

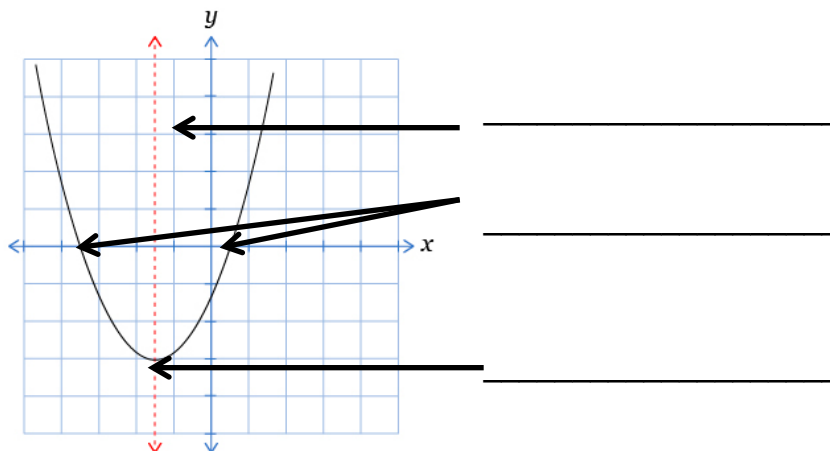
MPM2D – Unit 2: The Quadratic Relation

Review Worksheet – Part 1

Section 1 – Fill in the Blanks

1. Standard form of a quadratic relation is _____.
2. The shape of a quadratic relation is called a _____.

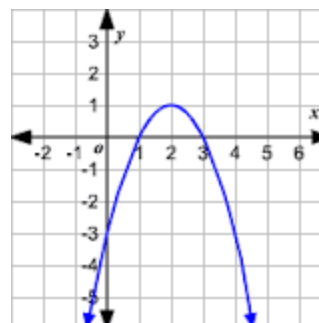
3.



4. When the vertex is the highest point on the graph, it is called a _____.
5. When the vertex is the lowest point on the graph, it is called a _____.
6. Determine the number of x-intercepts that each of the following quadratic relations would have.
 - a. $y = -3(x - 4)^2 + 6$ _____ x-intercept(s).
 - b. $y = (x + 2)^2$ _____ x-intercept(s).
 - c. $y = 7x^2 + 11$ _____ x-intercept(s).

7. Given the graph to the right, identify the following properties:

- a. Axis of Symmetry _____
- b. Vertex _____
- c. Number of x-intercepts _____
- d. Domain _____
- e. Range _____



Section 2 – Equations with Transformations

1. For each of the quadratic relations below, describe the direction of opening and transformations being applied.

a. $y = 9x^2 - 11$

b. $y = -(x + 8)^2$

c. $y = \frac{1}{3}(x - 7)^2 + 12$

d. $y = -\frac{3}{2}x^2 - 5$

e. $y = -\frac{4}{5}(x + 3)^2$

2. Write an equation for the quadratic relation that results from each transformation.

- a. The graph of $y = x^2$ is translated 6 units upward.
- b. The graph of $y = x^2$ is translated 4 units downward.
- c. The graph of $y = x^2$ is translated 7 units to the left.
- d. The graph of $y = x^2$ is translated 5 units to the right.
- e. The graph of $y = x^2$ opens down and is translated 8 units to the left.
- f. The graph of $y = x^2$ is translated 3 units to the right.
- g. The graph of $y = x^2$ opens down and is stretched vertically by a factor of 8.
- h. The graph of $y = x^2$ is compressed vertically by a factor of $\frac{1}{5}$.
- i. The graph of $y = x^2$ is stretched vertically by a factor of 3 and is translated 10 units to the right.
- j. The graph of $y = x^2$ is compressed vertically by a factor of 0.5 and translated 4 units left and 12 units up.
- k. The graph of $y = x^2$ opens down and is translated 6 units to the right and 17 units down.

Section 3 – Properties of Graphs

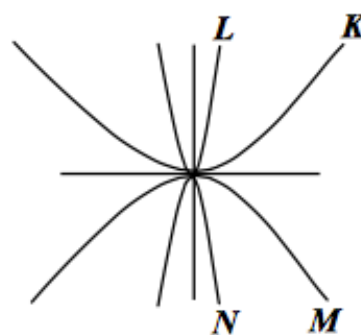
1. Order each group of quadratic relations from the widest to the narrowest graph.

a. $y = 4x^2$ $y = -2x^2$ $y = \frac{1}{3}x^2$

b. $y = -x^2$ $y = \frac{1}{5}x^2$ $y = -5x^2$

2. Match each of the following quadratic relations (K, L, M, N) in the graph with their corresponding equation.

Equation	Graph
$y = 3x^2$	
$y = -3x^2$	
$y = \frac{1}{3}x^2$	
$y = -\frac{1}{3}x^2$	



3. State whether each quadratic relation has a maximum or minimum and its value.

$y = 2x^2 + 7$ ☐ maximum ☐ minimum value = _____

$y = x^2 - 3$ ☐ maximum ☐ minimum value = _____

$y = -x^2 - 4$ ☐ maximum ☐ minimum value = _____

$y = -5x^2 + 12$ ☐ maximum ☐ minimum value = _____

4. Match each of the following quadratic relation equations with its corresponding graph.

a. $y = x^2 - 1$

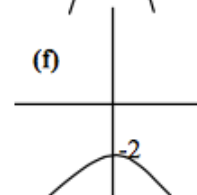
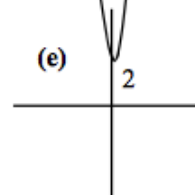
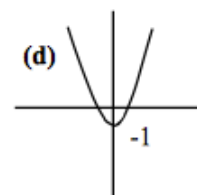
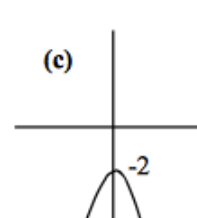
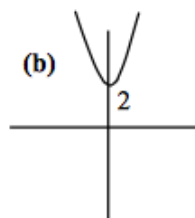
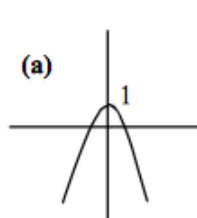
b. $y = x^2 + 2$

c. $y = -x^2 + 1$

d. $y = -x^2 - 2$

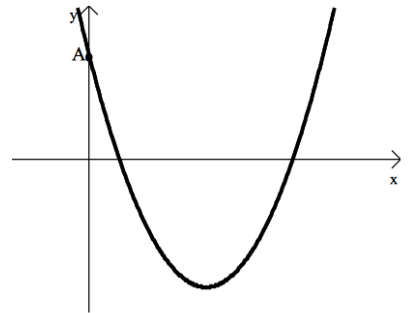
e. $y = 3x^2 + 2$

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



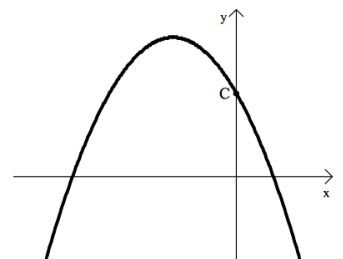
5. The equation of the parabola below is $y = (x - 3)^2 - 5$.

- a. State the coordinates of the minimum point of the parabola.
- b. State the equation of the axis of symmetry of the parabola.
- c. Find the coordinates of A.



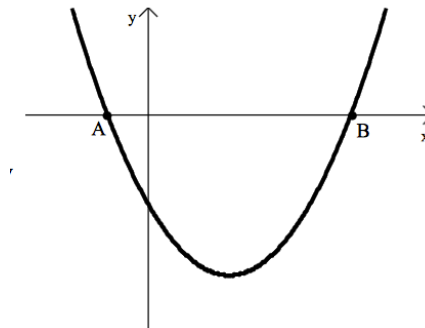
6. The equation of the parabola to the right is $y = 10 - (x + 2)^2$.

- a. State the coordinates of the maximum point of the parabola.
- b. State the equation of the axis of symmetry of the parabola.
- c. Find the coordinates of C.



7. The equation of the parabola below is $y = (x - 2)^2 - 9$.

- a. State the coordinates of the _____ turning point of the parabola.

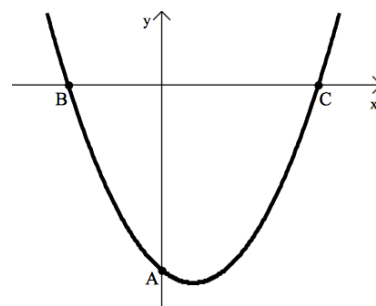


- b. State the equation of the axis of symmetry of the parabola.

- c. Find the coordinates of A and B.

8. The equation of the parabola below is $y = (x - 1)^2 - 16$.

- a. State the coordinates of the _____ turning point of the parabola.



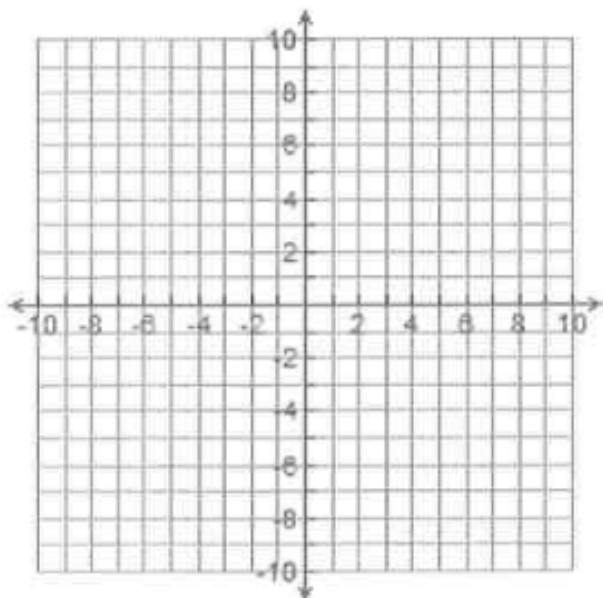
- b. Find the coordinates of A.

- c. Find the coordinates of B and C.

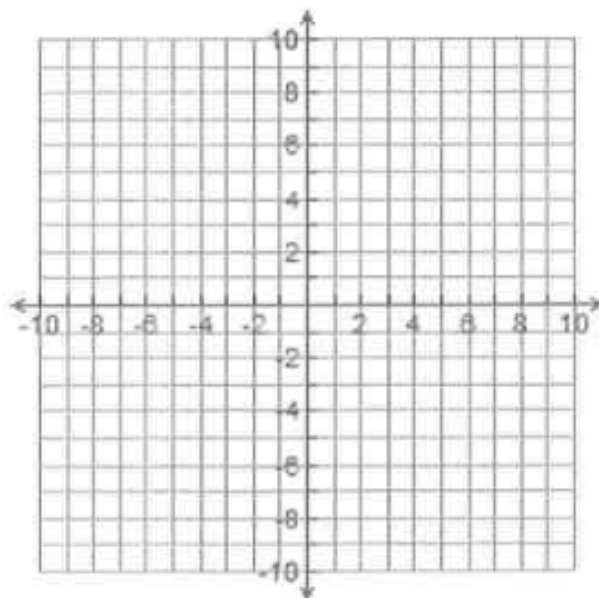
Part 4 – Graphing Combinations of Transformations

1. Graph each of the quadratic relations below on the grid(s) provided. Please use the step pattern to graph the relations.

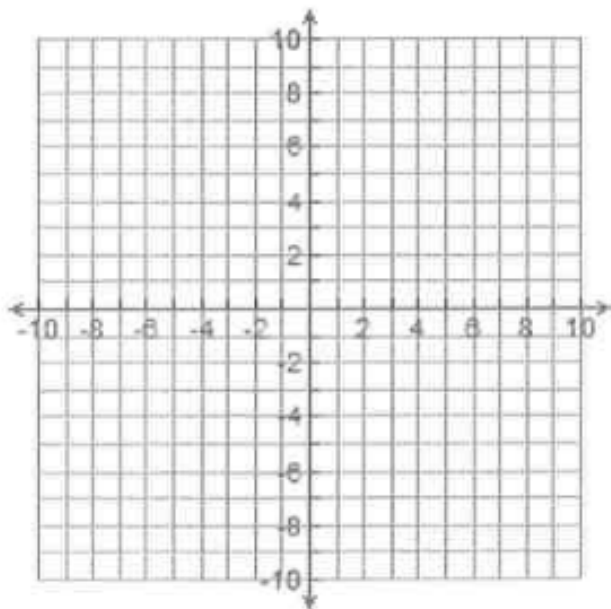
a. $y = x^2 + 3$



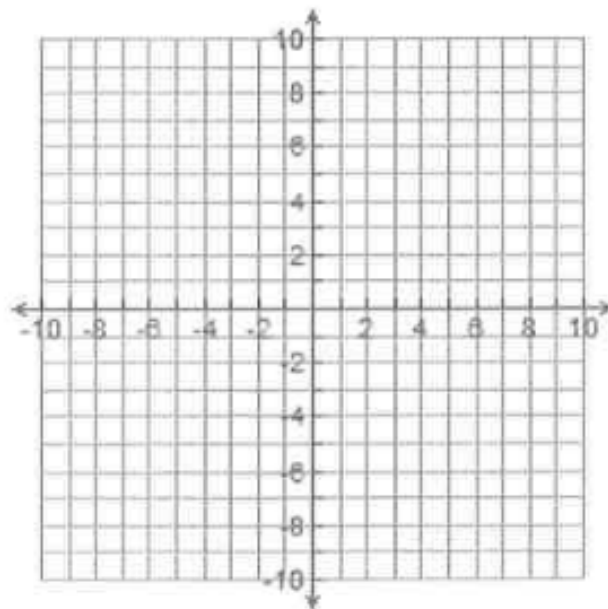
b. $y = (x + 4)^2$



c. $y = -2x^2$

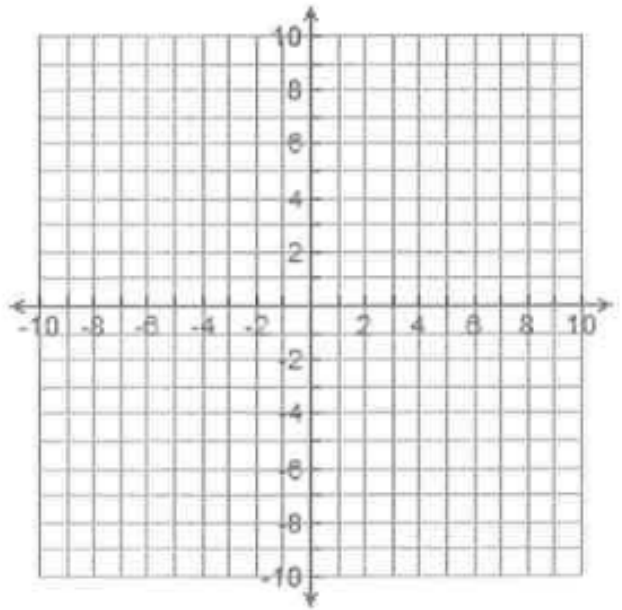
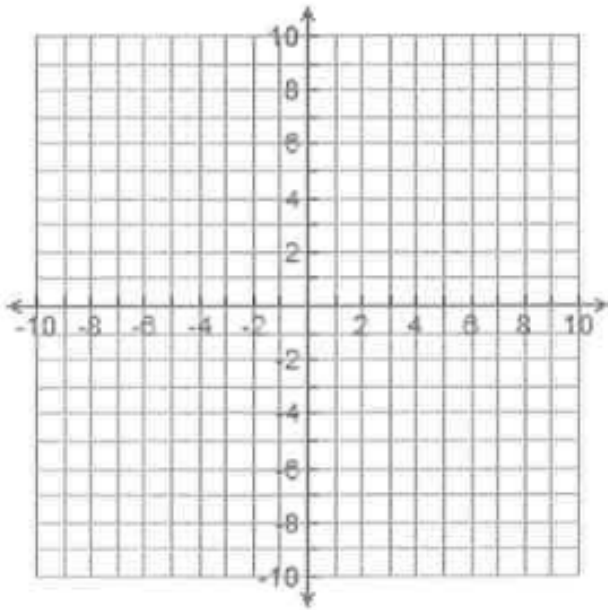


d. $y = -(x - 3)^2 + 4$



e. $y = 3(x - 4)^2 - 6$

f. $y = \frac{1}{2}(x + 2)^2 + 3$



Part 5 – Expanding from vertex form to standard form

1. Express each of the following quadratic relations in standard form.

a. $y = -3(x + 5)^2 + 11$

b. $y = \frac{1}{2}(x - 7)^2 - 16$