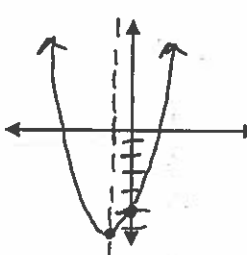
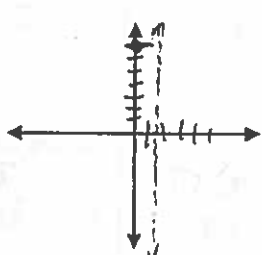
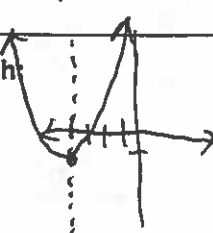




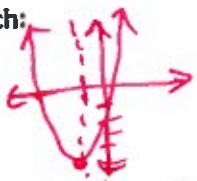
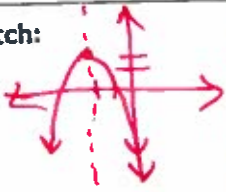



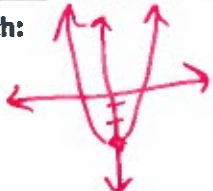
Name: Key

Topic: _____

Class: _____

Date: _____

Main Ideas/Questions	Notes
STANDARD FORM	All quadratic equations are written in the form: $y = ax^2 + bx + c$
GRAPH	When graphed, a quadratic equation creates a U-shaped curve called a <u>parabola</u> .
TYPES OF PARABOLAS	<p>Use your graphing calculator to sketch the following:</p> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px;">$y = x^2 + 2x - 5$</div> <div style="border: 1px solid black; padding: 5px;">$y = -x^2 + 3x + 7$</div> </div> <div style="display: flex; justify-content: space-around; align-items: center;">  <div style="text-align: center;"> $x = \frac{-2}{2(1)}$ $x = \frac{-2}{2} = -1$ $y = (-1)^2 + 2(-1) - 5$ $= 1 + (-2) - 5$ $= -6$ </div>  <div style="text-align: center;"> $x = \frac{-3}{2(-1)}$ $x = \frac{-3}{-2} = \frac{3}{2}$ $y = -(\frac{3}{2})^2 + 3(\frac{3}{2}) + 7$ $= -\frac{9}{4} + \frac{9}{2} + 7$ </div> </div> <ul style="list-style-type: none"> If 'a' is <u>positive</u>, then the parabola opens <u>up</u>, like a smile 😊 If 'a' is <u>negative</u>, then the parabola opens <u>down</u>, like a frown 😞
AXIS OF SYMMETRY	<p>vertical line that divides the parabola into two congruent halves</p> <p>Formula for the axis of symmetry: $x = -\frac{b}{2a}$</p>
VERTEX	<p>maximum or minimum point in a parabola</p> <ul style="list-style-type: none"> When the vertex is the <u>lowest point</u>, it is called a <u>minimum</u>. When the vertex is the <u>highest point</u>, it is called a <u>maximum</u>.
EXAMPLES	<p>1. $y = x^2 + 8x + 15$</p> <p>Axis of Symmetry: $x = -4$ Vertex: $(-4, -1)$ Sketch:</p> <div style="display: flex; align-items: center;"> <div style="margin-right: 20px;"> $x = \frac{-8}{2(1)} = -\frac{8}{2} = -4$ </div> <div style="margin-right: 20px;"> $y = (-4)^2 + 8(-4) + 15$ $y = 16 + (-32) + 15$ $y = -1$ </div>  </div>

<p>2. $y = -x^2 + 10x - 23$ $y = -(5)^2 + 10(5) - 23$ $y = -25 + 50 - 23$ $y = 2$</p>	<p>Axis of Symmetry: $x = 5$ Vertex: $(5, 2)$ Sketch:</p> <p>$x = \frac{-10}{2(-1)} = \frac{-10}{-2} = 5$</p> 
<p>3. $y = 3x^2 - 12x + 5$ $y = 3(2)^2 - 12(2) + 5$ $y = 12 - 24 + 5$ $y = -7$</p>	<p>Axis of Symmetry: $x = 2$ Vertex: $(2, -7)$ Sketch:</p> <p>$x = \frac{12}{2(3)} = \frac{12}{6} = 2$</p> 
<p>4. $y = 4x^2 + 8x - 1$ $y = 4(-1)^2 + 8(-1) - 1$ $y = 4 - 8 - 1$ $y = -5$</p>	<p>Axis of Symmetry: $x = -1$ Vertex: $(-1, -5)$ Sketch:</p> <p>$x = \frac{-8}{2(4)} = \frac{-8}{8} = -1$</p> 
<p>5. $y = -x^2 - 4x - 2$ $y = -(-2)^2 - 4(-2) - 2$ $y = -4 + 8 - 2$ $y = 2$</p>	<p>Axis of Symmetry: $x = -2$ Vertex: $(-2, 2)$ Sketch:</p> <p>$x = \frac{4}{2(-1)} = \frac{4}{-2} = -2$</p> 
<p>6. $y = 2x^2 - 12x + 9$ $y = 2(3)^2 - 12(3) + 9$ $y = 18 - 36 + 9$ $y = -9$</p>	<p>Axis of Symmetry: $x = 3$ Vertex: $(3, -9)$ Sketch:</p> <p>$x = \frac{12}{2(2)} = \frac{12}{4} = 3$</p> 
<p>7. $y = -3x^2 - 24x - 42$ $y = -3(-4)^2 - 24(-4) - 42$ $y = -48 + 96 - 42$ $y = 6$</p>	<p>Axis of Symmetry: $x = -4$ Vertex: $(-4, 6)$ Sketch:</p> <p>$x = \frac{24}{2(-3)} = \frac{24}{-6} = -4$</p> 
<p>8. $y = -x^2 + 4x$ $y = -(2)^2 + 4(2)$ $y = -4 + 8$ $y = 4$</p>	<p>Axis of Symmetry: $x = 2$ Vertex: $(2, 4)$ Sketch:</p> <p>$x = \frac{4}{2(-1)} = \frac{4}{-2} = -2$</p> 
<p>9. $y = x^2 - 3$ $y = 0^2 - 3$ $y = -3$</p>	<p>Axis of Symmetry: $x = 0$ Vertex: $(0, -3)$ Sketch:</p> <p>$x = \frac{0}{2(1)} = \frac{0}{2} = 0$</p> 
<p>10. $y = -2x^2 + 8$ $y = -2(0)^2 + 8$ $y = 0 + 8$ $y = 8$</p>	<p>Axis of Symmetry: $x = 0$ Vertex: $(0, 8)$ Sketch:</p> <p>$x = \frac{0}{2(-2)} = 0$</p> 