Algebra 1: Problem Set 9A

Mr. Chamberlain

Name _____

Date _____ Period _____

FYI

The **STANDARD FORM** of a **QUADRATIC EQUATION** is:

$y = ax^2 + bx + c$ where a, b, c are coefficients and $a \neq 0$

- If ***a*** is positive, the parabola opens up.
- If ***a*** is negative, the parabola opens down.
- The vertex has an *x*-coordinate of $x = -\frac{b}{2a}$.
- The axis of symmetry of a parabola is the vertical line $x = -\frac{b}{2a}$.

N.B. The vertex of a parabola can be found by substituting this value of ***x*** (*-b*/2*a*) into the original quadratic equation and solving for ***y***.

For example, for the quadratic function: $y = x^2 + 4x - 5$

$a = 1, b = 4, c = -5$

The parabola will **open up** because the leading coefficient, ***a***, is positive.

The *x*-coordinate of the vertex can be calculated using the formula:

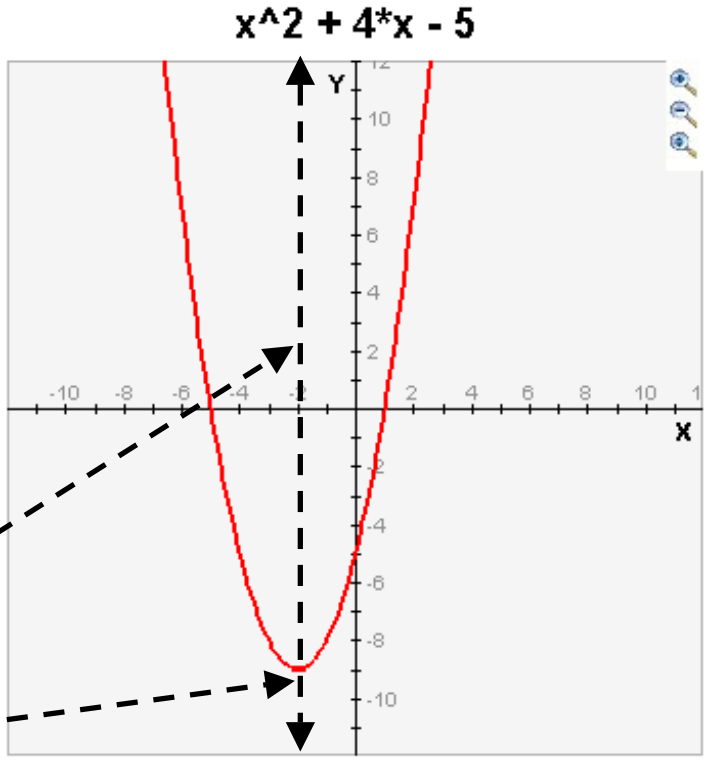
$$x = -\frac{b}{2a}$$
$$= -\frac{4}{2(1)}$$
$$x = -2$$

To find the *y*-coordinate, simply plug $x = -2$ into the function.

$$y = (-2)^2 + 4(-2) - 5$$
$$= 4 + (-8) - 5$$
$$y = -9$$

The equation for the axis of symmetry is: $x = -2$.

The coordinates of the vertex point are $(-2, -9)$



Graph the following quadratic equations using an x-y chart. ***SHOW ALL WORK.***
Find the axis of symmetry and the coordinates for the vertex.

1 $y = x^2 - 3$

Hint #1: Isn't this really: $y = x^2 + 0x - 3$

Hint #2: It is **IMPORTANT** to ***locate the vertex*** **BEFORE** you select the "***x***" values to graph so that you can pick ***appropriate*** "***x***" values on either side of the vertex.

$a =$

$b =$

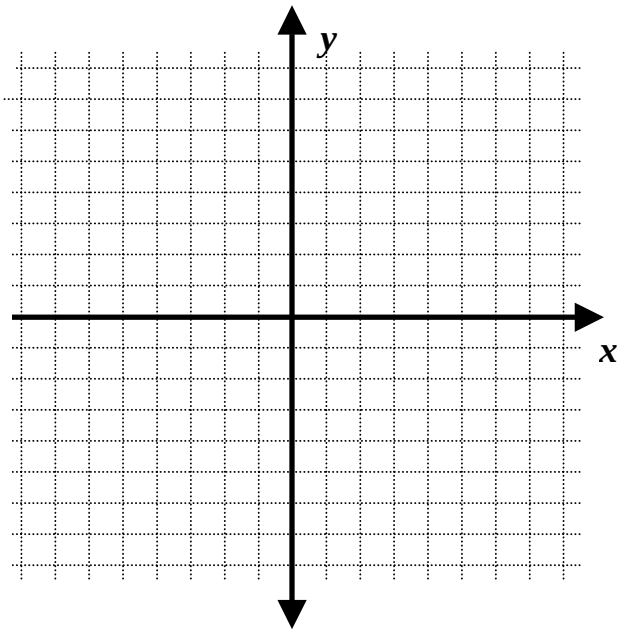
$c =$

Recall that **STANDARD FORM** is:

$y = ax^2 + bx + c$ where a, b, c are coefficients and $a \neq 0$

Recall: The vertex has an *x*-coordinate of $x = -\dfrac{b}{2a}$

x	$x^2 - 3$	***y***	***(x , y)***
-2	***(-2)² – 3***	***1***	***(-2 , 1)***
-1			
0			
1			
2			



2. $y = 2x^2 - 8x + 3$

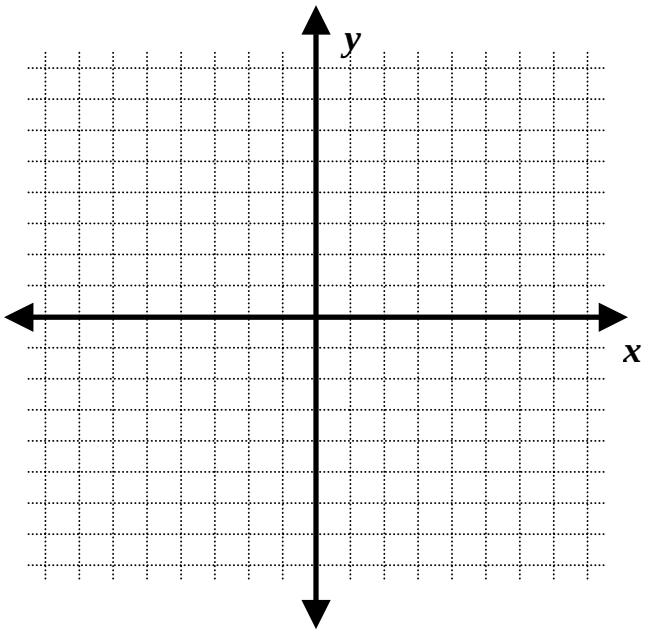
$a =$

$b =$

$c =$

Vertex: $x = -\dfrac{b}{2a} =$

x		y	(x, y)



3. $y = -x^2 - 6x - 2$

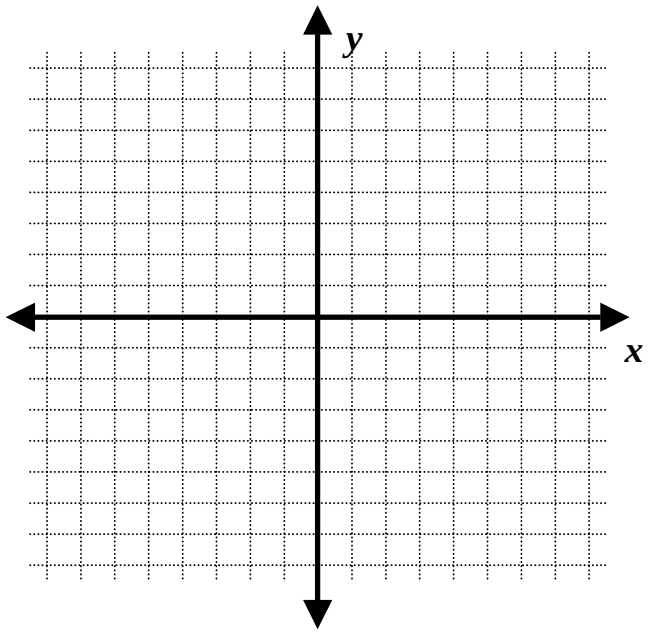
$a =$

$b =$

$c =$

Vertex: $x = -\dfrac{b}{2a} =$

x		y	(x, y)



Find the following square roots

5. a. $\sqrt{256}$ b. $\sqrt{-81}$

c. $-\sqrt{169}$ d. $\pm\sqrt{625}$

Solve the following equations for the indicated variable:

6. a. $g^2 = 225$ b. $4h^2 + 17 = 341$

c. $3x^2 + 5 = 80$ d. $9h^2 - 39 = -3$

FYI

The quadratic equation in standard form $h = -16t^2 + vt + s$ can be used to model the height, ***h***, of a vertically propelled or falling object in feet after ***t*** seconds, where -16 represents the effect of gravity, *v* represents the initial velocity in feet per second (positive or negative) and *s* is the initial height (in feet) of the object.

7. A construction worker working on a skyscraper building drops a hammer from a height of 400 feet. How long does the hammer take to hit the ground?
(Hint: *Since the hammer is dropped, not thrown, the initial velocity, v = 0*).