Name: _____             Date: _____

| Learning Goal 3.1 | Given a quadratic function, identify the transformations that graph has undergone from the standard graph of $y = x^2$. |
| --- | --- |

**Quadratic Function** a specific type of polynomial where the largest exponent on a variable is 2.
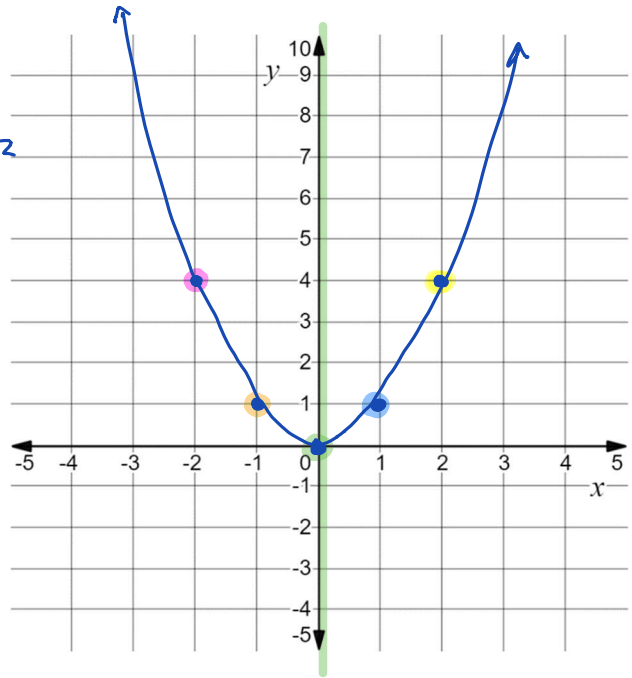
Graph the function $f(x) = x^2$.

Table of Values:

| $x$ | $y$ |
| --- | --- |
| -2 | 4 |
| -1 | 1 |
| 0 | 0 |
| 1 | 1 |
| 2 | 4 |

$f(-2) = (-2)^2$
$= 4$

$f(-1) = (-1)^2$
$= 1$

$f(0) = (0)^2$
$= 0$

$f(1) = (1)^2$
$= 1$

$f(2) = (2)^2$
$= 4$



**Vertex** for today, it's the bottom of the smile $(\overset{x}{0}, \overset{y}{0})$

**Axis of Symmetry**
always passes through the vertex
$x = 0$

**Maximum/Minimum Value**
the y-value of the vertex
$y = 0$

**Parabola**
The name of the shape that the function creates.

**Intercepts**
$x$-intercept(s) : 0, 1, 2
$y$-intecept (just one)

**Domain** possible $x$ values
$\leftarrow$ such that
$\{x \mid x \in \mathbb{R}\}$
variable    in    all real numbers

**Range** possible $y$-values
$\{y \mid y \geqslant 0, y \in \mathbb{R}\}$

Assignment                    Handout                   Quiz Next Day!

vertical                  horizontal

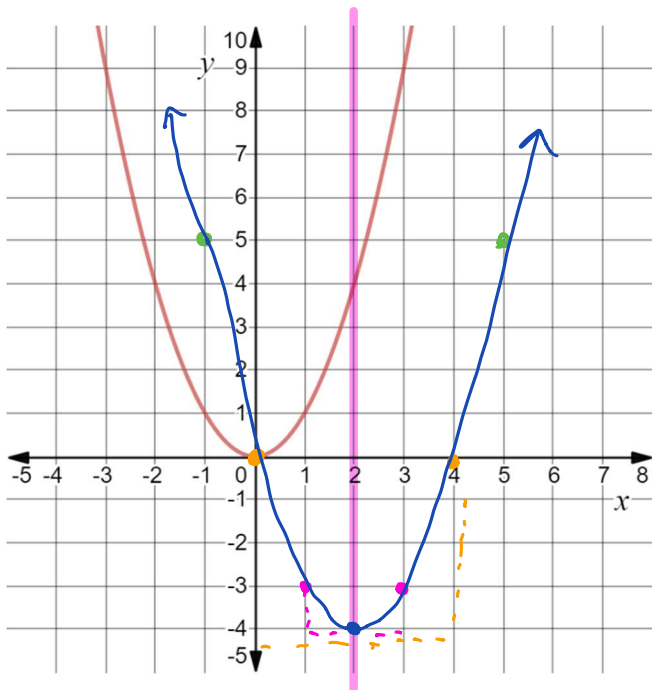$f(x) = x^2 + g$    movement
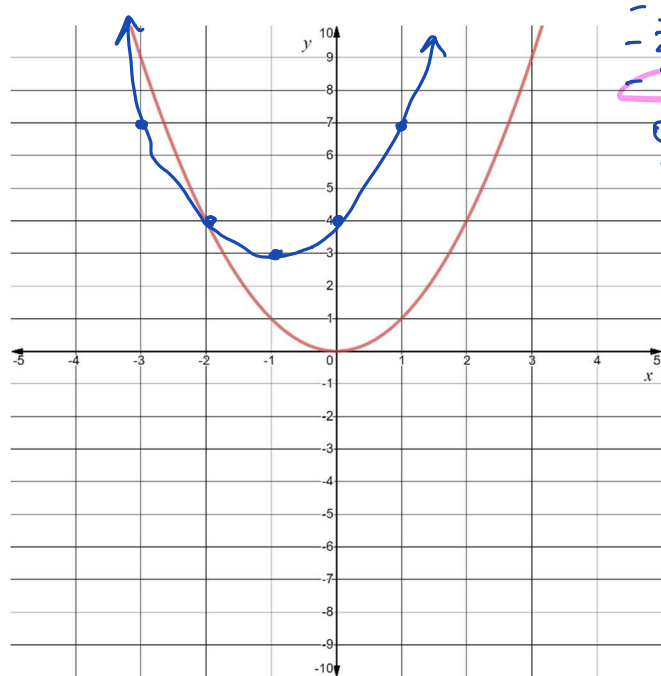
$f(x) = (x-p)^2$ movement

**Vertex Form**    $f(x) = (x-p)^2 + g$    vertex: $(p, g)$

In your groups, without the use of a graphing calculator, graph these functions.

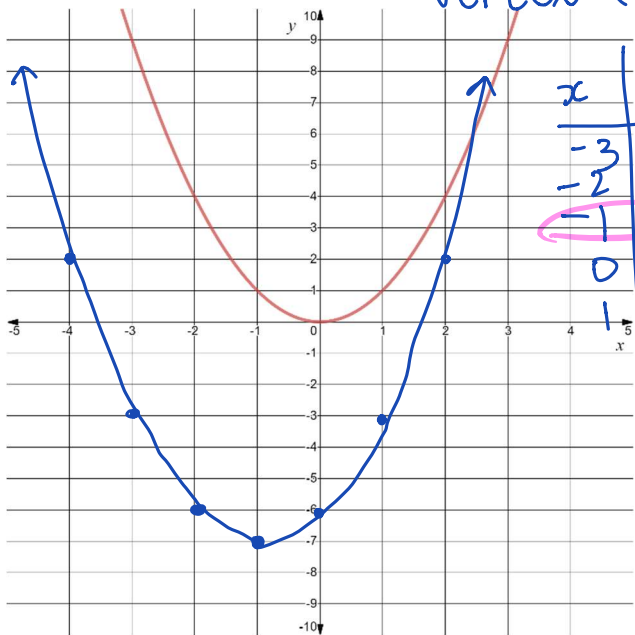vertex $(2, -4)$

Graph    $f(x) = (x-2)^2 - 4$

vertex: $(-1, 3)$

Graph    $f(x) = (x+1)^2 + 3$
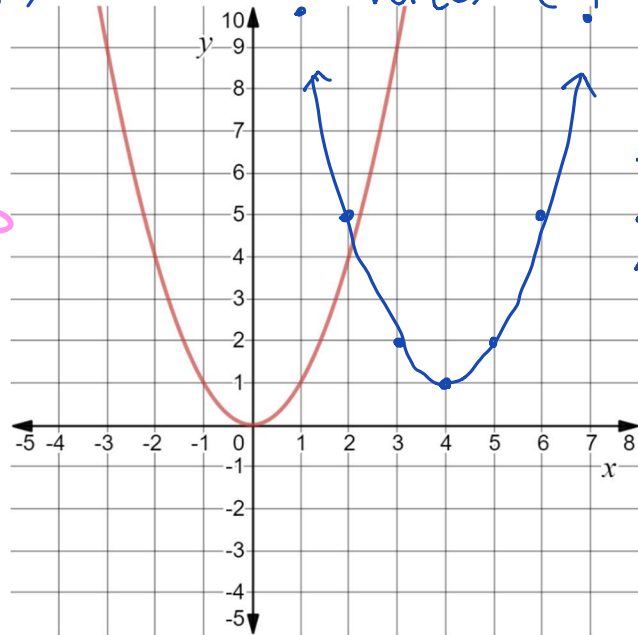
| $x$ | $y$ |
|-----|-----|
| -3  | 7   |
| -2  | 4   |
| -1  | 3   |
| 0   | 4   |
| 1   | 7   |





Graph $f(x) = (x+1)^2 - 7$

vertex $(-1, -7)$

| $x$ | $y$ |
|-----|-----|
| -3  | 2   |
| -2  | -6  |
| -1  | -7  |
| 0   | -6  |
| 1   | 2   |



Graph    $f(x) = (x-4)^2 + 1$

vertex: $(4, 1)$

| $x$ | $y$ |
|-----|-----|
| 2   | 5   |
| 3   | 2   |
| 4   | 1   |
| 5   | 2   |
| 6   | 5   |



Assignment                    Handout                    Quiz Next Day!