Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples

VERTEX FORM
of a Quadratic Equation

- **Vertex Form** of a **Quadratic Equation:**

- _____ is the **vertex;** _____ is the **axis of symmetry**

Directions: Give the axis of symmetry and vertex of each equation.

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

Axis of Symmetry: _____

Vertex: _____

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

Axis of Symmetry: _____

Vertex: _____

3. $y = (x-5)^2 - 4$

Axis of Symmetry: _____

Vertex: _____

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

Axis of Symmetry: _____

Vertex: _____

GRAPHING
from Vertex Form

Directions: Graph each equation using a table of values. Identify the axis of symmetry, vertex, domain, and range.

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

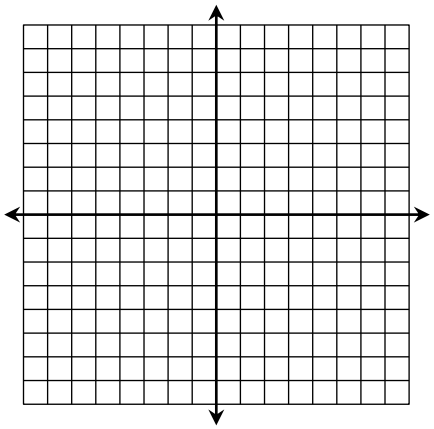
Axis of Symmetry: _____

Vertex: _____

Domain: _____

Range: _____

x	y



6. $y = 3(x-1)^2$

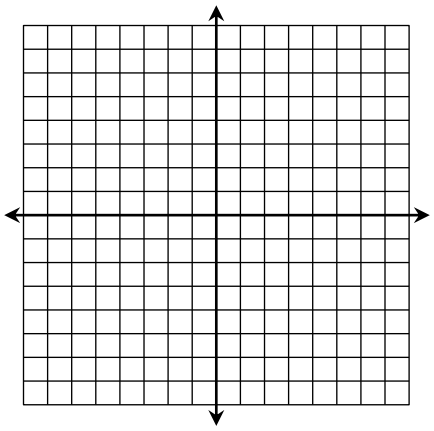
Axis of Symmetry: _____

Vertex: _____

Domain: _____

Range: _____

x	y



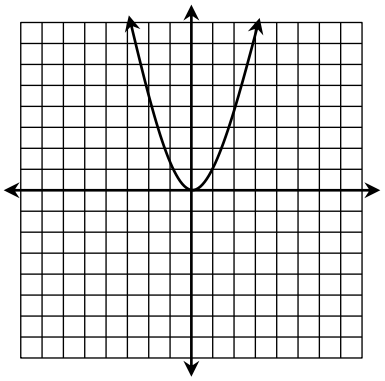
TRANSFORMATIONS
from the Parent Function

- The most simplistic quadratic equation is _____.
- This is known as the _____ _____.
- A **transformation** is a _____ to the _____ or _____ of a figure.

Directions: Graph each function. Describe how it compares to the parent function shown on the graph.

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

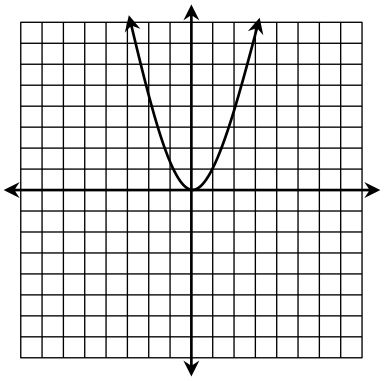
x	y



Transformations:

8. $y = x^2 + 5$

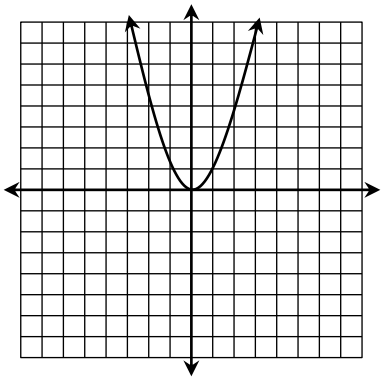
x	y



Transformations:

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

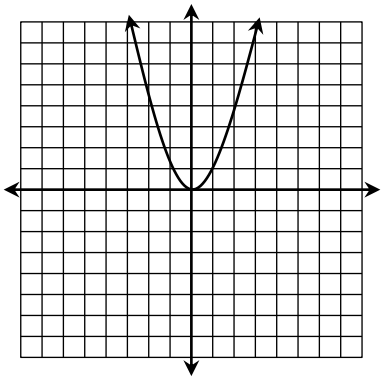
x	y



Transformations:

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

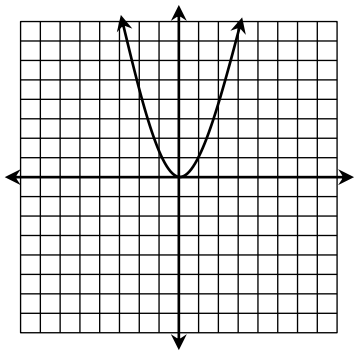
x	y



Transformations:

11. $y = 3x^2 - 7$

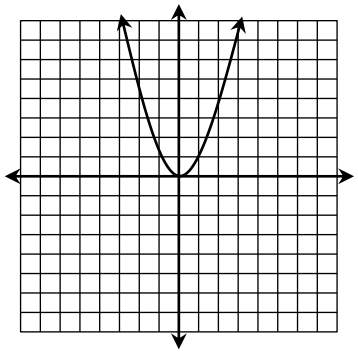
x	y



Transformations:

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

x	y



Transformations:

PUT IT TOGETHER!

Given a quadratic equation in vertex form, $y = a(x-h)^2 + k$:

- h is the _____ shift. (**+** shifts _____, **–** shifts _____)
- k is the _____ shift. (**+** shifts _____, **–** shifts _____)
- If a is negative, the function is _____ across the ____- _____
- $|a| > 1$ represents a vertical _____.
- $0 < |a| < 1$ represents a vertical _____.

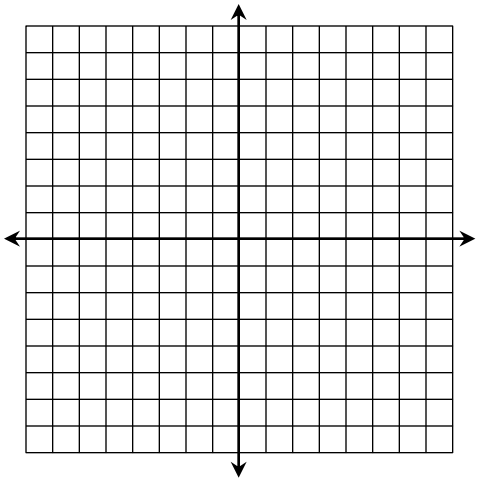
WRITING EQUATIONS

Directions: Transformations from the parent function $y = x^2$ are described below. Write an equation to represent the function.

13. translated 2 units right	**14.** translated 5 units up
15. translated 3 units left and 4 units down	**16.** translated 7 units right and 4 units up
17. reflected over the x-axis, then translated 3 units down	**18.** reflected over the x-axis, then translated 5 units right and 2 units down
19. vertically compressed by a factor of 1/3, then translated 8 units up	**20.** vertically stretched by a factor of 2, reflected over the x-axis, then translated 4 units left

8. $y = -(x-1)^2$

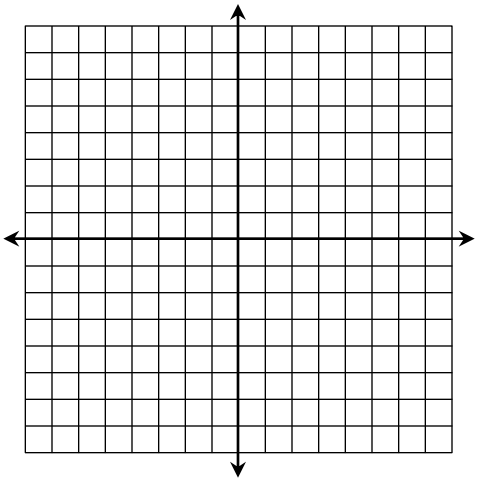
x	y



Axis of Symmetry:
Vertex:
Domain:
Range:
Transformations:

9. $y = \frac{1}{2}(x+4)^2 - 8$

x	y



Axis of Symmetry:
Vertex:
Domain:
Range:
Transformations:

Without graphing, describe the transformations of each equation from its parent function.

10. $y = -x^2 + 4$

Transformations:

11. $y = 3(x-6)^2 - 2$

Transformations:

The transformations to the parent function of a quadratic equation are given below. Write an equation of the new function in vertex form.

12. translated 3 units down

13. translated 7 units right and 2 units up

14. reflected over the x-axis, then translated 5 units left

15. vertically stretched by a factor of 2, then translated 4 units left and 1 unit down

12. _____

13. _____

14. _____

15. _____