

Agenda 2/15/18

1. Priority Standards Test
2. Warm-Up
3. Day 2 - Transformations

Warm-Up 2/15/18

**Answer all 9 questions of the
Day 1 Practice Assignment.**

**Directions: Describe the
transformations and name the
vertex.**

$$1. y = (x + 1)^2 - 4$$

left by 1 unit

down by 4 units

$$(-1, -4)$$

$$4. y = x^2 + 5$$

up by 5

$$(0, 5)$$

$$7. y = (x + 10)^2$$

left by 10 units

$$(-10, 0)$$

$$2. y = (x - 2)^2 + 2$$

Right by 2 Unit

Up by 2 (2, 2)

$$5. y = (x + 2)^2$$

Left by 2

(-2, 0)

$$8. y = x^2 + 9$$

Up 9

(0, 9)

$$3. y = (x - 3)^2 + 4$$

right 3

up 4

(3, 4)

$$6. y = (x - 4)^2 - 1$$

right by 4

down by 1 (4, -1)

$$9. y = (x - 7)^2 + 11$$

right by 7

UP by 11

(7, 11)

Essential Question 2/15/17

How can the graph of $f(x) = x^2$ move up, down, left, right, stretch, and shrink?

Day 2: Quadratic Transformations (A values)

So far, we have discussed what the H and K values do when a quadratic function is in vertex form. How do you think the "a" coefficient will affect the graph? The "a" value affects the graph in two different ways which you will learn about in this lesson.

Vertex Form

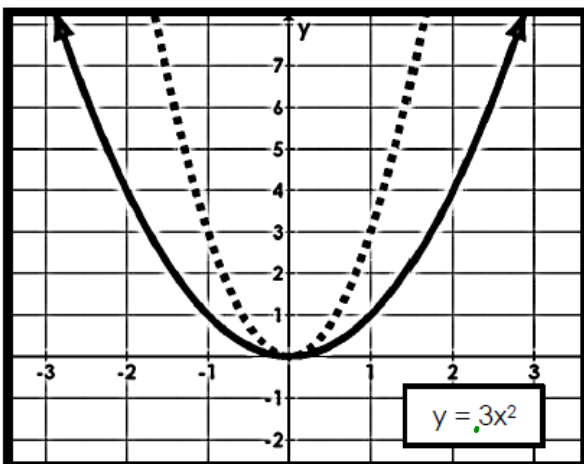
$$f(x) = a(x-h)^2 + k$$

$h =$ Horizontal Shift (left or right)

$k =$ Vertical Shift (up or down)

Vertex: (h, k)

The A Value, Part 1



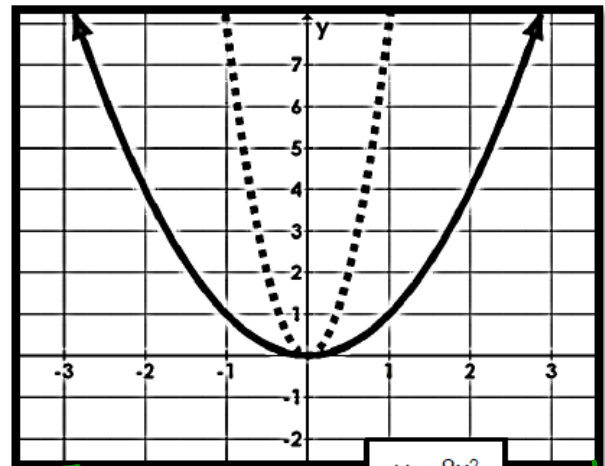
The smaller the value of a , the wider the graph.

1. Describe how the dotted graph has been transformed from $y = x^2$.
 Vertical stretch of a scale factor of 3. The graph is narrower.

2. What is the vertex? $(0, 0)$

3. How is the equation of the graph related to its vertex?

The vertex does not change.



The bigger the value of a , the thinner the graph.

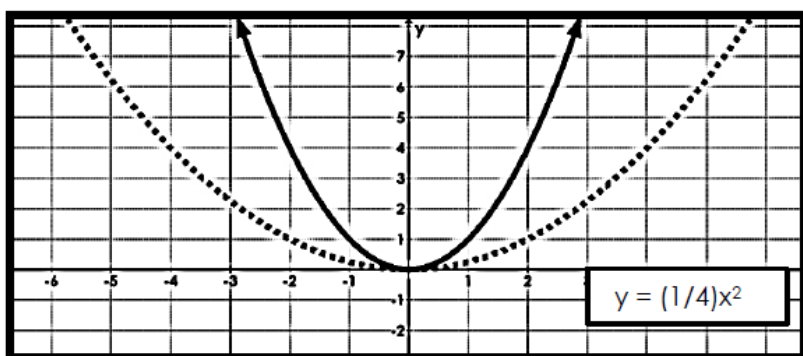
1. Describe how the dotted graph has been transformed from $y = x^2$.

Vertical stretch by a scale factor of 8.

2. What is the vertex? $(0, 0)$

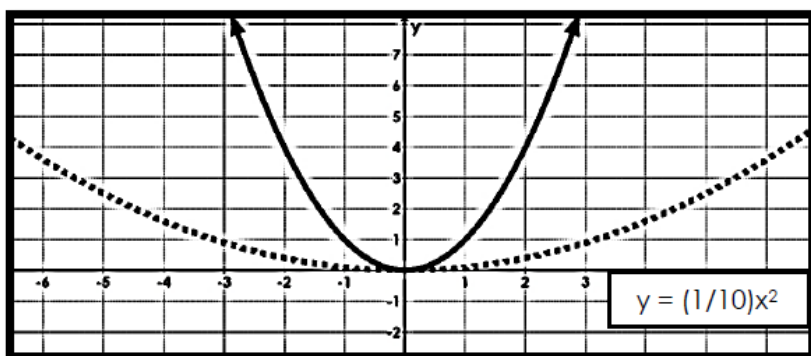
3. How is the equation of the graph related to its vertex?

The vertex does not change.



1. Describe how the dotted graph has been transformed from $y = x^2$.
Graph is compressed by a scale factor of $1/4$
2. What is the vertex? $(0,0)$
3. How is the equation of the graph related to its vertex?

The vertex does not change.



1. Describe how the dotted graph has been transformed from $y = x^2$.
Vertical compress or shrink by a scale factor of $1/10$
2. What is the vertex? $(0,0)$
3. How is the equation of the graph related to its vertex?

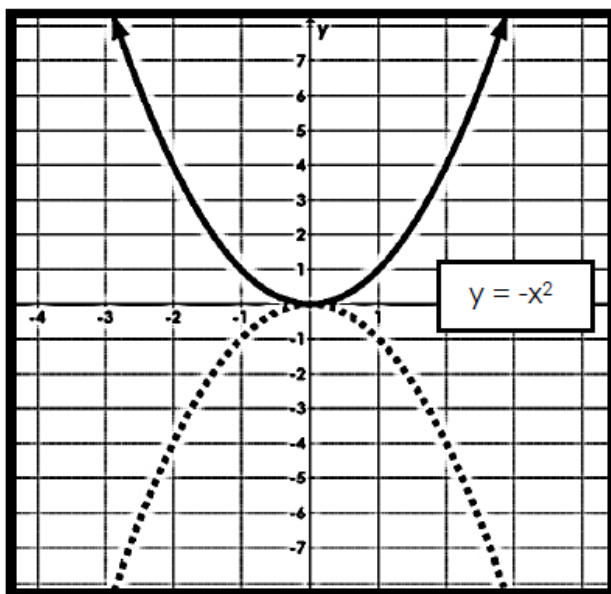
The vertex does not change.

How do you think the number in front affects the graph?

The a Value, Part 1

- Vertical stretch if $|a| > 1$
- Vertical shrink if $0 < |a| < 1$
or compress

 The A Value, Part 2



1. Describe how the dotted graph has been transformed from $y = x^2$.


It reflects the graph across the x-axis.


2. What is the vertex? $(0, 0)$

3. How is the equation of the graph related to its vertex?

The vertex does not change.

The a Value, Part 2

• Reflects graph across x-axis if a is negative 

• Does not reflect graph across x-axis if a is positive 

Practice: Describe the transformations from the given function to the transformed function.

a. $f(x) = x^2 \rightarrow f(x) = 4x^2$

Vertical stretch
by a scale factor
of 4.

b. $y = x^2 \rightarrow y = \frac{1}{4}x^2$

Vertical compress
by a scale factor
of $\frac{1}{4}$

c. $f(x) \rightarrow 6f(x)$

Vertical stretch
by scale factor
of 6.

d. $f(x) = x^2 \rightarrow f(x) = -x^2$

Reflects across
X-axis

f. $y = x^2 \rightarrow y = -\frac{1}{2}x^2$

reflects over
X-axis, vertical
compress by $\frac{1}{2}$

g. $f(x) \rightarrow -4f(x)$

Reflects across
the X-axis,
Vertical stretch
by 4.

Closing:**Putting It All Together**

Practice: Given the equations below, name the vertex and describe the transformations:

a. $y = -(x - 4)^2 + 7$

reflects over x-axis

Right by 4 units

Up by 7

$(4, 7)$

b. $y = -2(x + 2)^2 + 5$

reflects over x-axis

Vertical stretch by 2

Left by 2 units

Up by 5

$(-2, 5)$

c. $y = \frac{1}{2}(x - 3)^2 - 8$

Vertical compress

by $\frac{1}{2}$

Right by 3 units

Down by 8 units.

$(3, -8)$

Practice: Create an equation to represent the following transformations:

a. Shifted down 4 units, right 1 unit, and reflected across the x-axis

$$y = -(x - 1)^2 - 4$$

b. Shifted up 6 units, reflected across the x-axis, and stretch by a factor of 3

$$y = -3x^2 + 6$$

c. Shifted up 2 units, left 4 units, reflected across the x-axis, and shrunk by a factor of $\frac{3}{4}$.

$$y = -\frac{3}{4}(x + 4)^2 + 2$$

Home Work 2/15/18
Day 2 - Quadratic
Transformations (all)