

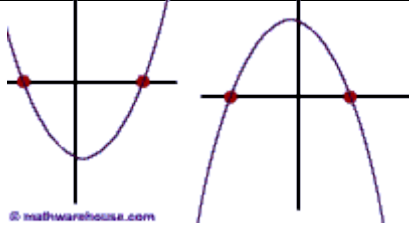
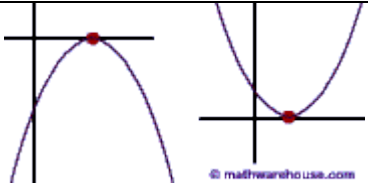
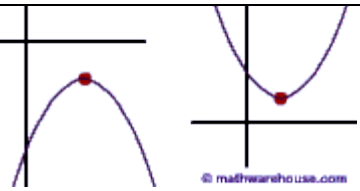
Today you will be using the...

- Discriminant to determine the number and type of solutions for a quadratic function
- Quadratic formula to solve quadratic functions

### The Discriminant

$$b^2 - 4ac$$

- small part of the quadratic equation
- used to determine the number and type of solutions (x-intercepts, roots, or zeros) to a quadratic function
- equation must be written in standard form:  $ax^2 + bx + c = 0$

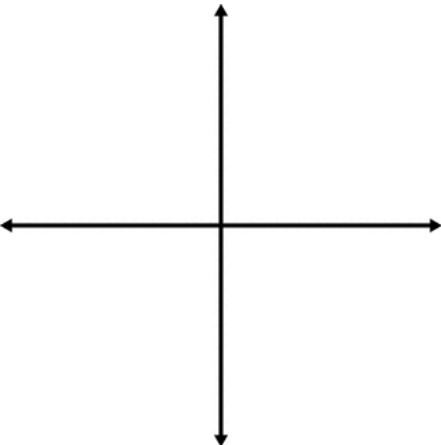
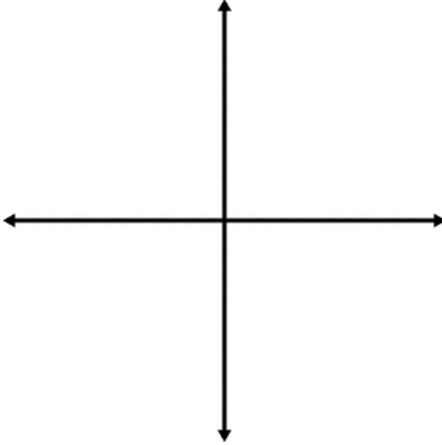
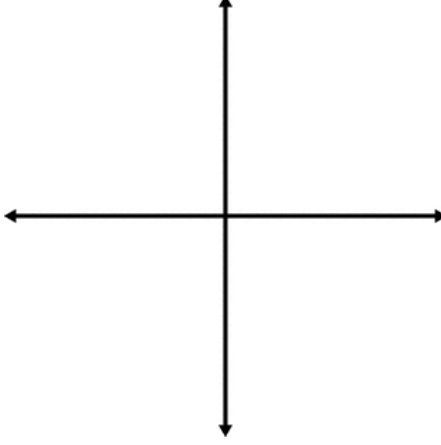
Value of Discriminant	Type and Number of Solutions	Example Graph
Positive Discriminant $b^2 - 4ac > 0$	Two Real Solutions	
Discriminant is Zero $b^2 - 4ac = 0$	One Real Solution	
Negative Discriminant $b^2 - 4ac < 0$	No Real Solution (two <i>imaginary</i> solutions)	

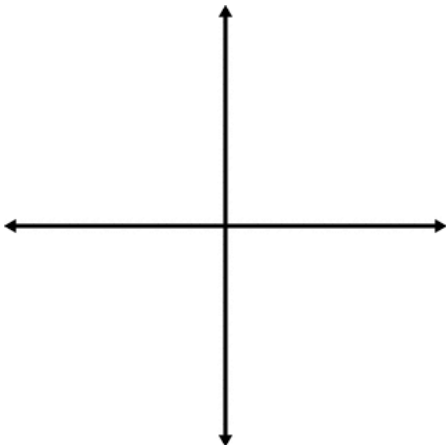
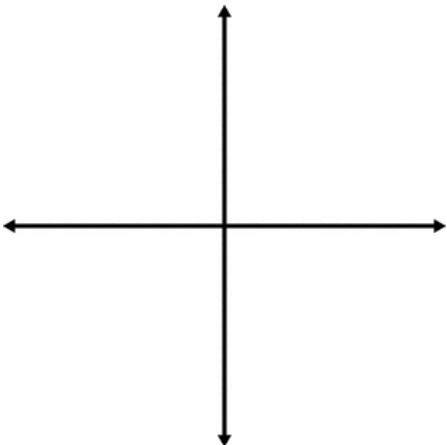
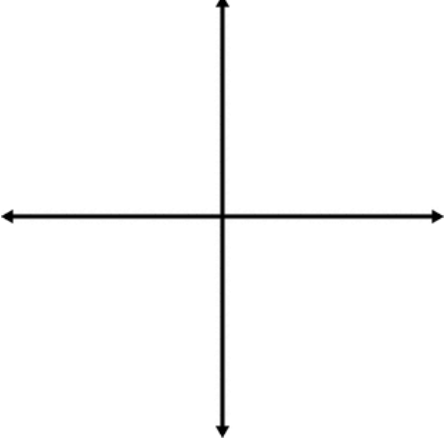
### The Quadratic Formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

- Works for solving ANY quadratic equation—equation must be written in standard form:  $ax^2 + bx + c = 0$
- Best used when the quadratic expression is not factorable

**Directions:** Find the discriminant of the following problems and state the nature and the number of solutions. Use the quadratic formula to determine the solutions and draw a quick sketch of the graph.

$x^2 - 8x + 16 = 0$ $a = \quad b = \quad c =$	$-5x^2 + x + 1 = 0$ $a = \quad b = \quad c =$	$8x^2 + 8x + 3 = 0$ $a = \quad b = \quad c =$
<p><i>Discriminant and # of Solutions</i></p>	<p><i>Discriminant and # of Solutions</i></p>	<p><i>Discriminant and # of Solutions</i></p>
<p><i>Quadratic Formula</i></p>	<p><i>Quadratic Formula</i></p>	<p><i>Quadratic Formula</i></p>
<p><i>Rough Sketch of Graph</i></p> 	<p><i>Rough Sketch of Graph</i></p> 	<p><i>Rough Sketch of Graph</i></p> 

$x^2 + 7x + 11 = 0$ $a =$ $b =$ $c =$	$x^2 + 3x + 6 = 0$ $a =$ $b =$ $c =$	$2x^2 + 8x + 8 = 0$ $a =$ $b =$ $c =$
<i>Discriminant and # of Solutions</i>	<i>Discriminant and # of Solutions</i>	<i>Discriminant and # of Solutions</i>
<i>Quadratic Formula</i>	<i>Quadratic Formula</i>	<i>Quadratic Formula</i>
<i>Rough Sketch of Graph</i> 	<i>Rough Sketch of Graph</i> 	<i>Rough Sketch of Graph</i> 

**Directions:** Solve using the quadratic formula. Remember, it must be in STANDARD FORM first ( $ax^2 + bx + c = 0$ )!

$$x^2 + 3x = 2 \quad a = \quad b = \quad c =$$

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$$x^2 + 18 = 10x \quad a = \quad b = \quad c =$$

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$$x^2 = x + 30 \quad a = \quad b = \quad c =$$