**Algebra 1: 11.1 Guided Notes** **Name** ______________________________ **Period** _______
**Exploring Quadratic Functions**

**Learning Goals:**
Graph a quadratic function using a table.
Analyze the standard form of a quadratic function and use it to sketch its graph.

## Review

A ________________________________ is a function that can be written in standard form,

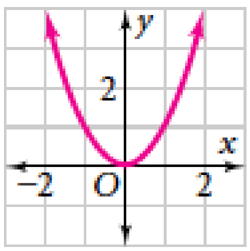
________________________________.

Examples:

The simplest quadratic function is the quadratic parent function: ______________________.

The graph of a quadratic function is a U-shaped curve called a ____________________.

The graph of $y = x^2$:




The line that divides a parabola into two matching halves is called the ______________________.

It is the $x$-coordinate of the vertex.

The turning point of a parabola is the ______________. When the vertex is the lowest point, it is called a ____________________. When the vertex is the highest point, it is called a ____________________.

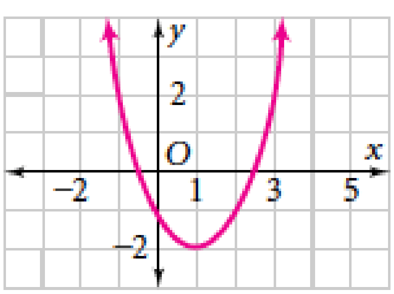
$$y = ax^2 + bx + c$$

| If a > 0 or positive, then | If a < 0 or negative, then |
|---|---|
| Parabola opens ______________. | Parabola opens ______________. |
| Vertex is a ____________________. | Vertex is a ____________________.. |

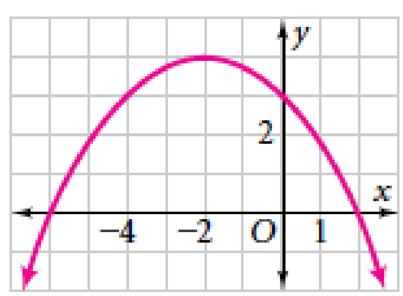
## Identifying a Vertex and the Axis of Symmetry

**Identify the vertex and the axis of symmetry. Tell whether the vertex is a maximum or minimum.**

**a.**



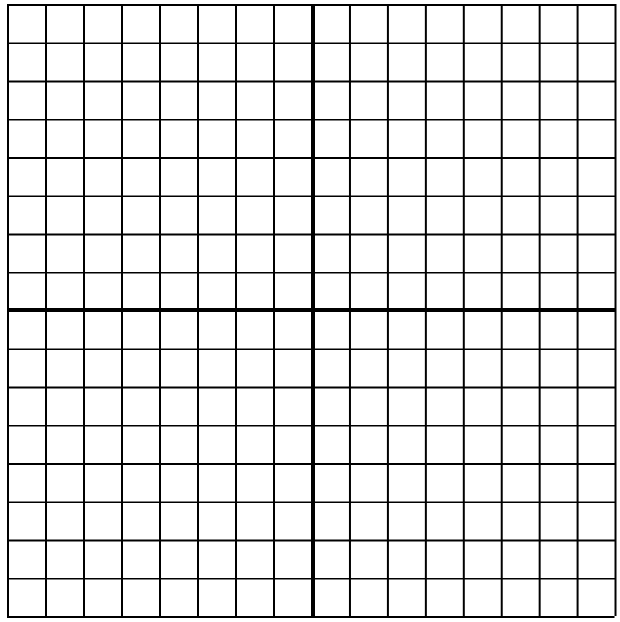

**b.**



<u>Graphing $y$ =a$x^2$</u>

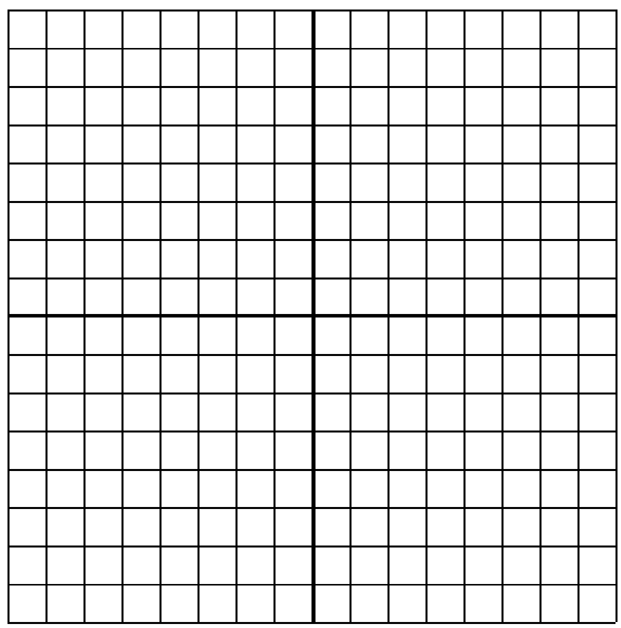
**Graph the quadratic function** $y = \frac{1}{2}x^2$

| $x$ | $y = \frac{1}{2}x^2$ | **($x$, $y$)** |
|---|---|---|
| $-4$ | $\frac{1}{2}(-4)^2 = 8$ | (-4, 8) |
| $-2$ | | |
| 0 | | |
| 2 | | |
| 4 | | |



**Graph the quadratic function** $y = -2x^2$

| $x$ | $y = -2x^2$ | **($x$, $y$)** |
|---|---|---|
| $-2$ | $-2(-2)^2 = -8$ | (-2, -8) |
| $-1$ | | |
| 0 | | |
| 1 | | |
| 2 | | |

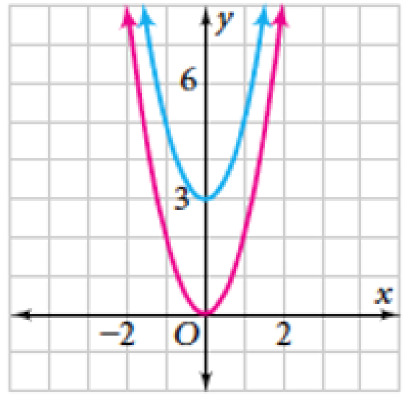


**For the quadratic function, $y$ = $ax^2$ + b$x$ + c, how does the value of "a" change the width of the parabola?**

**<u>Graphing $y = ax^2 + c$</u>**

**How do the graphs of $y = 2x^2 + 3$ and $y = 2x^2$ compare?**

| $x$ | $y = 2x^2$ | $y = 2x^2 + 3$ |
|---|---|---|
| -2 | 8 | 11 |
| -1 | 2 | 5 |
| 0 | 0 | 3 |
| 1 | 2 | 5 |
| 2 | 8 | 11 |




**For the quadratic function, $y = ax^2 + bx + c$, how does the value of "c" change the graph of the parabola?**

Remember, "c" is also the ________________________________ because when $x = 0$, $y = a(0)^2 + b(0) + c$ or $y = c$.