**Name:** _____ **Hour:** ___

# 5.1: Graphing Quadratic Functions – Standard Form

**Quadratic Function:** a function in the **standard form** of $f(x) = ax^2 + bx + c$ where $a \neq 0$.

A quadratic function will graph as a _____.

**Example 1:** Change to standard form

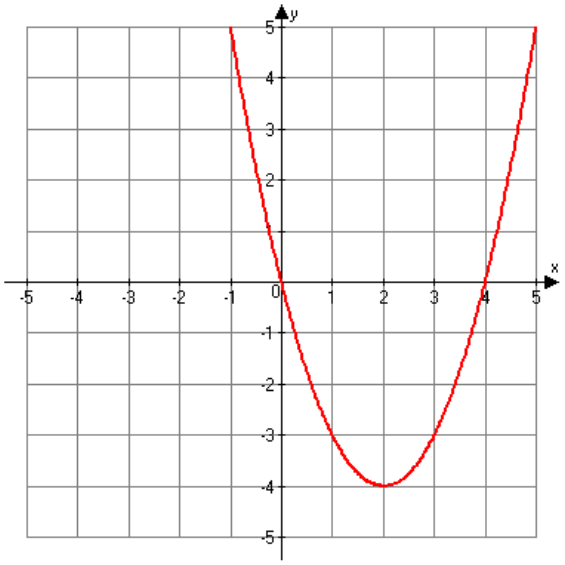
a. $-(x+3)(x-2)$

b. $y - 3 = \frac{1}{4}(x+2)^2$

**Vertex:** The lowest or highest point of the parabola.

Also called _____.

The coordinates of the vertex are $\left(\frac{-b}{2a}, f\left(\frac{-b}{2a}\right)\right)$




**Axis Of Symmetry:** the vertical line passing through the vertex of the parabola producing mirror images of each half of the parabola.

The axis of symmetry is $x = \frac{-b}{2a}$

Parabola opens up if _____

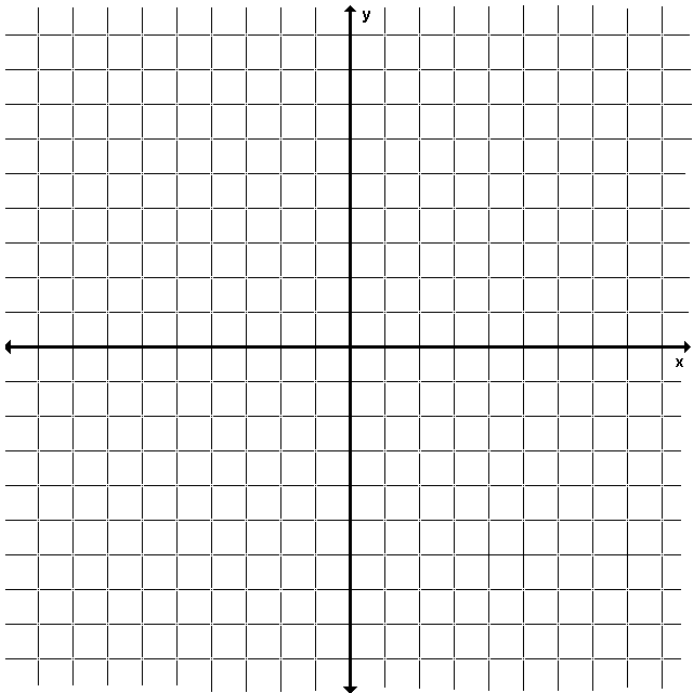
opens down if _____

**Example 2:** Find the vertex of the equation from example 1 Part b.

**Graph the Quadratic Function:**

- **From Standard Form** $y = -x^2 + 4x - 2$

1. Find the _____ of _____




2. Use _____ to find _____

** Vertex: _____

3. Find the _____.

** y-intercept: _____

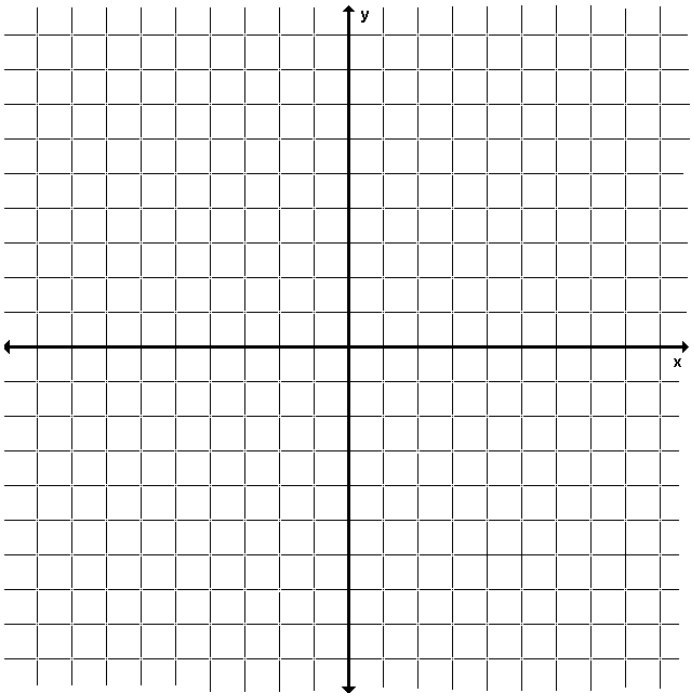
4. Find _____.

****** Axis of symmetry: _____

**Example 3:**

Graph the following equation: $y = x^2 - 6x + 11$

Vertex: _____




y-intercept: _____

Axis of symmetry: _____

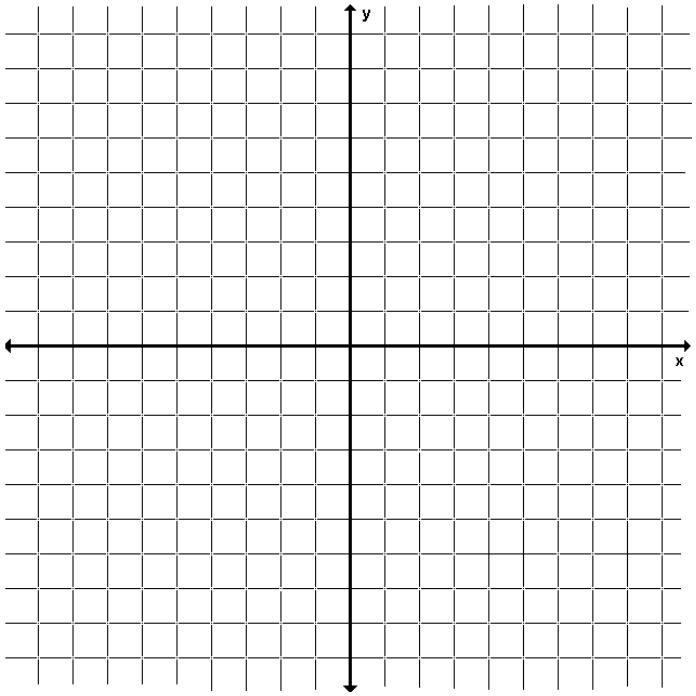
# 5.1 – Part 2: Graphing Quadratic Functions – Vertex & Intercept Form

**Vertex Form:** $y = a(x - h)2 + k$, where the vertex is $(h, k)$, the axis of symmetry is $x = h$ and "a" represents the vertical stretch of the graph.

From standard form _____ to get to vertex form.

**Graph From Vertex Form** $y = (x - 1)^2 + 2$

1. Determine the _____
2. Choose _____ coordinate.
3. Axis of symmetry: _____

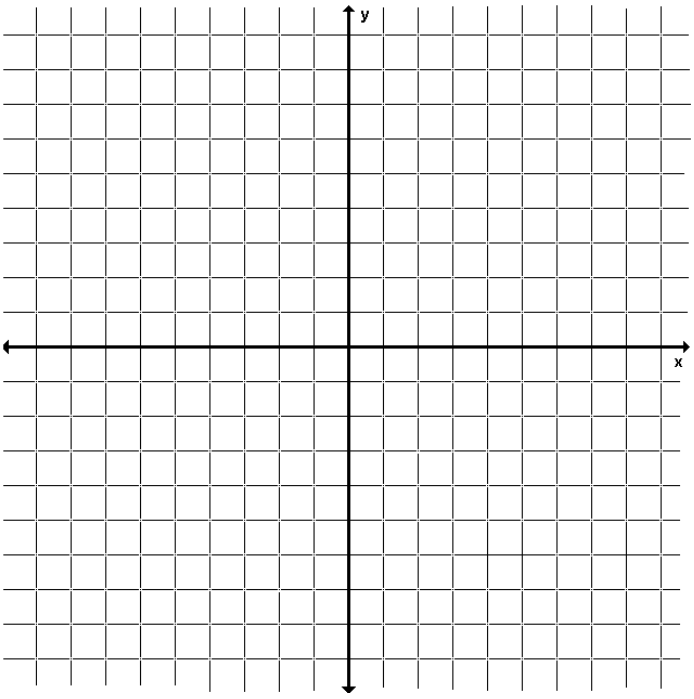



**Example 1:** Graph from vertex form $y = -(x - 2)^2 - 2$

Vertex: _____

2nd Point: _____

Axis of symmetry: _____

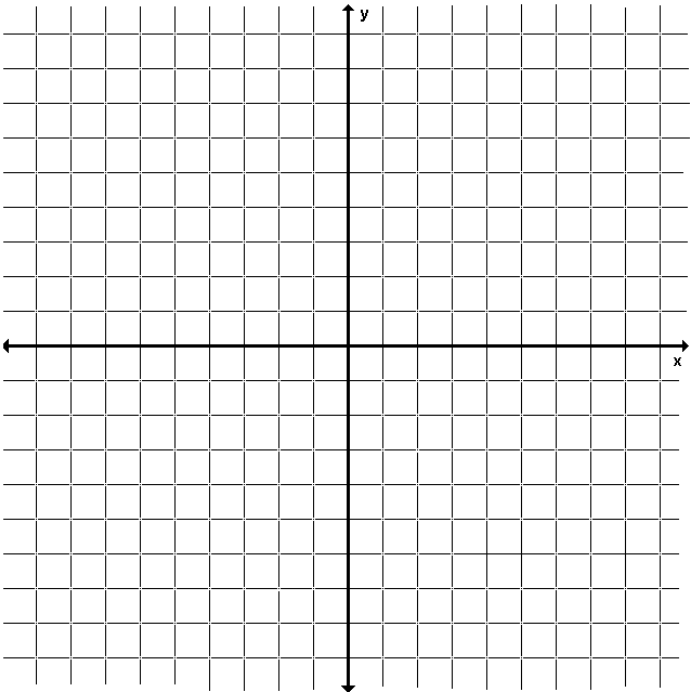


**Intercept/Root Form:** $y = a\,(x - p)\,(x - q)$, where the x- intercepts are p and q and the axis of symmetry is half way between $(p, 0)$ and $(q, 0)$

From standard form _____ to get to intercept form.

**Graph From Intercept Form** $y = 2(x - 1)(x - 6)$

1. Identify the _____




2. Axis of symmetry:_____

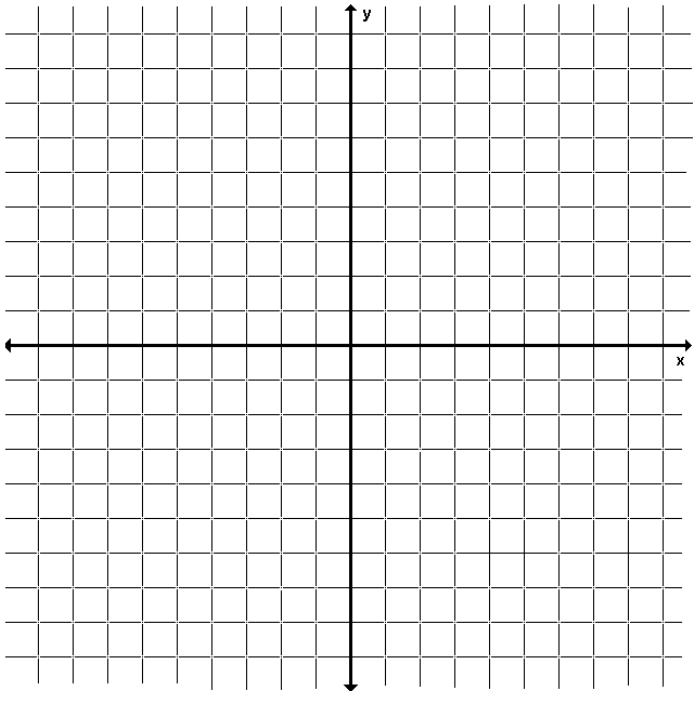
3. Use axis of symmetry to find the _____

**Example 2:** Graph from intercept form $y = 4(x - 1)(x + 1)$

Intercepts/Roots: _____

Axis of symmetry: _____

Vertex: _____



# Lesson 5.5 – Part 2: Completing the Square/Vertex Form & Intercept/Root Form

**Vertex Form:** $y = a(x - h)2 + k$, where the vertex is $(h, k)$, the axis of symmetry is $x = h$ and "a" represents the vertical stretch of the graph.

From standard form _____ to get to vertex form.

**Completing the Square:**

$$x^2 \pm bx + \left(\frac{b}{2}\right)^2 = \left(x \pm \frac{b}{2}\right)^2$$

**Example #1** Write the quadratic function in vertex form. Give the coordinates of the vertex and the equation of the axis of symmetry.
$y = x^2 + 10x - 3$

Vertex Form: _____

Vertex: _____

Axis of Symmetry: _____

**Example #2** Write the quadratic function in vertex form. Give the coordinates of the vertex and the equation of the axis of symmetry.
$y = -x^2 + 14x - 45$

Vertex Form: _____

Vertex: _____

Axis of Symmetry: _____

**Intercept Form:** $y = a(x - p)(x - q)$, where the x- intercepts (roots) are p and q and the axis of symmetry is half way between $(p, 0)$ and $(q, 0)$

From standard form _____ to get to intercept form.

**Example #3** Write the quadratic function in intercept/root form and identify the roots of the function. $y = -2x^2 + 3x + 20$

Intercept Form: _____

Roots: _____

**Given the following equations, identify which form the equation is in.**

a. $y - 2 = -(x - 3)^2$

b. $y = (x + 2)(x - 3)$

c. $y = x^2 - 6x + 11$

d. $y = -\frac{7}{3}(x + 6)(x + 3)$

e. $y = -3x^2 + 5$

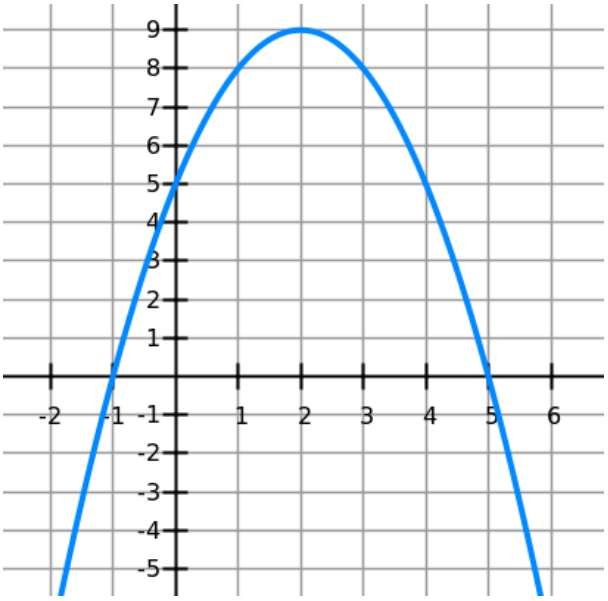
f. $y = \frac{5}{4}(x - 3)^2$

# 5.8: Modeling with Quadratic Functions

Vertex: _____ Intercept/Root: _____ Standard: _____

**Write a quadratic function for each graph shown in vertex, intercept/root, and standard form.**

**Example 1:**

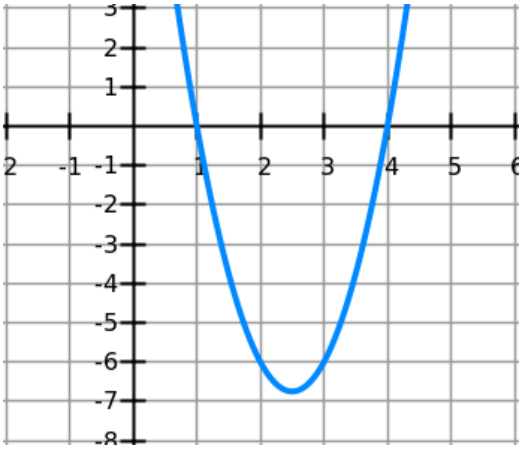



a. Vertex Form: _____

b. Intercept/Root Form: _____

c. Standard Form: _____

**Example 2:**




a. Vertex Form: _____

a. Intercept/Root Form: _____

b. Standard Form: _____