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
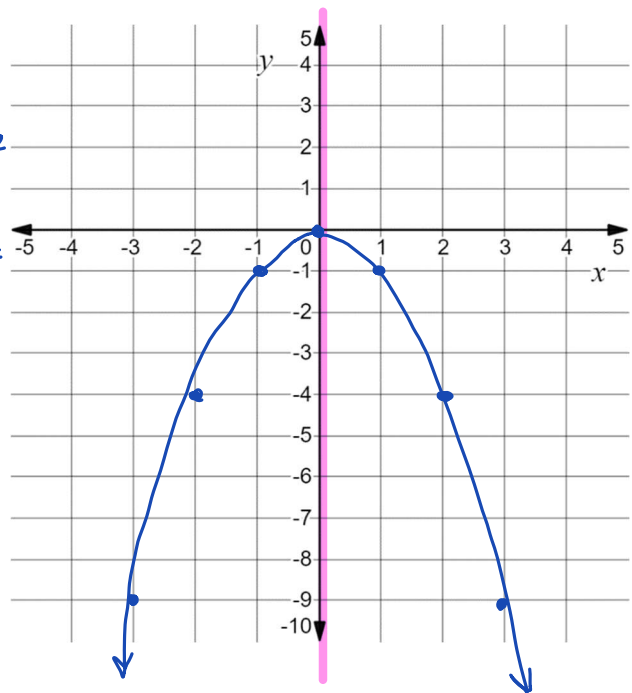
Graph the function $f(x) = -x^2$.

Table of Values:

x	y
-2	-4
-1	-1
0	0
1	-1
2	-4

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

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

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

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

Vertex
- top of the frown
- switch from inc. to dec.

$(0,0)$

Axis of Symmetry
- vertical line through the vertex that acts as a mirror $x = 0$

Maximum/Minimum Value
- the largest y value that the parabola passes through
$y = 0$

Parabola
- a description of the shape of a quadratic function.

Intercepts
- x int   0, 1, or 2 of these
- y int   always 1

Domain
- all the possible x-values

$\{x \mid x \in \mathbb{R}\}$

x is in the
real # set

Range
- all possible y values

$\{y \mid y \le 0, y \in \mathbb{R}\}$

↑
switches
with the -ve sign.

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horizontal

vertical

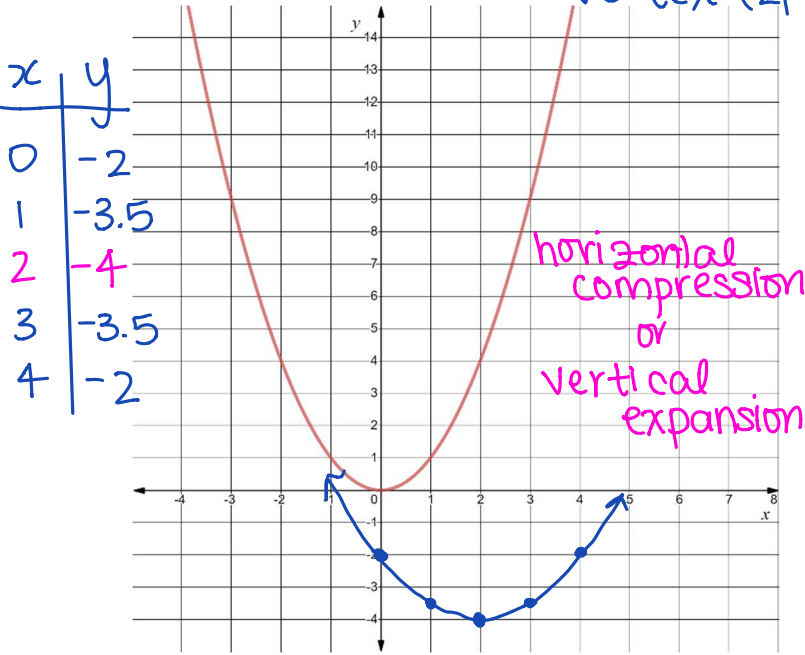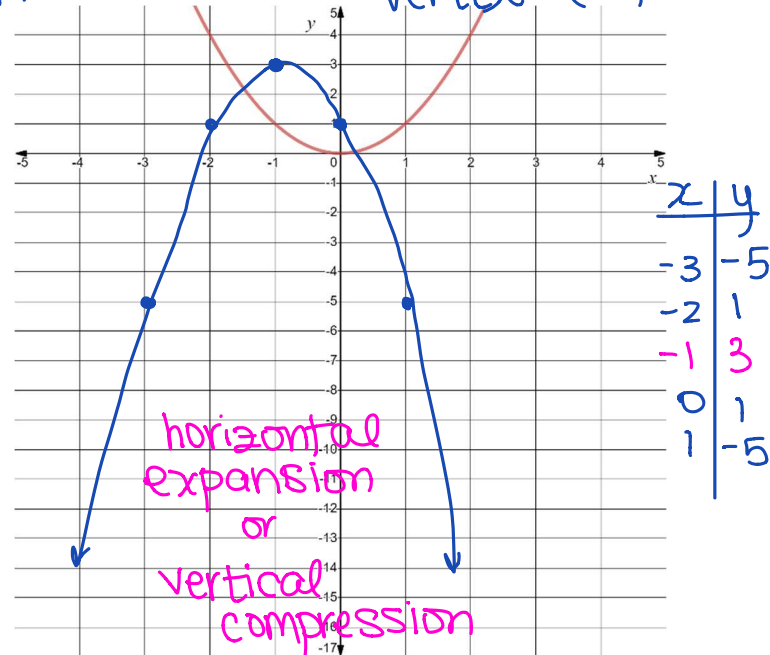**Vertex Form**

$$f(x) = a(x - p)^2 + q$$

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

Graph $f(x) = \dfrac{1}{2}(x - 2)^2 - 4$
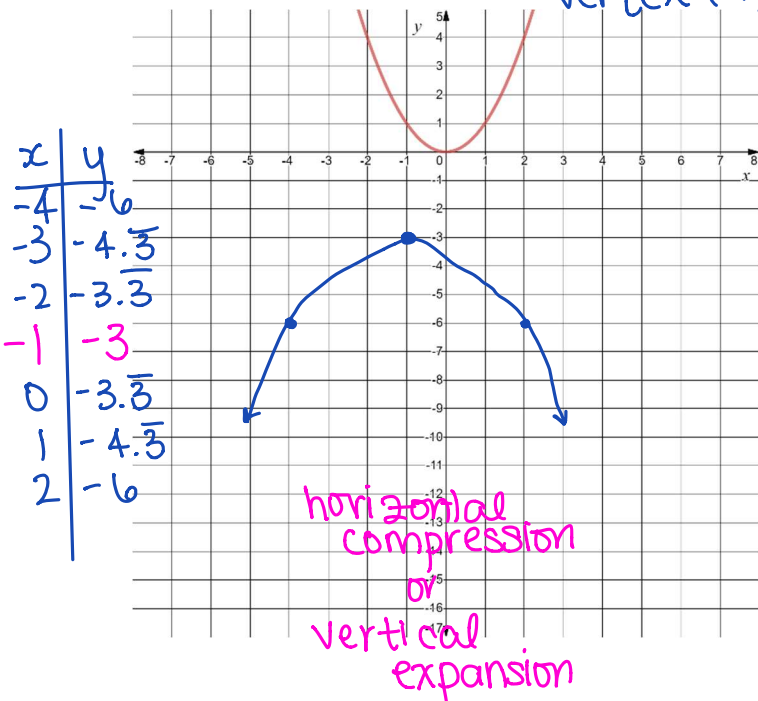
vertex $(2, -4)$

x	y
0	-2
1	-3.5
2	-4
3	-3.5
4	-2

horizontal
compression
or
vertical
expansion

Graph $f(x) = -2(x + 1)^2 + 3$

vertex $(-1, 3)$

x	y
-3	-5
-2	1
-1	3
0	1
1	-5

horizontal
expansion
or
vertical
compression

Graph $f(x) = -\dfrac{1}{3}(x + 1)^2 - 3$

vertex $(-1, -3)$

x	y
-4	-6
-3	-4.3
-2	-3.3
-1	-3
0	-3.3
1	-4.3
2	-6

horizontal
compression
or
vertical
expansion

Graph $f(x) = 4(x - 4)^2 - 8$

vertex $(4, -8)$

x	y
2	8
3	-3
4	-8
5	-3
6	8

horizontal
expansion
or
vertical
compression

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