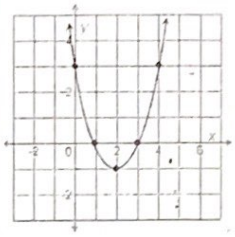
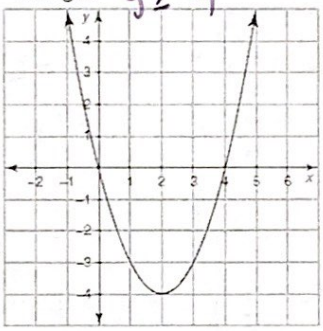
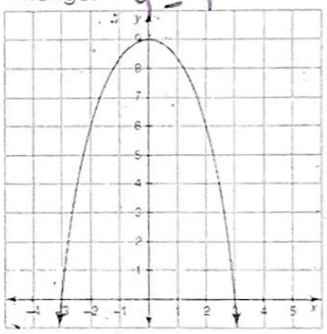
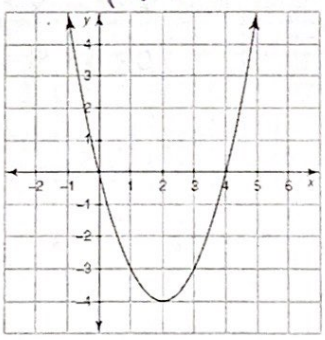
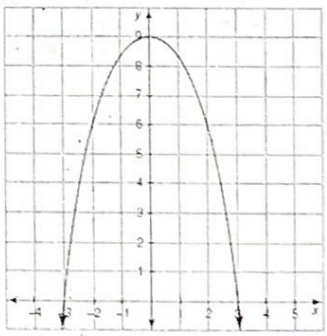
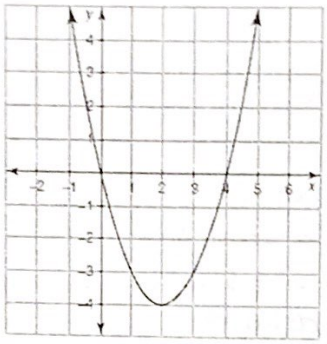
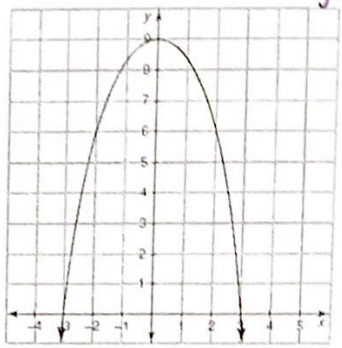
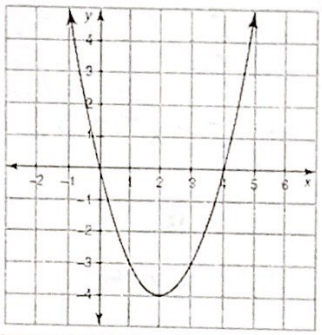
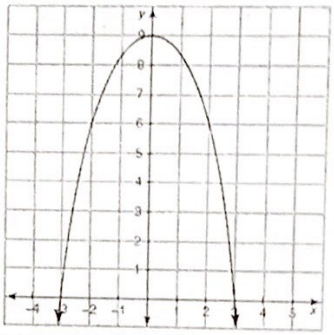
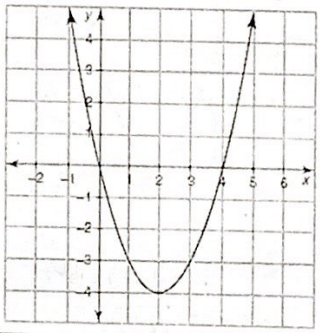
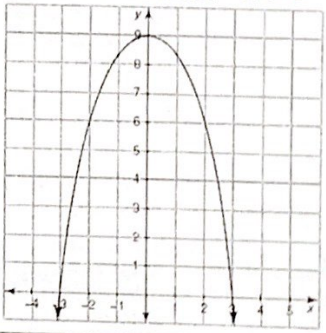
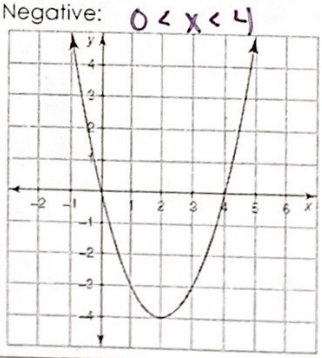
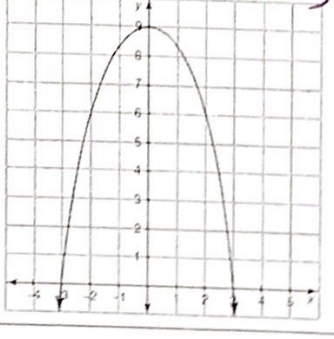
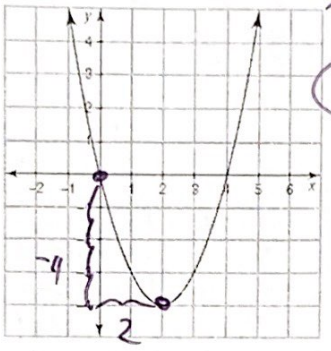
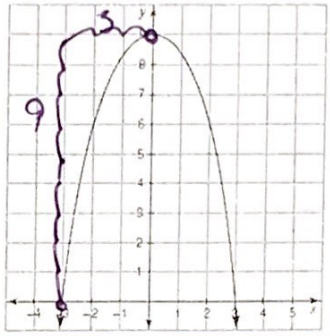
Algebra
Unit 6 Review – Graphing Quadratics

Name: Key
Date: _____ Period: _____

What you need to know & be able to do	Things to remember	Examples	
1. *Describe transformations from an equation or graph*	$y = a(x - h)^2 + k$ a: stretches/shrinks & reflects h: shifts left & right k: shifts up & down vertex: (h, k)	a. Describe the transformations and name the vertex: $y = -2(x + 3)^2 - 9$ reflect Stretch 2 Left 3 down 9 (-3, -9)	a. Describe the transformations and name the vertex:  right 2 down 1 (+2, -1)
2. *Create a function using transformations*	Determine your, a, h, and k values	a. Opens down, shifts up 3 units and shrinks by ¼ $y = -\frac{1}{4}x^2 + 3$	b. Shifts left 5 and reflects across the x-axis $y = -(x+5)^2$
3. *Describe the domain and range.*	-Domain: all possible values for x -Range: all possible values for y -"How far up or down does your graph go?" -written as an inequality	a. Domain: $\mathbb{R}$ Range: $y \geq -4$ 	b. Domain: $\mathbb{R}$ Range: $y \leq 9$ 
4. *Describe the intercepts and zeros.*	Zeros and x-intercepts are the same thing. Zeros: x = ___ X-int: (p, 0) (q, 0) Y-int: (0, c)	a. x-intercepts: (0,0) (4,0) zeros: x = 0, x = 4 y-intercept: (0,0) 	b. x-intercepts: (-3,0) (3,0) zeros: x = -3, x = 3 y-intercept: (0,9) 

5. *Describe the vertex, axis of symmetry, extrema, and min/max values.*	Vertex: highest or lowest point Axis of Symmetry: x value of the vertex; written as x = Extrema: Max or Min? Max/Min Value: What's the lowest or highest your graph goes; written as y =	a. Vertex: (2, -4) Axis of Sym: $x = 2$ Extrema: min Max/Min Value: $y = -4$ 	b. Vertex: (0, 9) Axis of Sym: $x = 0$ Extrema: max Max/Min Value: $y = 9$ 
6. *Describe the end behavior.*	Which direction are the ends of the graph headed? To positive or negative infinity?	a. As $x \to -\infty$, $f(x) \to \infty$. As $x \to \infty$, $f(x) \to \infty$. 	b. As $x \to -\infty$, $f(x) \to -\infty$. As $x \to \infty$, $f(x) \to -\infty$. 
7. *Describe the intervals of increase or decrease.*	Draw your axis of symmetry and create an inequality to represent to the left and right of the axis of symmetry. Then determine which direction the graph is going on the left and then on the right using your inequalities.	a. Interval of Increase: $x > 2$ Interval of Decrease: $x < 2$ 	b. Interval of Increase: $x < 0$ Interval of Decrease: $x > 0$ 
8. *Describe the positive and negative parts of the graph*	Determine which parts of the graph are above or below the x-axis. Use inequalities to describe the different regions using the x-intercepts.	a. Positive: $x < 0$ $x > 4$ Negative: $0 < x < 4$ 	b. Positive: $-3 < x < 3$ Negative: $x < -3$ $x > 3$ 

9. Find the average rate of change given a graph	-Determine your two x-values and find their corresponding y-values on the parabola. -Calculate the rate of change (rise over run)	a. On interval from $0 \le x \le 2$:  $\frac{-4}{2} = -2$	b. On interval from $-3 \le x \le 0$:  $\frac{9}{3} = 3$
10. Find the average rate of change given an equation	Find two points (by substituting x-values into the equation to get your y-values. Then use slope formula	a. Calculate the average rate of change for $y = x^2 + 1$ on the interval $0 \le x \le 2$. | x	y
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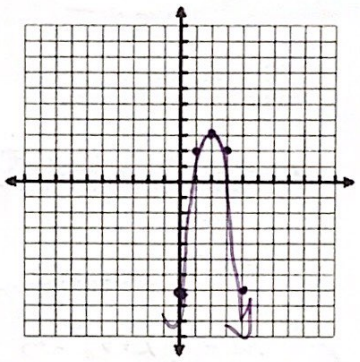
0	1
2	5	 $\frac{y}{x} = \frac{4}{2} = 2$	
11. Graph in vertex form	1. Determine your vertex. 2. Create a table with 2 values to the left and right of the vertex. 3. Graph.	a. Graph the following equation: $y = -3(x-2)^2 + 5$  | x	y
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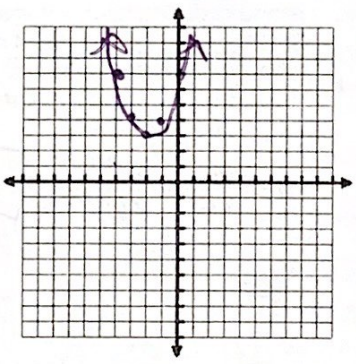
0	-7
1	2
2	5
3	2
4	-7		
12. Graph in standard form	1. Determine your vertex $\left(x = \frac{-b}{2a}\right)$. 2. Create a table with 2 values to the left and right of the vertex. 3. Graph.	a. Graph the following equation: $y = x^2 + 4x + 7$  $x = \frac{-b}{2a} = \frac{-4}{2(1)} = \frac{-4}{2} = -2$ | x	y
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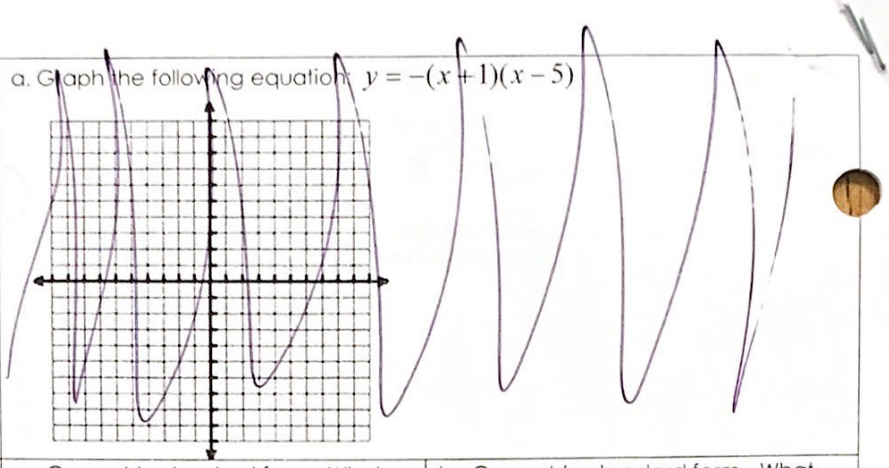
-4	7
-3	4
-2	3
-1	4
0	7		

13. Graph in factored form	1. Determine your x-intercepts and plot them. 2. Determine you vertex (find the middle of the two x-intercepts or use $x=\frac{p+q}{2}$). 3. Plot vertex and graph.	a. Graph the following equation: $y=-(x+1)(x-5)$ 	
14. Converting between forms	Use your Converting Between Forms graphic organizer.	a. Convert to standard form. What new characteristic can you give? $y = -3(x + 4)^2 + 2$? $-3(x^2+8x+16)+2$ $-3x^2-24x-48+2$ $y=-3x^2-24x-46$	b. Convert to standard form. What new characteristic can you give? $y = (x + 3)^2 - 5$ $(x^2+6x+9)-5$ $y=x^2+6x+4$
		c. Convert to vertex form. What new characteristic can you give? $y = x^2 + 6x + 4$ $x=\frac{-b}{2a}=\frac{-6}{2(1)}=\frac{-6}{2}=-3$ $y=-5$ $y=(x+3)^2-5$	d. Convert to factored form. What new characteristic can you give? $y = x^2 - 5x - 24$ $x=\frac{5}{2(1)}=2.5$ $y=-30.25$ $y=(x-2.5)^2-30.25$
15. Apply properties of quadratics to solve problems	Decide what your x and y represents. Make sure you answer what the question was asking	a. The equation for the cost of manufacturing lawn mowers is $y = 0.008x^2 - 0.04x + 75$. What number of lawn mowers should be produced to minimize costs? $x=\frac{-b}{2a}=\frac{.04}{2(.008)}=2.5$	14. The height in feet of a rocket after x second is given by $y = 128x - 16x^2$. What is the maximum height reached by the rocket and how long does it take to reach that height? $x=\frac{-b}{2a}=\frac{-128}{2(-16)}=4$ $y=256$