

Date: _____

Learning Goal

Reviewing Yesterday

If you were asked to graph the function

$y = x^2$, how would you do it?

Explain in words.

Investigation

Part A

1. Open Desmos.
 2. Graph $y = ax^2$ and turn on the slider for a .
 3. Play with the slider, keeping it greater than 0.
 4. Explain what changing the value of a does to the parabola when a gets larger and when a gets smaller.
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5. Play with the slider, go into the negatives and positives.
 6. Explain what happens when a becomes negative.

Part B

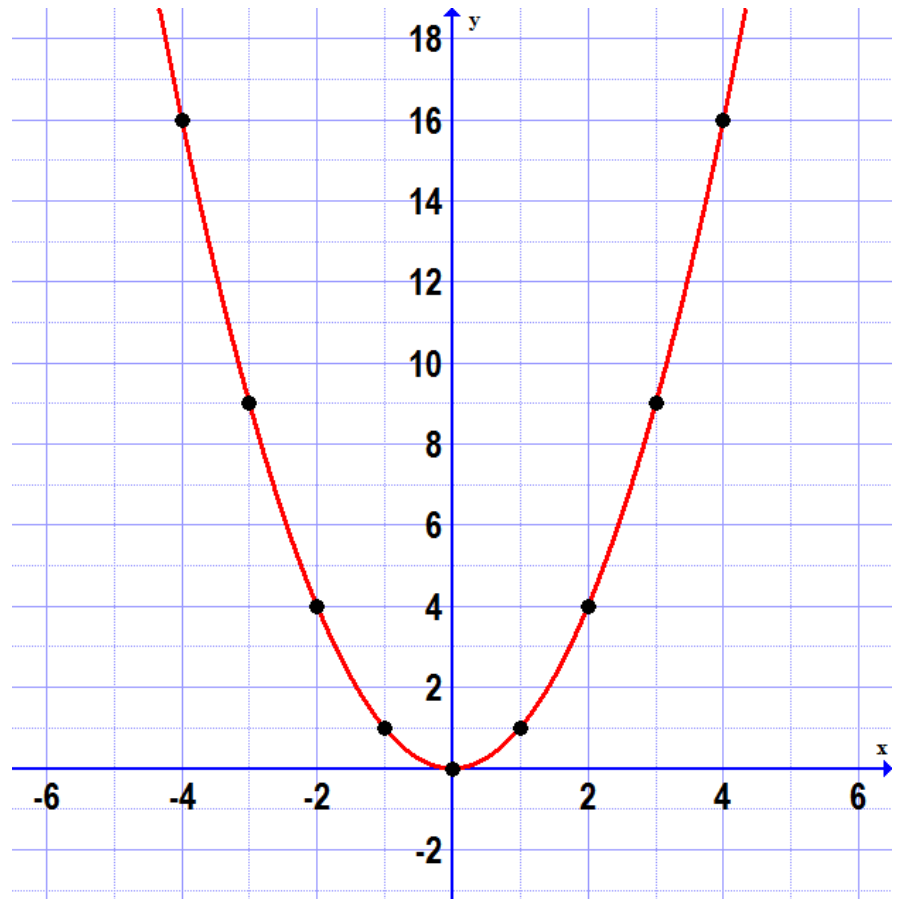
1. Still in Desmos.
2. Graph $y = x^2 + k$ and turn on the slider for k .
3. Play with the slider.
4. Explain what changing the value of k does to the parabola when k is positive and when k is negative.

Graphing $y = ax^2$

Equation

$$y = 0.5x^2$$

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



The value of a _____ the parabola when a is *greater than 1* and
_____ the parabola when a is *less than 1*.

The value of a also changes the _____. Basically, to get the
new _____, just multiply the original one by a !

Graph $y = 2x^2$ on the axes above.

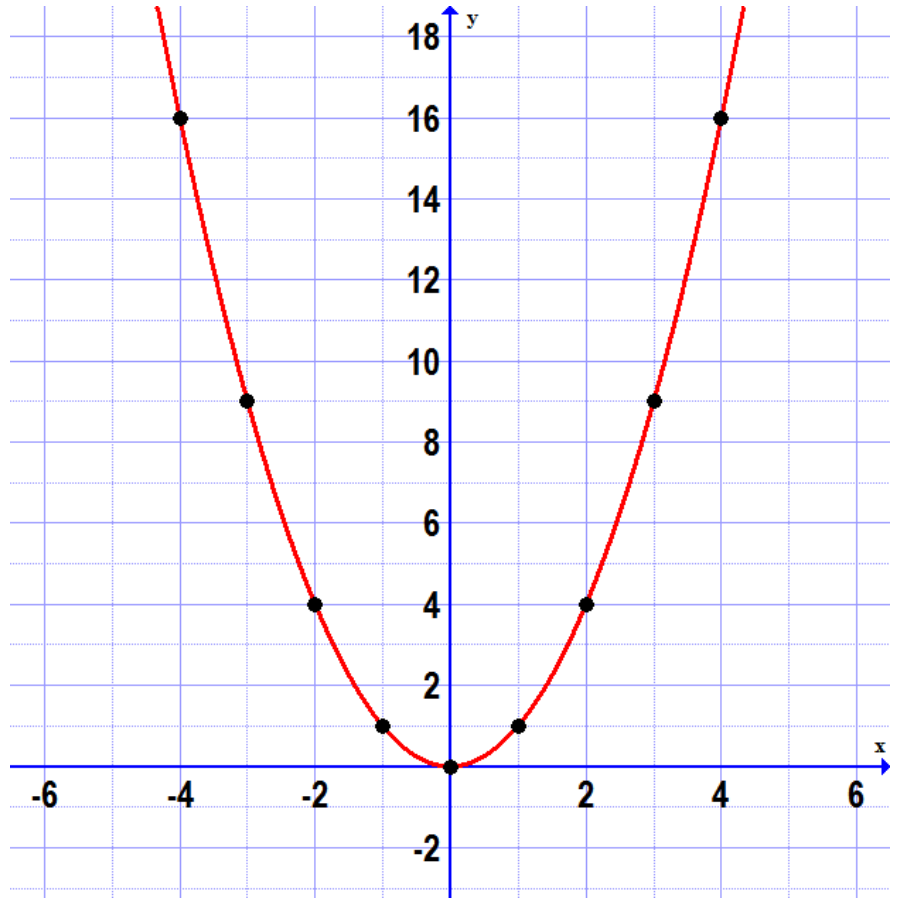
What is the step pattern of the parabola?

Graphing $y = x^2 + k$

Equation

$$y = x^2 + 4$$

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



The value of k shifts the parabola _____ when k is *positive* and _____ when k is *negative*.

Graph $y = x^2 - 2$ on the axes above.

What is the vertex of the parabola?

To graph $y = ax^2 + k$, first place the vertex by going up or down k units from $(0, 0)$. Then use the new step pattern to graph the remaining points.

Note: the *new* step pattern is found by multiplying each *original step* by the value of a . If a is positive, the steps will go up, if a is negative, the steps will go down.

Graphing $y = ax^2 + k$ when a is positive

Equation 1

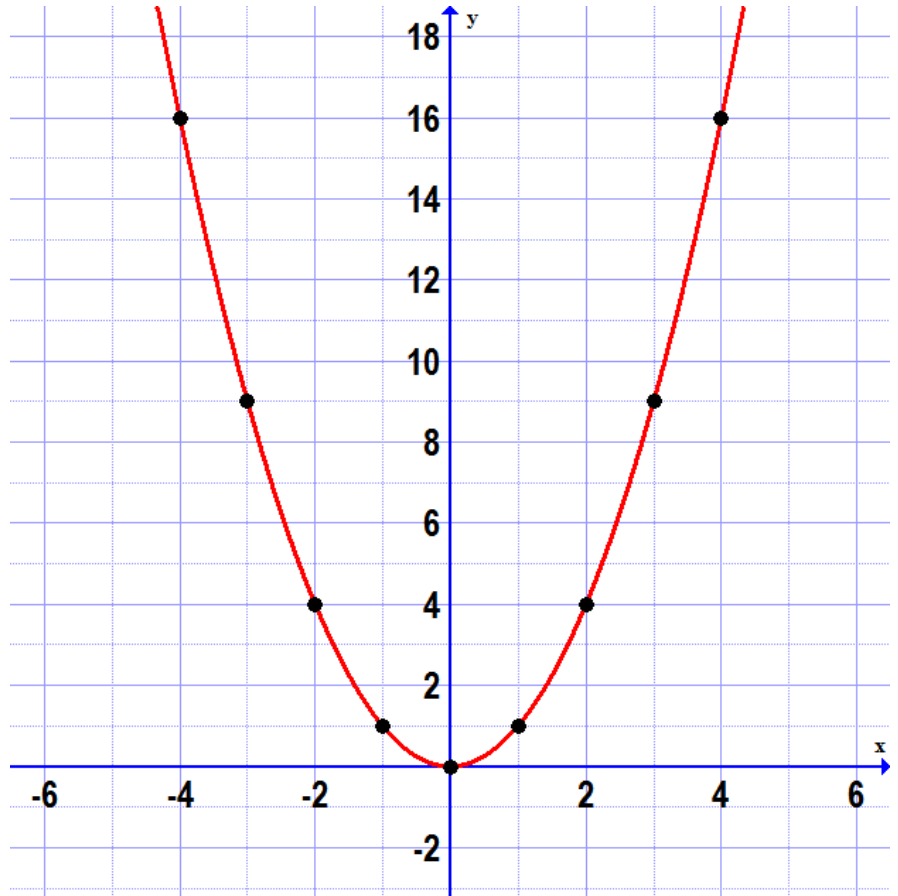
$$y = 0.5x^2 - 2$$

Equation 2

$$y = 2x^2 + 5$$

Equation 3

$$y = 0.25x^2 + 12$$



For each equation, determine the coordinates of the vertex and the step pattern.

	$y = 0.5x^2 - 2$	$y = 2x^2 + 5$	$y = 0.25x^2 + 12$
Vertex			
Step Pattern			

Graphing $y = ax^2 + k$ when a is negative

Equation 1

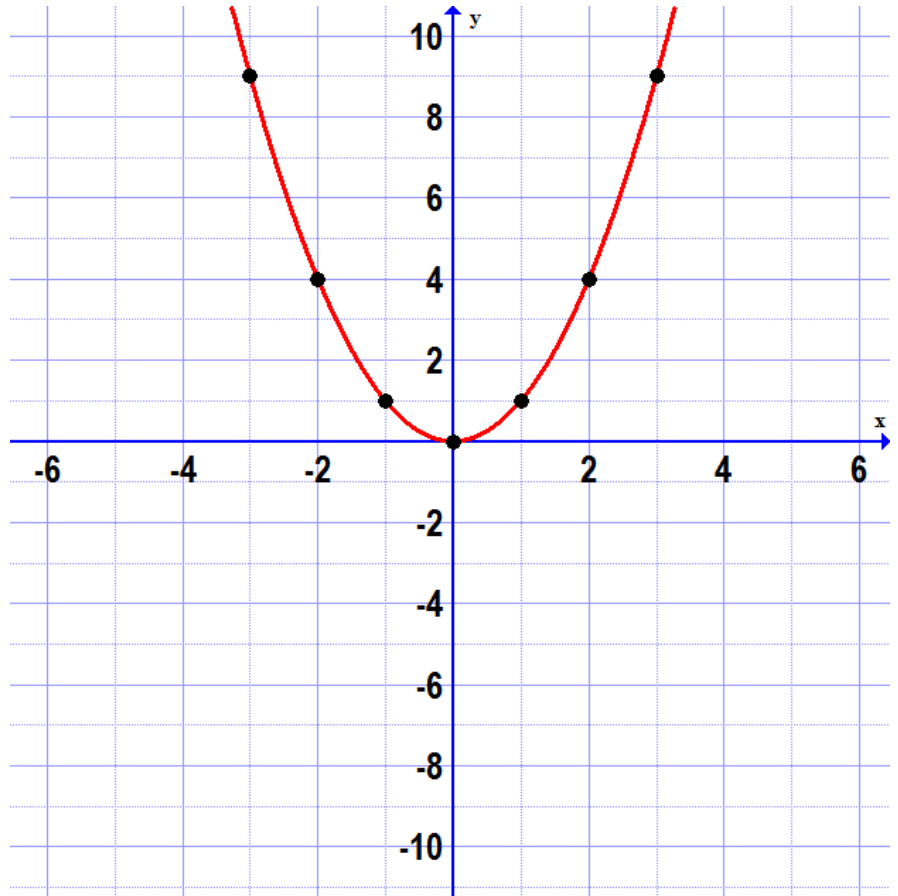
$$y = -0.5x^2 - 4$$

Equation 2

$$y = -3x^2 + 10$$

Equation 3

$$y = -0.25x^2 + 7$$



For each equation, determine the coordinates of the vertex and the step pattern.

	$y = -0.5x^2 - 4$	$y = -3x^2 + 10$	$y = -0.25x^2 + 7$
Vertex			
Step Pattern			

