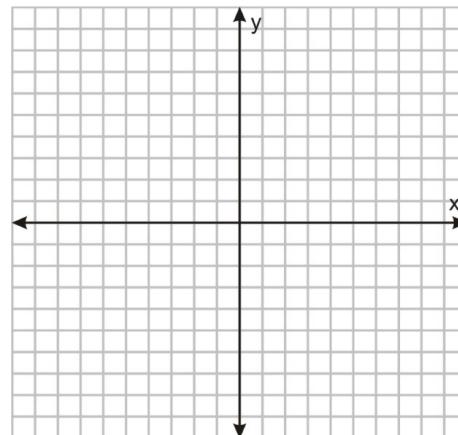
2.  $y = \underline{\hspace{2cm}}$

- Sketch the graph.
- Where does the graph cross the x-axis?



3.  $y = \underline{\hspace{2cm}}$

- Sketch the graph.
- Where does the graph cross the x-axis?



## Lesson 16: Finding the Zeros of Quadratics

**Solve by Factoring:** Factor the quadratic and find the zeros.

**Quadratic:**  $y =$  \_\_\_\_\_

Mathematical Steps	Description
	Factor out any factor common to all three terms.
	Rewrite in factored form.
	Set $y = 0$ (think about why we do this)
	Set each factor with a variable equal to 0 and solve for $x$
	Check your answers by plugging in each $x$ -value into the quadratic.
	State the answer as $x =$ _____.

**Practice:** Find the zeros to each quadratic. Test your value(s).

1. $y = x^2 + 2x - 15$  Test Step:  <div style="border: 1px dashed black; padding: 5px;">Zeros(s): _____</div>	2. $y = 2x^2 - 7x - 4$  Test Step:  <div style="border: 1px dashed black; padding: 5px;">Zero(s): _____</div>
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Where will you see this in upcoming material?	What are the calculator skills you needed?
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