

Algebra 1

Unit 8: Quadratic Functions

Practice

## Day 3 - Characteristics of Quadratic Functions

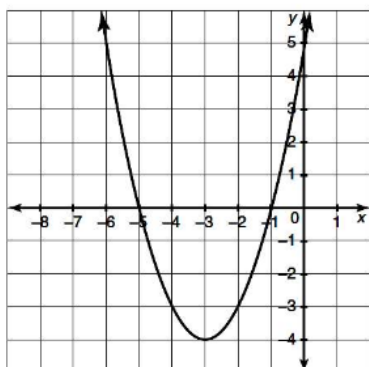
Name: \_\_\_\_\_

## Practice Assignment

Date: \_\_\_\_\_ Block: \_\_\_\_\_

Identify all of the characteristics listed for the following graphs.

1.



Domain: \_\_\_\_\_ Range: \_\_\_\_\_

Vertex: \_\_\_\_\_ Axis of Sym. \_\_\_\_\_

Y-Intercept: \_\_\_\_\_ Zeroes: \_\_\_\_\_

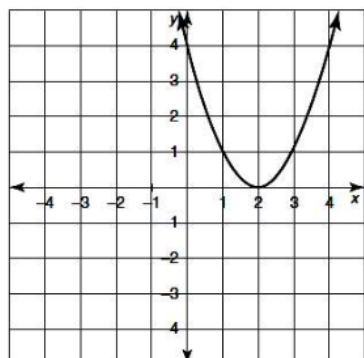
Extrema: \_\_\_\_\_ Max/Min Value: \_\_\_\_\_

Int of Inc: \_\_\_\_\_ Int of Dec: \_\_\_\_\_

Positive: \_\_\_\_\_ Negative: \_\_\_\_\_

End Behavior: As  $x \rightarrow -\infty$ ,  $f(x) \rightarrow$  \_\_\_\_\_. As  $x \rightarrow \infty$ ,  $f(x) \rightarrow$  \_\_\_\_\_

2.



Domain: \_\_\_\_\_ Range: \_\_\_\_\_

Vertex: \_\_\_\_\_ Axis of Sym. \_\_\_\_\_

Y-Intercept: \_\_\_\_\_ Zeroes: \_\_\_\_\_

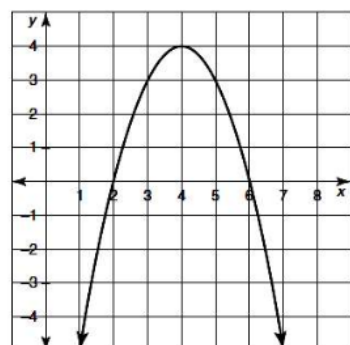
Extrema: \_\_\_\_\_ Max/Min Value: \_\_\_\_\_

Int of Inc: \_\_\_\_\_ Int of Dec: \_\_\_\_\_

Positive: \_\_\_\_\_ Negative: \_\_\_\_\_

End Behavior: As  $x \rightarrow -\infty$ ,  $f(x) \rightarrow$  \_\_\_\_\_. As  $x \rightarrow \infty$ ,  $f(x) \rightarrow$  \_\_\_\_\_

3.



Domain: \_\_\_\_\_ Range: \_\_\_\_\_

Vertex: \_\_\_\_\_ Axis of Sym. \_\_\_\_\_

Y-Intercept: \_\_\_\_\_ Zeroes: \_\_\_\_\_

Extrema: \_\_\_\_\_ Max/Min Value: \_\_\_\_\_

Int of Inc: \_\_\_\_\_ Int of Dec: \_\_\_\_\_

Positive: \_\_\_\_\_ Negative: \_\_\_\_\_

End Behavior: As  $x \rightarrow -\infty$ ,  $f(x) \rightarrow$  \_\_\_\_\_. As  $x \rightarrow \infty$ ,  $f(x) \rightarrow$  \_\_\_\_\_

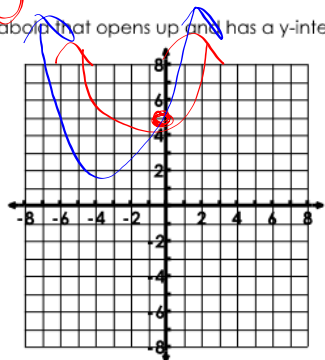
Algebra 1

Unit 8: Quadratic Functions

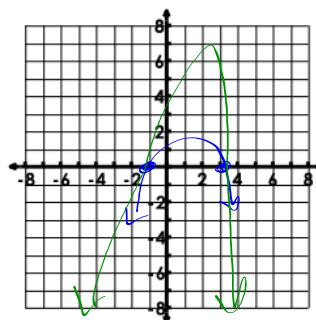
Practice

Problems 4 – 9: Use the given description to create a rough sketch of a quadratic function. Your graphs might look different than mine, but they must meet the characteristic described below. Start by placing your characteristics on the graph and create the sketch after that.

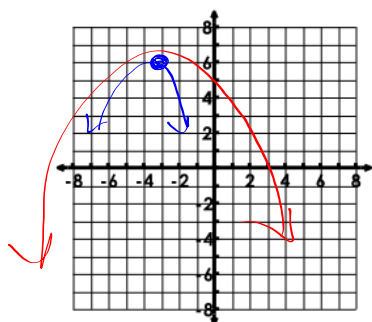
4. Parabola that opens up and has a y-intercept of (0, 5).



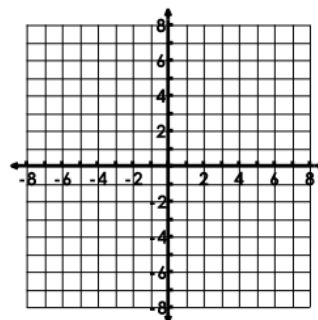
5. Parabola that opens down and has x-intercepts of 3 and -1.



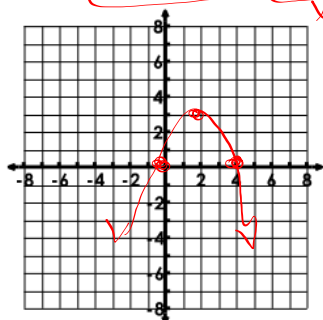
6. Parabola with end behavior that approaches  $-\infty$  and has a vertex of  $(-3, 6)$ .



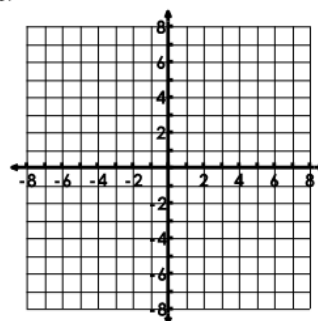
7. Parabola with a negative part of the graph between  $-2 \leq x \leq 2$ .



8. Parabola with a maximum of 3 and zeros of 0 and 4.



9. Parabola with an axis of symmetry of  $x = -1$  and a range of  $y \geq -5$ .





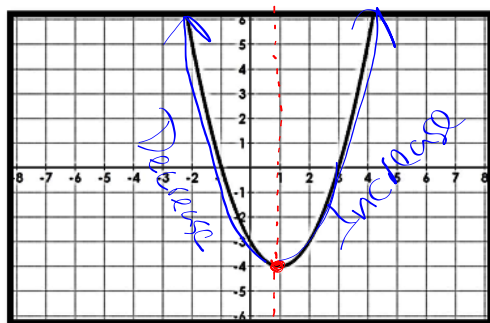
# TODAYS NOTES

### Day 3 - Characteristics of Quadratics (Cont'd)

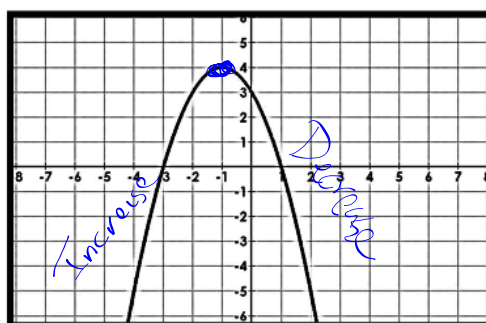
#### Intervals of Increase and Decrease

Interval of Increase		
<b>Define:</b> The part of the graph that is rising as you read left to right.	<b>Think:</b> From left to right, is my graph going up?	<b>Write:</b> An inequality using the x-value of the vertex
Interval of Decrease		
<b>Define:</b> The part of the graph that is falling as you read from left to right.	<b>Think:</b> From left to right, is my graph going down?	<b>Write:</b> An inequality using the x-value of the vertex

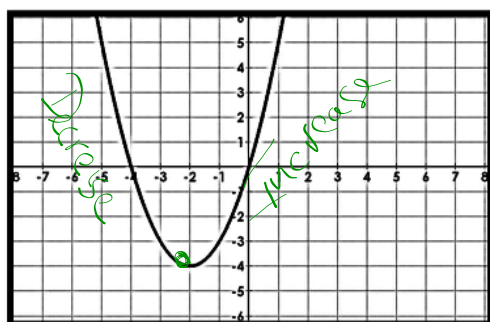
Graph 1

Interval of Increase:  $x > 1$ Interval of Decrease:  $x < 1$ 

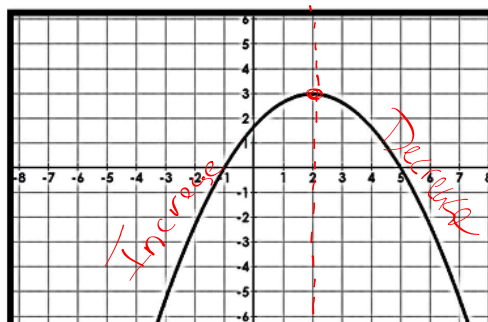
Graph 2

Interval of Increase:  $x < -1$ Interval of Decrease:  $x > -1$ 

Graph 3

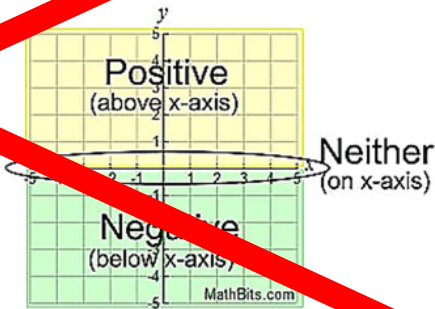
Interval of Increase:  $x > -2$ Interval of Decrease:  $x < -2$ 

Graph 4

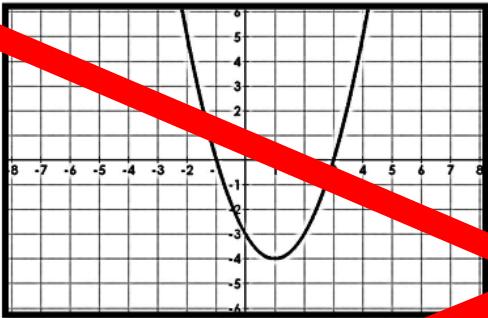
Interval of Increase:  $x < 2$ Interval of Decrease:  $x > 2$

Positive & Negative Parts of the Graph

Positive		
<b>Define:</b> The part of the function that is above the x-axis.	<b>Think:</b> Which part of the function is in the positive region and where?	<b>Write:</b> Inequality using the zero values (x)
Negative		
<b>Define:</b> The part of the function that is below the x-axis.	<b>Think:</b> Which part of the function is in the negative region and where?	<b>Write:</b> Inequality using the zero values (x)

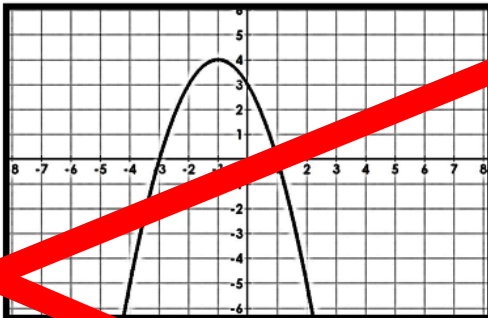


Graph 1



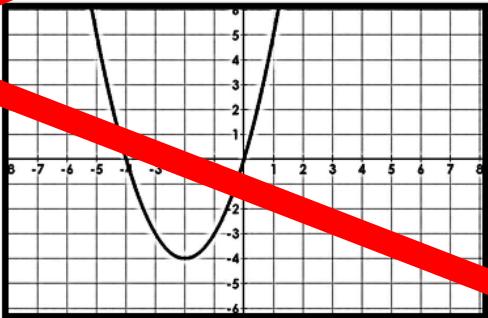
Positive:  
Negative:

Graph 2



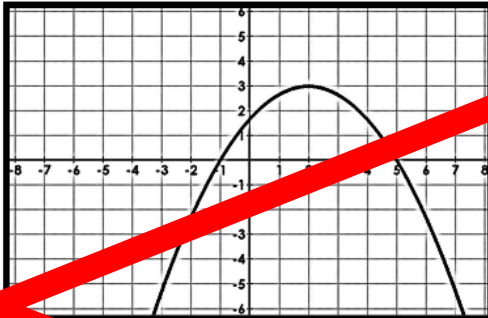
Positive:  
Negative:

Graph 3



Positive:  
Negative:

Graph 4



Positive:  
Negative:

Algebra 1

Unit 8: Quad

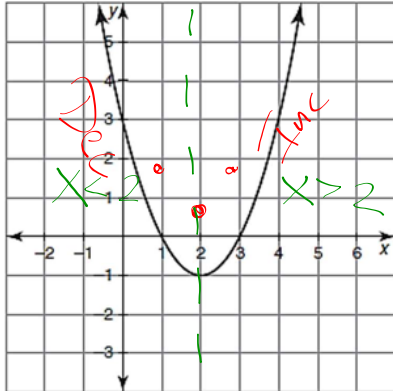


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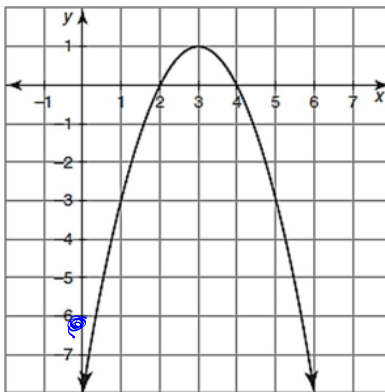


Notes

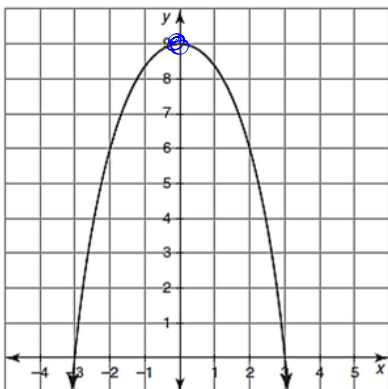
**Practice:** Describe the characteristics of the following graphs:



Domain:  $\mathbb{R}$   
 Range:  $y \geq -1$   
 Axis of Sym.:  $x = 2$   
 Vertex:  $(2, -1)$   
 Y-Intercept:  $(0, 3)$   
 Extrema: minimum  
 Int of Inc:  $x < 2$   
 Int of Dec:  $x > 2$   
 Positive:  $x < 2$   
 Negative:  $x > 2$   
 End Behavior: As  $x \rightarrow -\infty$ ,  $f(x) \rightarrow \infty$ . As  $x \rightarrow \infty$ ,  $f(x) \rightarrow \infty$



Domain:  $\mathbb{R}$   
 Range:  $y \leq 1$   
 Axis of Sym.:  $x = 3$   
 Vertex:  $(3, 1)$   
 Y-Intercept:  $(0, -8)$   
 Extrema: max  
 Int of Inc:  $x < 3$   
 Int of Dec:  $x > 3$   
 Positive:  $x < 3$   
 Negative:  $x > 3$   
 End Behavior: As  $x \rightarrow -\infty$ ,  $f(x) \rightarrow -\infty$ . As  $x \rightarrow \infty$ ,  $f(x) \rightarrow -\infty$

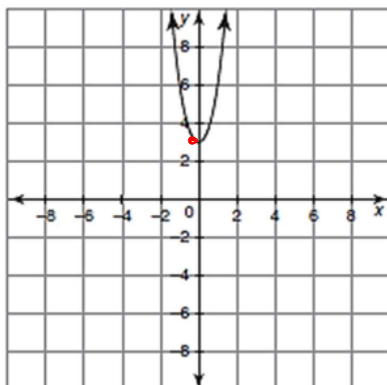


Domain:  $\mathbb{R}$   
 Range:  $y \leq 9$   
 Axis of Sym.:  $x = 0$   
 Vertex:  $(0, 9)$   
 Y-Intercept:  $(0, 9)$   
 Extrema: max  
 Int of Inc:  $x < 0$   
 Int of Dec:  $x > 0$   
 Positive:  $x < 0$   
 Negative:  $x > 0$   
 End Behavior: As  $x \rightarrow -\infty$ ,  $f(x) \rightarrow -\infty$ . As  $x \rightarrow \infty$ ,  $f(x) \rightarrow -\infty$

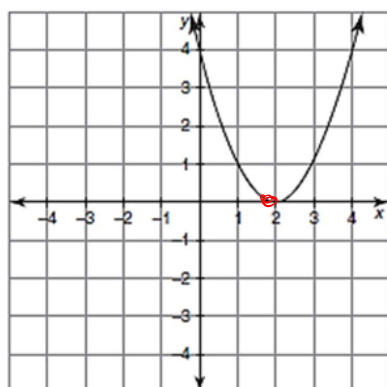
Algebra 1

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Notes



Domain:  $\mathbb{R}$       Range:  $y \geq 3$   
 Vertex:  $(0, 3)$       Axis of Sym.  $x = 0$   
 Y-Intercept:  $(0, 3)$       Zeroes:  $n/A$   
 Extrema:  $\min$       Max/Min Value:  $y = 3$   
 Int of Inc:  $x > 0$       Int of Dec:  $x < 0$   
 Positive: \_\_\_\_\_      Negative: \_\_\_\_\_  
 End Behavior: As  $x \rightarrow -\infty$ ,  $f(x) \rightarrow \infty$ . As  $x \rightarrow \infty$ ,  $f(x) \rightarrow \infty$



Domain:  $\mathbb{R}$       Range:  $y \geq 0$   
 Vertex:  $(2, 0)$       Axis of Sym.  $x = 2$   
 Y-Intercept:  $(0, 4)$       Zeroes:  $x = 2$   
 Extrema:  $\min$       Max/Min Value:  $y = 0$   
 Int of Inc:  $x > 2$       Int of Dec:  $x < 2$   
 Positive: \_\_\_\_\_      Negative: \_\_\_\_\_  
 End Behavior: As  $x \rightarrow -\infty$ ,  $f(x) \rightarrow \infty$ . As  $x \rightarrow \infty$ ,  $f(x) \rightarrow \infty$



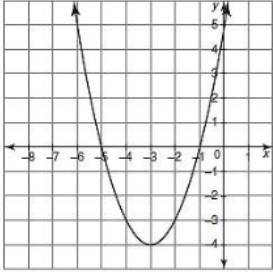
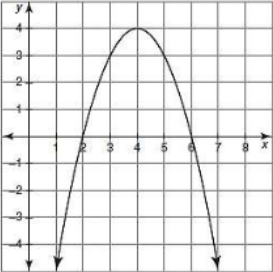
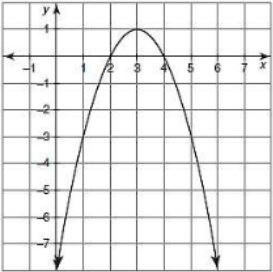
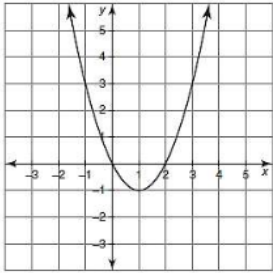
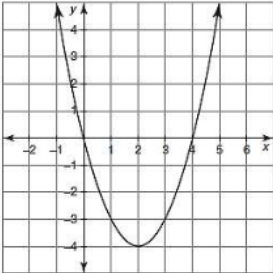
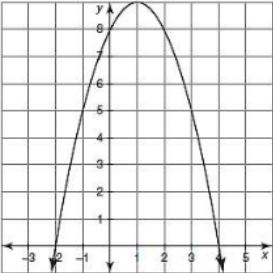
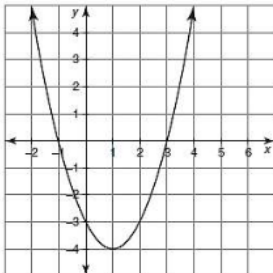
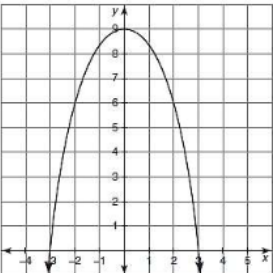
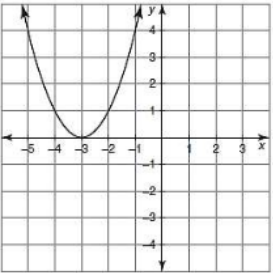
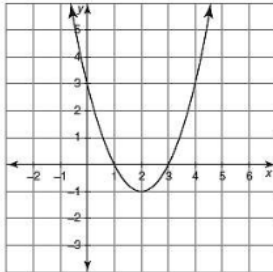
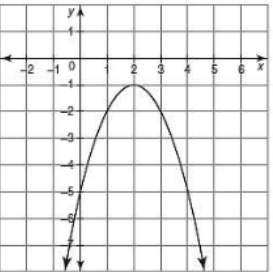
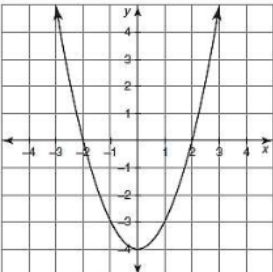
# Transformations Quick Check

Algebra 1

Unit 8: Quadratic Functions

Characteristics Extra Practice

Domain and Range

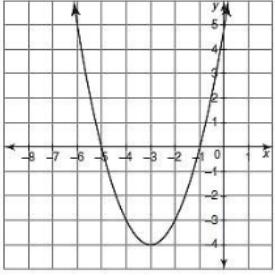
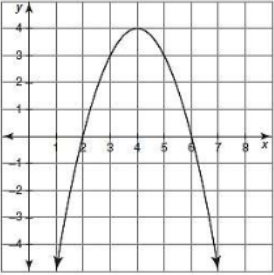
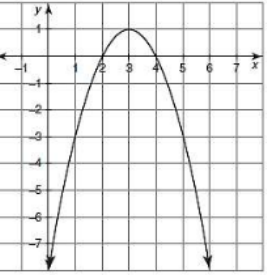
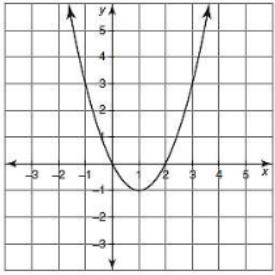
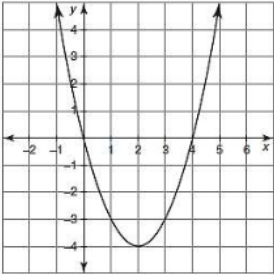
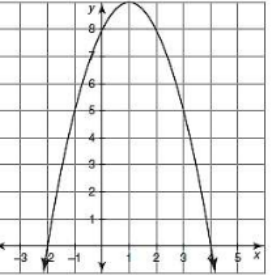
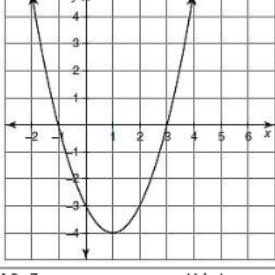
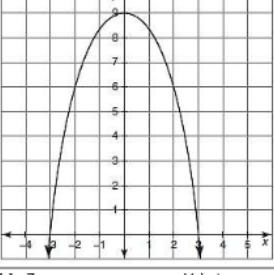
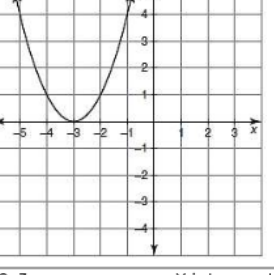
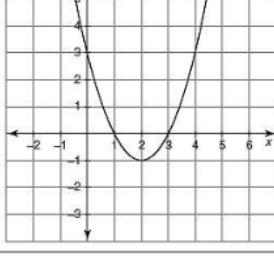
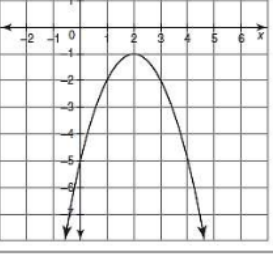
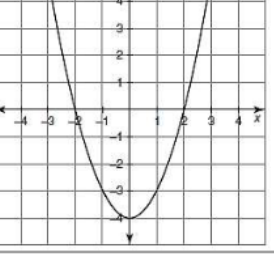
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<p>4. Domain:</p> <p>Range:</p> 	<p>5. Domain:</p> <p>Range:</p> 	<p>6. Domain:</p> <p>Range:</p> 
<p>7. Domain:</p> <p>Range:</p> 	<p>8. Domain:</p> <p>Range:</p> 	<p>9. Domain:</p> <p>Range:</p> 
<p>10. Domain:</p> <p>Range:</p> 	<p>11. Domain:</p> <p>Range:</p> 	<p>12. Domain:</p> <p>Range:</p> 

Algebra I

Unit 8: Quadratic Functions

Characteristics Extra Practice

**Zeros and Intercepts**

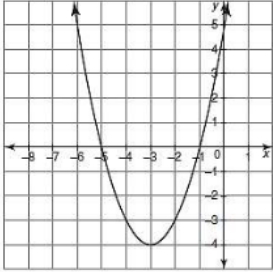
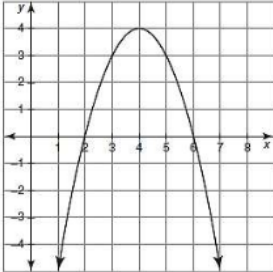
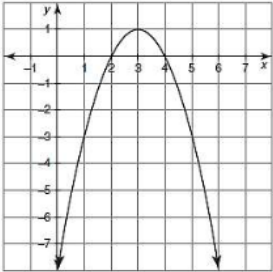
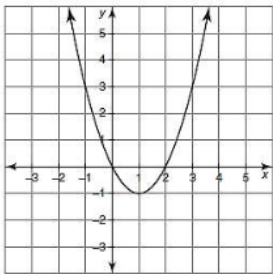
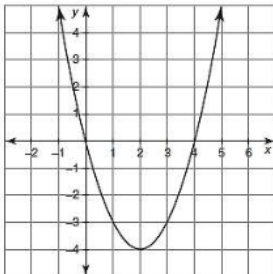
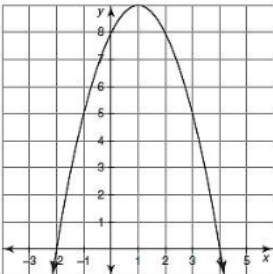
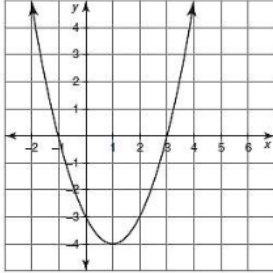
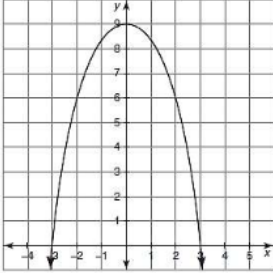
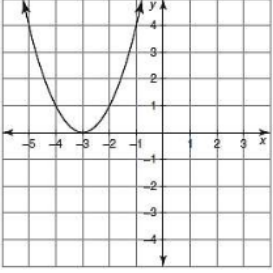
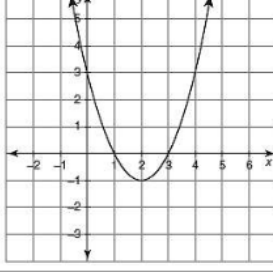
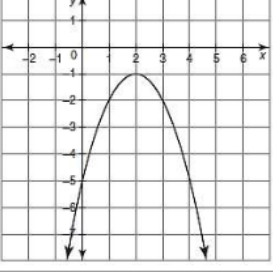
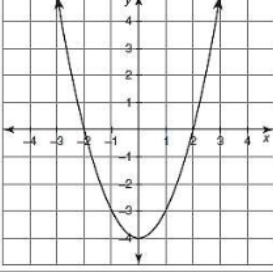
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<p>4. Zeros:                      Y-intercept:</p> <p>X-intercepts:</p> 	<p>5. Zeros:                      Y-intercept:</p> <p>X-intercepts:</p> 	<p>6. Zeros:                      Y-intercept:</p> <p>X-intercepts:</p> 
<p>7. Zeros:                      Y-intercept:</p> <p>X-intercepts:</p> 	<p>8. Zeros:                      Y-intercept:</p> <p>X-intercepts:</p> 	<p>9. Zeros:                      Y-intercept:</p> <p>X-intercepts:</p> 
<p>10. Zeros:                      Y-intercept:</p> <p>X-intercepts:</p> 	<p>11. Zeros:                      Y-intercept:</p> <p>X-intercepts:</p> 	<p>12. Zeros:                      Y-intercept:</p> <p>X-intercepts:</p> 

Algebra 1

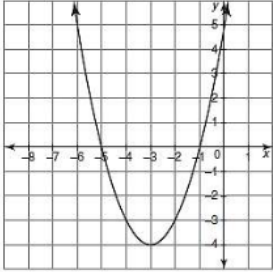
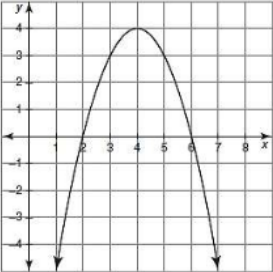
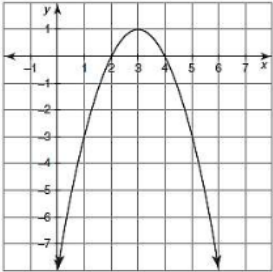
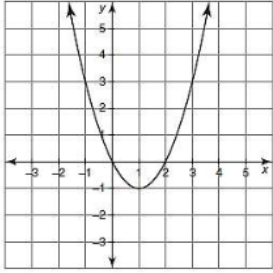
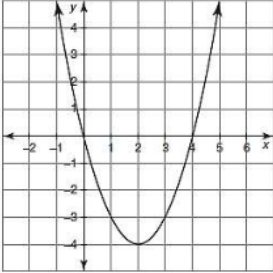
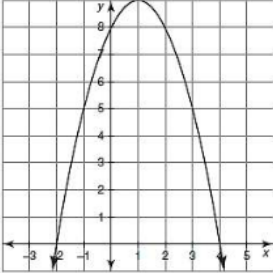
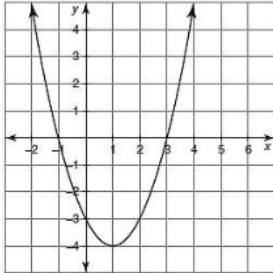
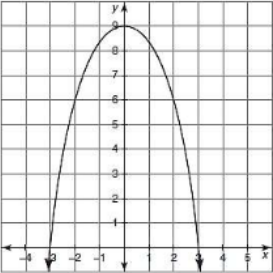
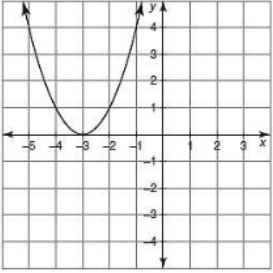
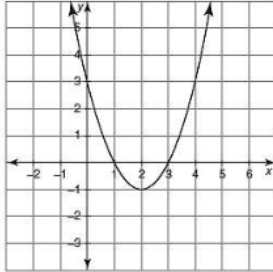
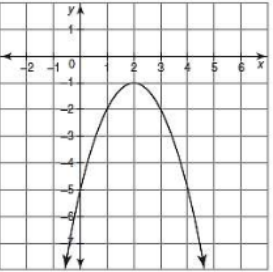
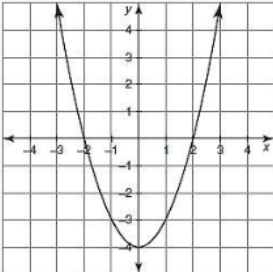
Unit 8: Quadratic Functions

Characteristics Extra Practice

**Vertex, Extrema, Axis of Symmetry, and Max/Min Value**

<p>1. Vertex:                      Axis of Symmetry:</p> <p>Extrema:                      Max/Min Value:</p> 	<p>2. Vertex:                      Axis of Symmetry:</p> <p>Extrema:                      Max/Min Value:</p> 	<p>3. Vertex:                      Axis of Symmetry:</p> <p>Extrema:                      Max/Min Value:</p> 
<p>4. Vertex:                      Axis of Symmetry:</p> <p>Extrema:                      Max/Min Value:</p> 	<p>5. Vertex:                      Axis of Symmetry:</p> <p>Extrema:                      Max/Min Value:</p> 	<p>6. Vertex:                      Axis of Symmetry:</p> <p>Extrema:                      Max/Min Value:</p> 
<p>7. Vertex:                      Axis of Symmetry:</p> <p>Extrema:                      Max/Min Value:</p> 	<p>8. Vertex:                      Axis of Symmetry:</p> <p>Extrema:                      Max/Min Value:</p> 	<p>9. Vertex:                      Axis of Symmetry:</p> <p>Extrema:                      Max/Min Value:</p> 
<p>10. Vertex:                      Axis of Symmetry:</p> <p>Extrema:                      Max/Min Value:</p> 	<p>11. Vertex:                      Axis of Symmetry:</p> <p>Extrema:                      Max/Min Value:</p> 	<p>12. Vertex:                      Axis of Symmetry:</p> <p>Extrema:                      Max/Min Value:</p> 

**Intervals of Increase and Decrease**

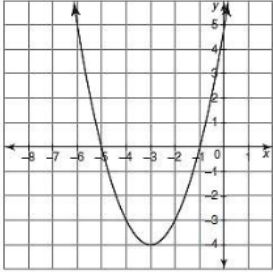
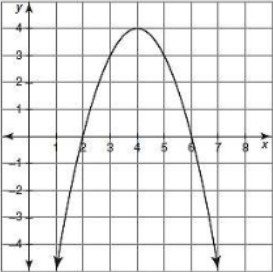
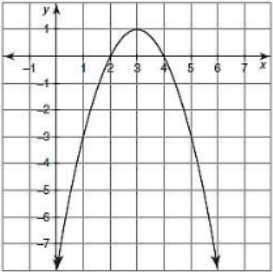
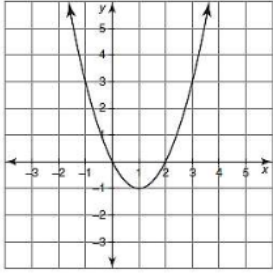
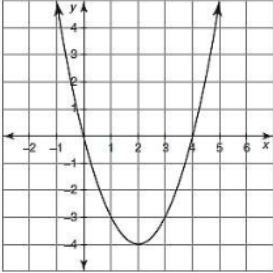
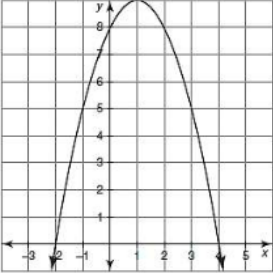
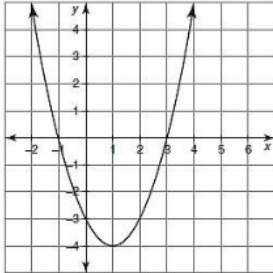
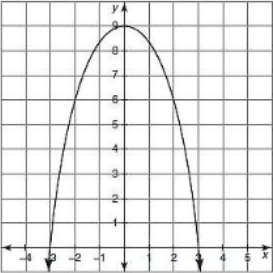
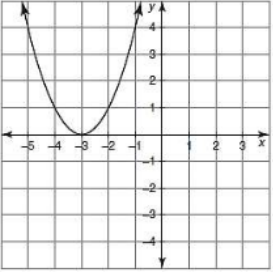
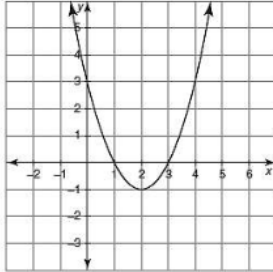
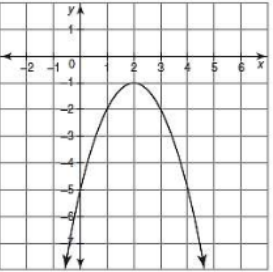
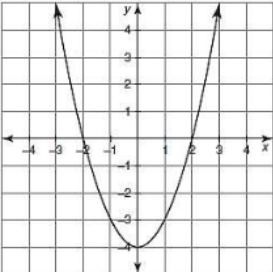
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<p>10. Interval of Increase:</p> <p>Interval of Decrease:</p> 	<p>11. Interval of Increase:</p> <p>Interval of Decrease:</p> 	<p>12. Interval of Increase:</p> <p>Interval of Decrease:</p> 

Algebra 1

Unit 8: Quadratic Functions

Characteristics Extra Practice

**Positive and Negative Parts of the Graph**

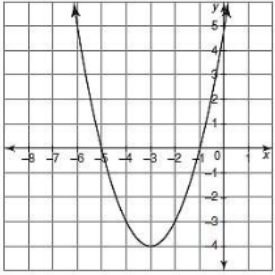
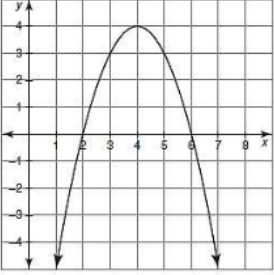
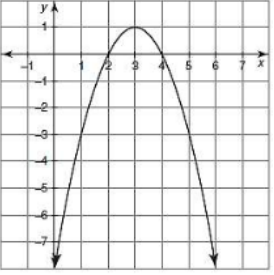
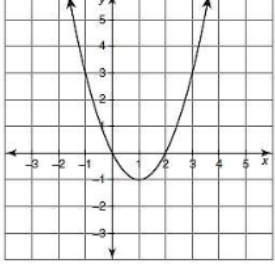
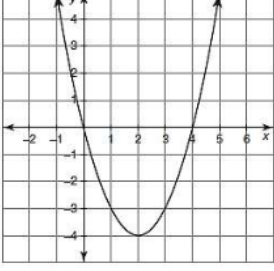
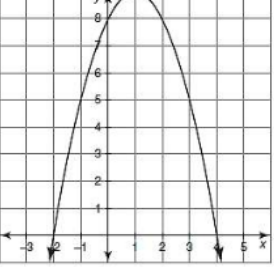
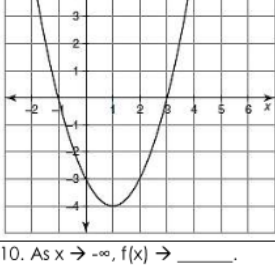
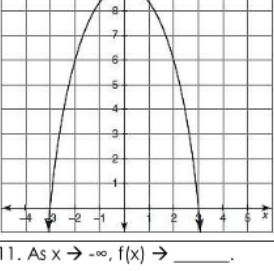
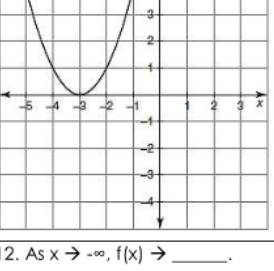
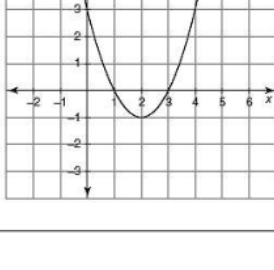
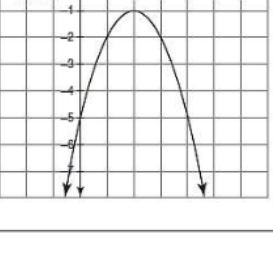
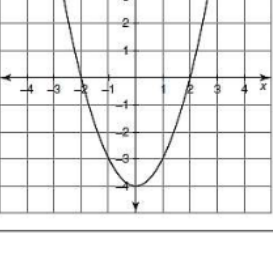
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## Algebra I

## Unit 8: Quadratic Functions

## Characteristics Extra Practice

**End Behavior**

<p>1. As <math>x \rightarrow -\infty</math>, <math>f(x) \rightarrow</math> ____.</p> <p>As <math>x \rightarrow \infty</math>, <math>f(x) \rightarrow</math> ____.</p> 	<p>2. As <math>x \rightarrow -\infty</math>, <math>f(x) \rightarrow</math> ____.</p> <p>As <math>x \rightarrow \infty</math>, <math>f(x) \rightarrow</math> ____.</p> 	<p>3. As <math>x \rightarrow -\infty</math>, <math>f(x) \rightarrow</math> ____.</p> <p>As <math>x \rightarrow \infty</math>, <math>f(x) \rightarrow</math> ____.</p> 
<p>4. As <math>x \rightarrow -\infty</math>, <math>f(x) \rightarrow</math> ____.</p> <p>As <math>x \rightarrow \infty</math>, <math>f(x) \rightarrow</math> ____.</p> 	<p>5. As <math>x \rightarrow -\infty</math>, <math>f(x) \rightarrow</math> ____.</p> <p>As <math>x \rightarrow \infty</math>, <math>f(x) \rightarrow</math> ____.</p> 	<p>6. As <math>x \rightarrow -\infty</math>, <math>f(x) \rightarrow</math> ____.</p> <p>As <math>x \rightarrow \infty</math>, <math>f(x) \rightarrow</math> ____.</p> 
<p>7. As <math>x \rightarrow -\infty</math>, <math>f(x) \rightarrow</math> ____.</p> <p>As <math>x \rightarrow \infty</math>, <math>f(x) \rightarrow</math> ____.</p> 	<p>8. As <math>x \rightarrow -\infty</math>, <math>f(x) \rightarrow</math> ____.</p> <p>As <math>x \rightarrow \infty</math>, <math>f(x) \rightarrow</math> ____.</p> 	<p>9. As <math>x \rightarrow -\infty</math>, <math>f(x) \rightarrow</math> ____.</p> <p>As <math>x \rightarrow \infty</math>, <math>f(x) \rightarrow</math> ____.</p> 
<p>10. As <math>x \rightarrow -\infty</math>, <math>f(x) \rightarrow</math> ____.</p> <p>As <math>x \rightarrow \infty</math>, <math>f(x) \rightarrow</math> ____.</p> 	<p>11. As <math>x \rightarrow -\infty</math>, <math>f(x) \rightarrow</math> ____.</p> <p>As <math>x \rightarrow \infty</math>, <math>f(x) \rightarrow</math> ____.</p> 	<p>12. As <math>x \rightarrow -\infty</math>, <math>f(x) \rightarrow</math> ____.</p> <p>As <math>x \rightarrow \infty</math>, <math>f(x) \rightarrow</math> ____.</p> 

# Transformations Practice

Reflect

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

left +  
right -

Stretch bigger than 1  
Shrink b/w 0 and 1

up +  
down -



Algebra 1

Unit 8: Quadratic Functions

Practice

Day 2 - Quadratic Transformations (all)

Name: \_\_\_\_\_

Practice Assignment

Date: \_\_\_\_\_ Block: \_\_\_\_\_

Describe the transformations of the parent graph for each equation. Then name vertex.

1.  $f(x) = x^2 + 5$

up 5

Vertex:  $(0, 5)$ 

2.  $f(x) = -(x+9)^2 - 2$

Reflect  
left 9  
down 2Vertex:  $(-9, -2)$ 

3.  $f(x) = \frac{1}{2}(x-10)^2$

Shrink  $\frac{1}{2}$   
right 10Vertex:  $(10, 0)$ 

4.  $f(x) = -5x^2 + 2$

Reflect  
Stretch 5  
up 2Vertex:  $(0, 2)$ 

5.  $f(x) = \frac{2}{3}(x-8)^2 + 0$

Shrink  $\frac{2}{3}$   
right 8Vertex:  $(8, 0)$ 

6.  $f(x) = (x+1)^2 + 4$

left 1  
up 4Vertex:  $(-1, 4)$ 

Write the quadratic equation in vertex form that has been...

7.  $y = (x-4)^2 + 3$  shifted to the right 4 and up 3

8.  $y = -(x+1)^2$  reflected over the x-axis and shifted left 1

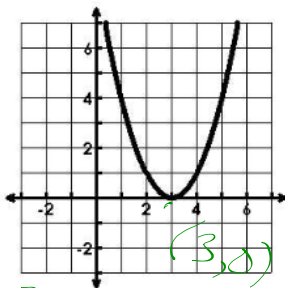
9.  $y = \frac{1}{4}x^2 - 4$  moved down 4 and shrunk by  $\frac{1}{4}$

$y = \frac{1}{4}(x+0)^2 - 4$

10.  $y = -(x+9)^2 - 8$  reflected over the x-axis, shifted left 9 and down 8

Describe the transformations and write an equation for each quadratic function. Assume all functions have no stretches or shrinks.

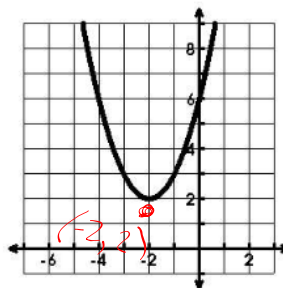
11.



shift + 3

$y = (x-3)^2$

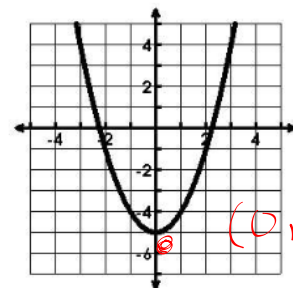
12.



left 2 up 2

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

13.



down 5

$$y = x^2 - 5$$

$$y = (x+0)^2 - 5$$

14. Describe and correct the errors in analyzing the equation of  $f(x) = -6(x - 1)^2 + 4$ .



The graph is shifted up four units and shifted left one unit, followed by a stretch by a factor of 6, followed by a reflection over the x-axis. The vertex is  $(1, 4)$ .



The graph is shifted up 1 unit and shifted right 4 units, followed by a stretch by a factor of 6, followed by a reflection over the x-axis of the graph of the parent quadratic function. The vertex is  $(-1, 4)$ .

15-20. Match each function to its graph.

15.  $g(x) = 2(x - 1)^2 - 2$

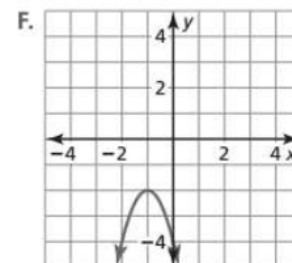
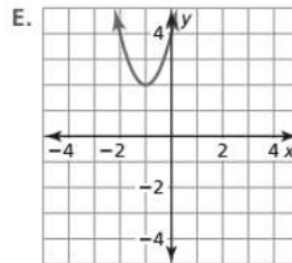
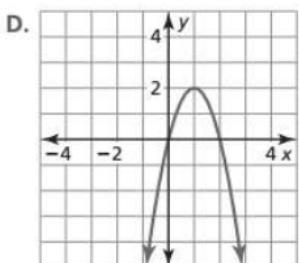
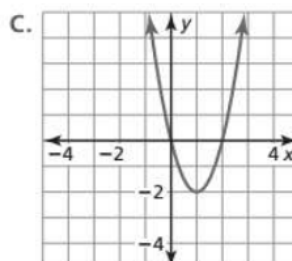
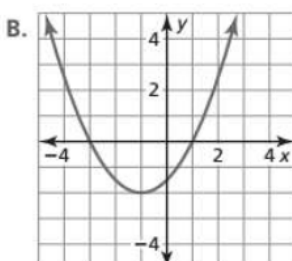
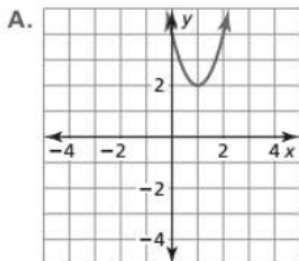
16.  $g(x) = \frac{1}{2}(x + 1)^2 - 2$

17.  $g(x) = -2(x - 1)^2 + 2$

18.  $g(x) = 2(x + 1)^2 + 2$

19.  $g(x) = -2(x + 1)^2 - 2$

20.  $g(x) = 2(x - 1)^2 + 2$



Algebra 1

Unit 8: Quadratic Functions

Practice

**Directions: Describe each transformation and name the vertex.**

Graph	Vertex	Describe the transformation(s)
$y = x^2 + 4$		
$y = x^2 - 1$		
$y = 2x^2$		
$y = -x^2 + 6$		
$y = \frac{1}{4}(x - 3)^2$		
$y = -3(x + 2)^2$		
$y = (x - 1)^2 + 3$		
$y = 2(x + 6)^2$		
$y = (x - 3)^2 - 5$		
$y = -\frac{1}{2}(x + 4)^2 + 5$		

Algebra 1  
Extra Practice with Transformations

## Unit 8: Quadratic Functions

## Practice

Name: \_\_\_\_\_

## Practice Assignment

Date: \_\_\_\_\_ Block: \_\_\_\_\_

- 
1. If  $f(x) = x^2 + 2$  is transformed to create the quadratic function  $g(x) = 3x^2 - 4$ , what transformations took place?
  
  2. If  $f(x) = (x - 2)^2 + 5$  is transformed to create the quadratic function  $g(x) = (x + 1)^2 - 3$ , what transformations took place?
  
  3. If  $y = (x - 3)^2 - 2$  was shifted up 5 units, what would the new equation be?
  
  4. If  $y = (x + 4)^2 + 1$  was shifted right 7 units, what would the new equation be?
  
  5. If the graph  $y = -3x^2$  is transformed so it opens up and is wider, which of the following is a possible equation for the new graph?
    - A.  $y = -x^2$
    - B.  $y = 1/2x^2$
    - C.  $y = 3x^2$
    - D.  $y = 5x^2$
  
  6. If the -5 in  $y = -x^2 - 5$  is changed to a positive number, what is the effect on the graph?
    - A. The graph gets wider.
    - B. The graph gets narrower.
    - C. The graph shifts up.
    - D. The graph is shifts right.
  
  7. Put the following functions in order from the narrowest to widest.
    - a.  $f(x) = -3x^2$
    - b.  $g(x) = \frac{1}{2}x^2$
    - c.  $h(x) = -\frac{1}{9}x^2$
    - d.  $j(x) = 5x^2$
    - e.  $k(x) = \frac{5}{4}x^2$
    - f.  $m(x) = 3.5x^2$
  
  8. Name the vertex for the following quadratic functions:
    - a.  $y = (x + 2)^2 - 3$
    - b.  $y = -(x - 5)^2$
    - c.  $y = x^2 - 8$

# Class Practice

**More Transformations Extra Practice  
Practice Assignment**

Name: \_\_\_\_\_

Date: \_\_\_\_\_ Block: \_\_\_\_\_

**Self-Assessment:** Answer the following questions **without** using your notes. If you can't answer these, you need to study!!

1. Write the general vertex form of a quadratic function: \_\_\_\_\_
2. What does changing the "a" variable to a number do to the graph of a quadratic function?
3. What does changing the "a" variable to a negative sign do to the graph of a quadratic function?
4. What does changing the "h" variable do to the graph of a quadratic function?
5. If "h" is positive how does the parabola move? When I look at the equation, what would I see in the equation?
6. If "h" is negative, how does the parabola move? When I look at the equation, what would I see in the equation?
7. What does changing the "k" variable do to the graph of a quadratic function?
8. If "k" is positive how does the parabola move? If negative?
9. What variables represent the vertex? \_\_\_\_\_

**Directions:** For the following problems, describe the transformations and name the vertex. Label each part as *a*, *h*, or *k*.

1.  $y = (x + 1)^2 - 4$  Vertex: \_\_\_\_\_

2.  $y = \frac{1}{4}(x - 2)^2 + 2$  Vertex: \_\_\_\_\_

3.  $y = (x - 3)^2 + 4$  Vertex: \_\_\_\_\_

4.  $y = x^2 + 5$  Vertex: \_\_\_\_\_

5.  $y = -(x + 2)^2$  Vertex: \_\_\_\_\_

6.  $y = 4(x - 4)^2 - 1$  Vertex: \_\_\_\_\_

7.  $y = -6(x + 10)^2$  Vertex: \_\_\_\_\_

8.  $y = \frac{1}{2}x^2 + 9$  Vertex: \_\_\_\_\_

9.  $y = (x - 7)^2 + 11$  Vertex: \_\_\_\_\_

Teacher Initials: \_\_\_\_\_

Write the quadratic equations as transformations from  $y = x^2$ . Label each part of the description as  $a$ ,  $h$ , or  $k$ .

10. Translate 1 unit to the right and 5 units down

\_\_\_\_\_

11. Stretch by a factor of 2, reflect across the x-axis and translate 3 units up

\_\_\_\_\_

12. Shrink by a factor of  $1/3$  and translate 7 units to the left

\_\_\_\_\_

13. Shift to the right 4 and up 3

\_\_\_\_\_

14. Reflect over the x-axis and shifted left 11

\_\_\_\_\_

15. Move down 4 and shrunk by  $1/4$

\_\_\_\_\_

16. Reflect over the x-axis, shift left 9 and down 8.

\_\_\_\_\_

Teacher Initials: \_\_\_\_\_

17. Put the following functions in order from the **widest to narrowest**.

a.  $f(x) = 2x^2$

b.  $g(x) = 1/4x^2$

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

d.  $j(x) = -6x^2$

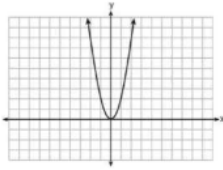
e.  $k(x) = \frac{3}{2}x^2$

f.  $m(x) = 4.7x^2$

18. If  $f(x) = x^2 - 5$  is transformed to create the quadratic function  $g(x) = 1/4x^2 + 1$ , what transformations took place?

19. If  $f(x) = (x - 3)^2$  is transformed to create the quadratic function  $g(x) = (x + 1)^2 - 6$ , what transformations took place?

20. Challenge Multiple Choice Questions:

<p>Which transformation of <math>y = f(x)</math> moves the graph 7 units to the left and 3 units down?</p> <ol style="list-style-type: none"> <li>1) <math>y = f(x + 7) - 3</math></li> <li>2) <math>y = f(x + 7) + 3</math></li> <li>3) <math>y = f(x - 7) - 3</math></li> <li>4) <math>y = f(x - 7) + 3</math></li> </ol>	<p>The minimum point on the graph of the equation <math>y = f(x)</math> is <math>(-1, -3)</math>. What is the minimum point on the graph of the equation <math>y = f(x) + 5</math>?</p> <ol style="list-style-type: none"> <li>1) <math>(-1, 2)</math></li> <li>2) <math>(-1, -8)</math></li> <li>3) <math>(4, -3)</math></li> <li>4) <math>(-6, -3)</math></li> </ol>	<p>The maximum point on the graph of the equation <math>y = f(x)</math> is <math>(2, -3)</math>. What is the maximum point on the graph of the equation <math>y = f(x - 4)</math>?</p> <ol style="list-style-type: none"> <li>1) <math>(2, -7)</math></li> <li>2) <math>(-2, -3)</math></li> <li>3) <math>(6, -7)</math></li> <li>4) <math>(6, -3)</math></li> </ol>
<p>The graph of the equation <math>y = ax^2</math> is shown below.</p>  <p>If <math>a</math> is multiplied by <math>-\frac{1}{2}</math>, the graph of the new equation is</p> <ol style="list-style-type: none"> <li>1) wider and opens downward</li> <li>2) wider and opens upward</li> <li>3) narrower and opens downward</li> <li>4) narrower and opens upward</li> </ol>	<p>Melissa graphed the equation <math>y = x^2</math> and Dave graphed the equation <math>y = -3x^2</math> on the same coordinate grid. What is the relationship between the graphs that Melissa and Dave drew?</p> <ol style="list-style-type: none"> <li>1) Dave's graph is wider and opens in the opposite direction from Melissa's graph.</li> <li>2) Dave's graph is narrower and opens in the opposite direction from Melissa's graph.</li> <li>3) Dave's graph is wider and is three units below Melissa's graph.</li> <li>4) Dave's graph is narrower and is three units to the left of Melissa's graph.</li> </ol>	<p>How does the graph of <math>f(x) = 3(x - 2)^2 + 1</math> compare to the graph of <math>g(x) = x^2</math>?</p> <ol style="list-style-type: none"> <li>1) The graph of <math>f(x)</math> is wider than the graph of <math>g(x)</math>, and its vertex is moved to the left 2 units and up 1 unit.</li> <li>2) The graph of <math>f(x)</math> is narrower than the graph of <math>g(x)</math>, and its vertex is moved to the right 2 units and up 1 unit.</li> <li>3) The graph of <math>f(x)</math> is narrower than the graph of <math>g(x)</math>, and its vertex is moved to the left 2 units and up 1 unit.</li> <li>4) The graph of <math>f(x)</math> is wider than the graph of <math>g(x)</math>, and its vertex is moved to the right 2 units and up 1 unit.</li> </ol>

Attachments

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