Lesson 4: Quadratics in Vertex Form

By the end of today you should be able to:

- Recognize the vertex form of a quadratic
- Apply transformations to the graph of $y = x^2$

Vertex Form: A Quadratic function in the form $y = a(x-h)^2 + k$, where the vertex is (*h*,*k*).

To graph a quadratic when it is vertex form, you must apply the transformations (movements up or down, left or right, stretches or compressions and reflections) to the original graph ($y = x^2$)

Example 1: use a data table to graph the function $y = 2(x+3)^2 + 5$ and then graph your data.

x	y
-3	5
-2	7
-1	13
0	
1	

$2(-3+3)^2+5$

$2(0)^2+5$

$y = 2(-2+3)^2+5$

$= 2+5 = 7$

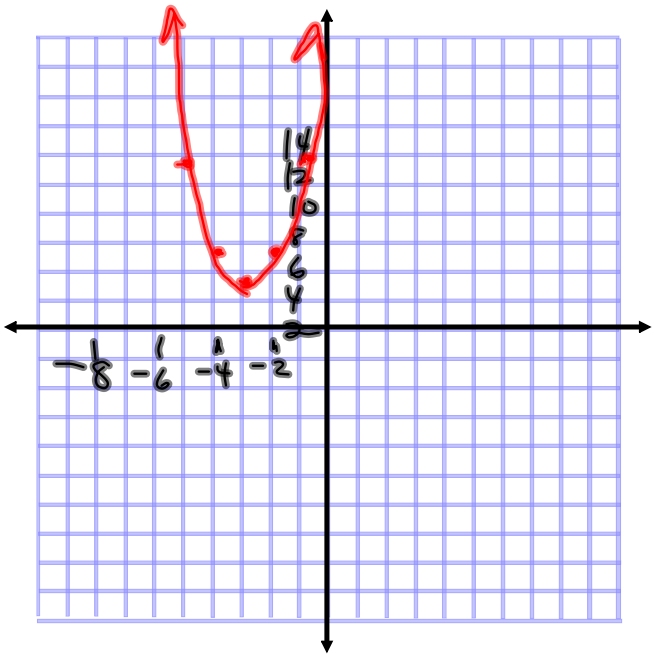
$y = 2(-1+3)^2+5$

$= 2(4)+5$

$= 13$

$y = 2(-4+3)^2+5$

$= 2+5 = 7$



Example 2: using reasoning to graph quadratics in vertex form. Graph $y = -3(x-2)^2 - 7$

move right 2 units.

Step 1: create a table of values for $y = x^2$

Step 2: There is a vertical stretch by a factor of 3 and a reflection in the x-axis.
Make a table of values for $y = -3x^2$

Step 3: the x values increase by 2 since h=2, the y values decrease by7, since k=-7. Make a table of values that has all of your x values increasing by 2 and all of your y values decreasing by 7 (use the table you made in step 2 as your starting point because it has been stretched and reflected).

STEP 1 $y = x^2$

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

STEP 2: $y = -3x^2$

x	y
2	-12
1	-3
0	0
-1	-3
-2	-12

STEP 3:

x	y
4	-19
3	-10
2	-7
1	-10
0	-19