Name: Key Hour: ____ Date: ____

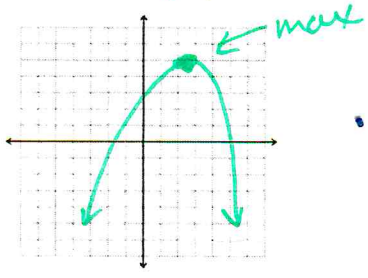
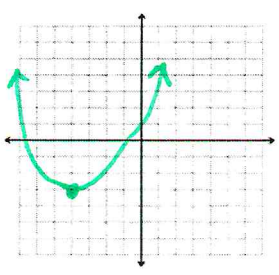
Graphing Quadratics in Standard Form Notes

The standard form of a quadratic is:

Features of a Quadratic Function: (using the quadratic function $y = 3x^2 - 12x + 1$)

Y-Intercept: Where the function crosses the y-axis. The y-intercept is found by plugging 0 in for x. $3(0)^2 - 12(0) + 1$ $3(0) - 0 + 1$ $0 - 0 + 1$ 1 $(0, 1)$ *Also is simply $(0, c)$ ☺	**Axis of Symmetry:** The vertical line that divides the parabola into two parts. The equation to find the axis of symmetry is $x = -\frac{b}{2a}$. $x = \frac{-(-12)}{2(3)}$ $= \frac{12}{6}$ $= 2$ AoS: $x = 2$	**Vertex:** The point where the parabola intersects the axis of symmetry. The x-coordinate of the vertex is $-\frac{b}{2a}$. Use it to find the y-coordinate. Plug the AoS in for x. $3(2)^2 - 12(2) + 1$ $3(4) - 24 + 1$ $12 - 24 + 1$ $-12 + 1$ -11 $(2, -11)$

Maximum and Minimum Values:

Maximum Value: • Opens down. • The *a* value is negative. Ex: 	**Minimum Value:** • Opens up. • The *a* value is positive. Ex: 

Directions for graphing a quadratic in standard form:

1. Find the y-intercept and graph it.
2. Find the axis of symmetry and graph it. (Remember that this is also the x-intercept of the vertex!)
3. Use a table of values to find the y-coordinate of the vertex and graph it.
4. Choose some x-values that are less than the axis of symmetry and some that are greater to find coordinates that you can graph on your parabola.

Example: Graph the equation $y = 2x^2 + 4x + 3$

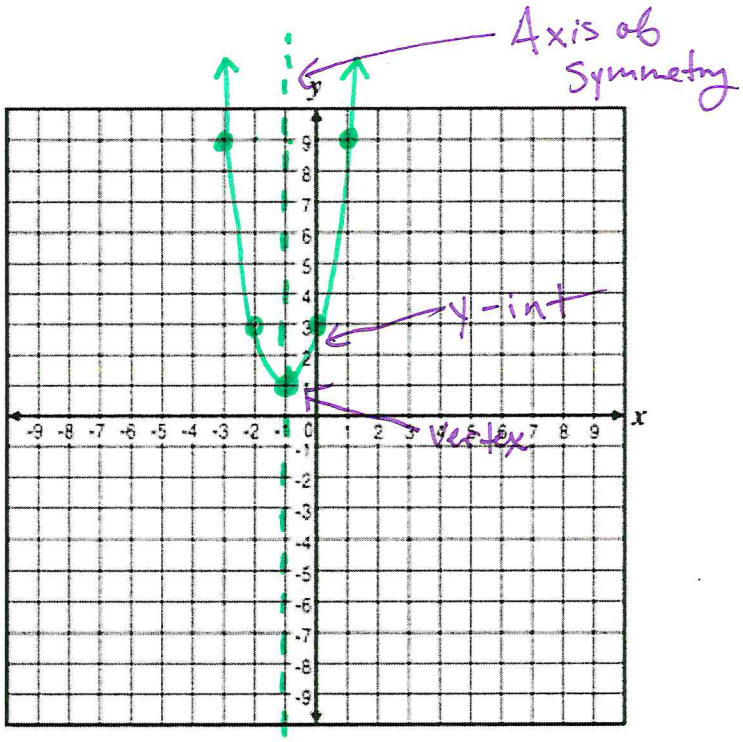
y – intercept: $(0, c)$

$(0, 3)$

axis of symmetry: $a = 2 \quad b = 4 \quad c = 3$

$$x = \frac{-b}{2a} = \frac{-4}{2(2)} = \frac{-4}{4} = -1$$

x	$f(x) = 2x^2 + 4x + 3$	$f(x)$	$(x, f(x))$
0	y-int	3	(0, 3)
-1 (Vertex)	$2(-1)^2 + 4(-1) + 3$ $2(1) - 4 + 3$ $2 - 4 + 3$	1	(-1, 1)
-2	Reflected y-int over AoS	3	(-2, 3)
1	$2(1)^2 + 4(1) + 3$ $2 + 4 + 3$	9	(1, 9)
-3	Reflected (1, 9) over AoS	9	(-3, 9)



The a value of this quadratic is positive, so it opens up and has a minimum value at the vertex.