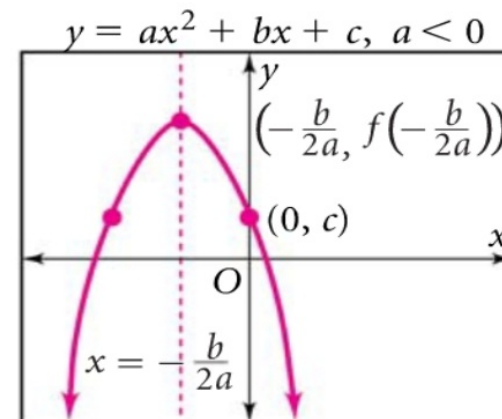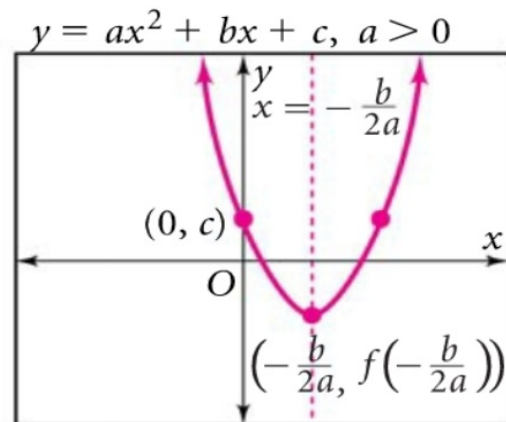# Goal #2: Graphing into standard form

Properties   **Graph of a Quadratic Function in Standard Form**

The graph of $f(x) = ax^2 + bx + c$ is a parabola when $a \neq 0$.

- When $a > 0$, the parabola opens up. When $a < 0$, the parabola opens down.
- The axis of symmetry is the line $x = -\frac{b}{2a}$.
- The x-coordinate of the vertex is $-\frac{b}{2a}$. The y-coordinate of the vertex is the y value of the function when $x = -\frac{b}{2a}$, or $y = f\left(-\frac{b}{2a}\right)$.
- The y-intercept is $(0, c)$.

$y = ax^2 + bx + c, \ a > 0$

$x = -\frac{b}{2a}$

$(0, c)$

$\left(-\frac{b}{2a}, f\left(-\frac{b}{2a}\right)\right)$

$y = ax^2 + bx + c, \ a < 0$

$\left(-\frac{b}{2a}, f\left(-\frac{b}{2a}\right)\right)$

$(0, c)$

$x = -\frac{b}{2a}$

Consider the equation $y = -2x^2 - 15x + 10$

1. Does the parabola open up or down?

2. What is the axis of symmetry?

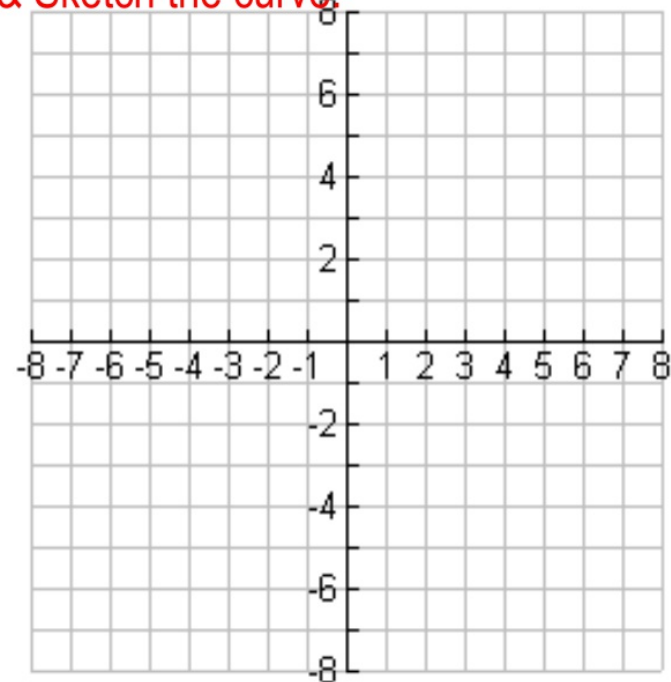3. What is the vertex?

4. What is the y-intercept?

Graphing Quadratic Functions in standard form.

1. Graph the axis of symmetry.
2. Graph the vertex.
3. Graph the y-intercept and it's reflection
4. Evaluate the function for another value of x.
Graph that point & it's reflection.
5. Sketch the curve.

Alternate Method: Make a table. Put the vertex in the middle. Choose 2 x-values on either side of the vertex and find the corresponding y-values. Plot the points & Sketch the curve.

Graph the equation $y = -x^2 + 4x + 2$

What is the max/min?
Where is the mx/min?

HW

Re-write in standard form, then answer the following questions:

1. Does the parabola open up or down?

2. What is the axis of symmetry?

3. What is the vertex

4. What is the y-intercept?

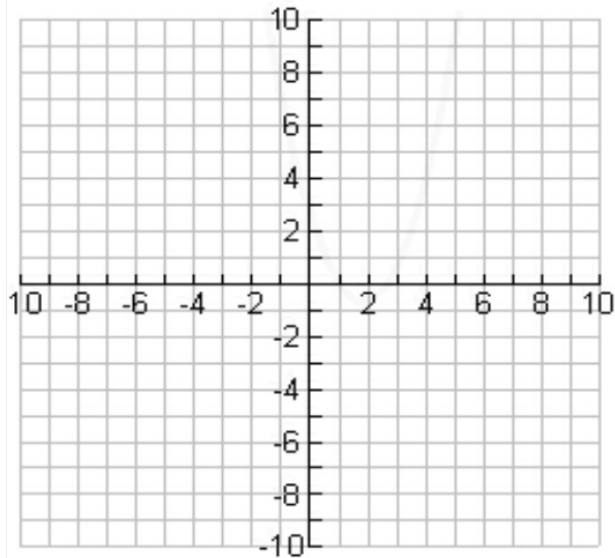A. $y = 1/2x^2 + 4x - 10$ B. $f(x) = 4 + 5x - 4x^2$ C. $f(x) = -5 + 3x^2$

HW

You Try: Graph each equation. Identify the axis of symmetry, the max/min and where the max/min occurs.

1. $y = x^2 - 4x + 3$

2. $y = -x^2 + 6x - 10$