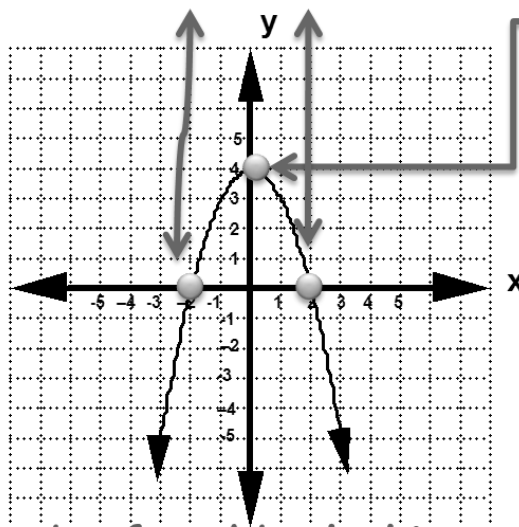# 10.1 Notes-Graphing Quadratics

What is a Quadratic??????

* A quadratic equation is an equation in which the highest power of the variable is a square.
* When graphed, the equation forms a "parabola."
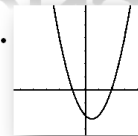* The points at which the parabola crosses the x-axis are called the <u>solutions</u>, or <u>roots</u>.

THE "VERTEX" IS ALSO CALLED
THE MAXIMUM OR MINIMUM (DEPENDING ON THE OPENING OF THE GRAPH)

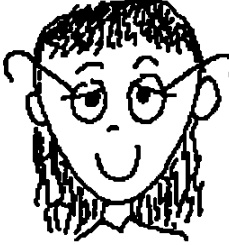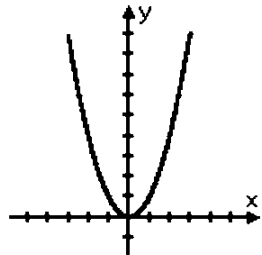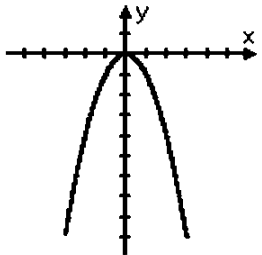* The solutions can be found by looking at the graph.

QUADRATIC FUNCTIONS

The graph of any quadratic function is a parabola. Parabolas have certain common characteristics.

•**Axis of Symmetry**: the line about which the parabola is symmetric; divides a parabola into two mirror images.

•**Vertex**: the point of the parabola where the parabola and axis of symmetry intersect; the highest (or lowest) point of a parabola; the point at which the function has its maximum (or minimum) value.

•The graphs of all parabolas have the same general shape, a U shape.

POSITIVE VS. NEGATIVE PARABOLAS

| positive quadratic $y = x^2$	negative quadratic $y = -x^2$

This can be useful information: If, for instance, you have an equation where *a* is negative, but you're somehow coming up with plot points that make it look like the quadratic is right-side-up, then you will know that you need to go back and check your work, because *something* is wrong.

Section 1:
Identifying the vertex (minimum/maximum), the axis of symmetry, and the roots (zeros):

IDENTIFYING THE VERTEX (MINIMUM/MAXIMUM) AND THE ROOTS (ZEROS):

State the maximum or minimum point (vertex), the axis of symmetry, and the roots (zeros) of the graphs:
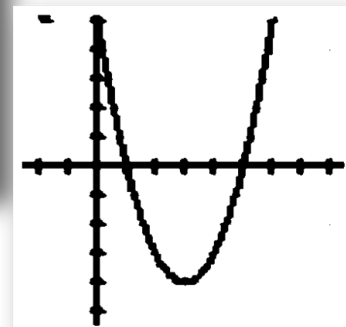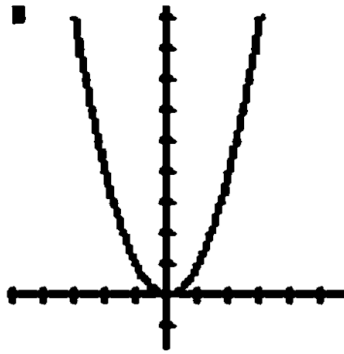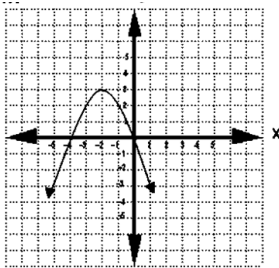
Section 2

Vertex form The form $y = a(x - h)^2 + k$, where the vertex of the graph is (h, k) and the axis of symmetry is $x = h$

Intercept form The form $y = a(x - p)(x - q)$, where the x-intercepts of the graph are p and q
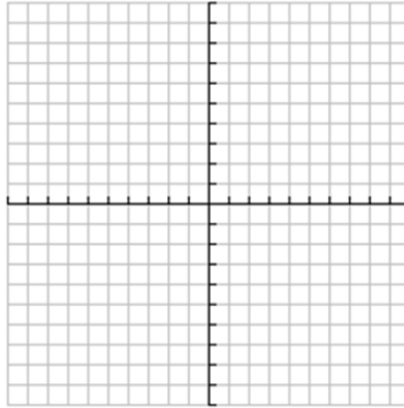
GRAPHING PARABOLAS

Using the graphing function of your calculator, place the quadratic into y= then look at the graph. After gaining an understanding of the function, go to the table and plot ALL the point that will fit on the given graph. Label the <u>vertex</u> and <u>axis of symmetry</u>.
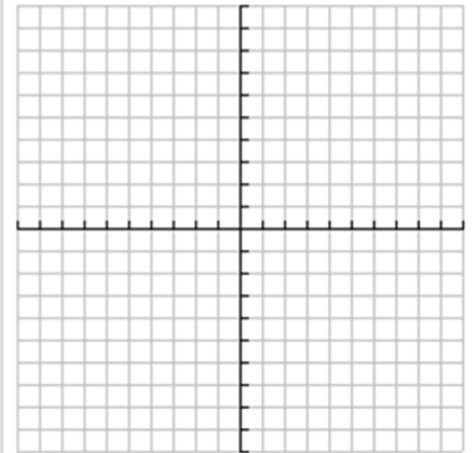
Intercept Form	*Standard Form*	*Vertex Form*
$y = (x - 3)(x + 3)$	$y = x^2 - 2x - 4$	$y = -(x - 2)^2 - 3$

HOMEWORK:WORKSHEET 10.1
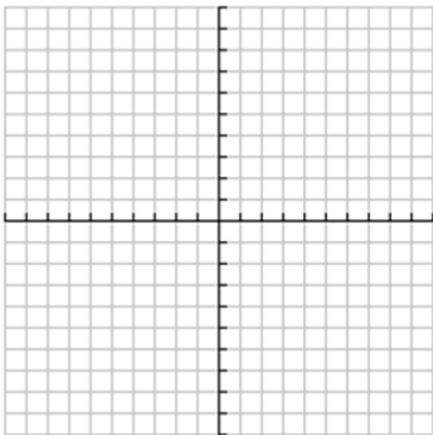
Name_____   Per. _____ Date_____
Algebra 1   10.1 Worksheet   Graphing Quadratics
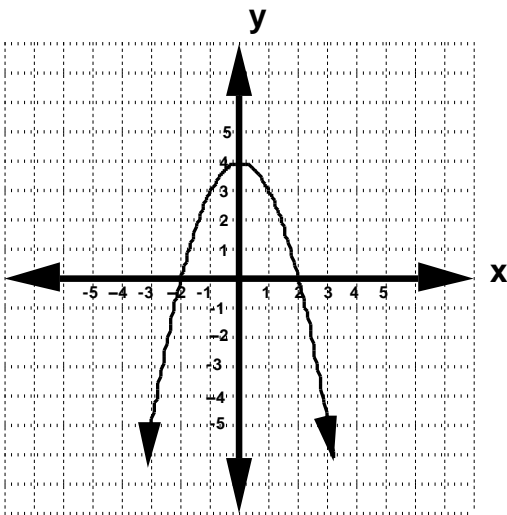   Show all work, when necessary, in the space provided.

For question 1 - 6, identify the **maximum** or **minimum** point, the axis of symmetry, and the roots (zeros) of the graph of the quadratic function shown, as indicated.

Section 1:

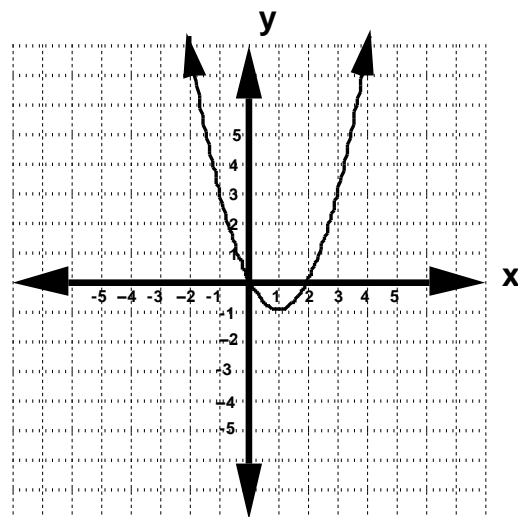1. Maximum point; (____ , ____)
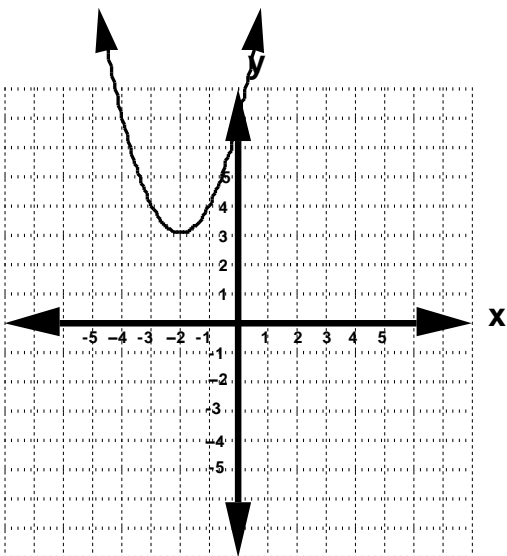   Axis of Symmetry:
    Roots:

3. Minimum point; (____ , ____)
    Axis of Symmetry:
    Roots:

2. Minimum point; (____ , ____)
    Axis of Symmetry:
    Roots:

4. Maximum point; (____ , ____)
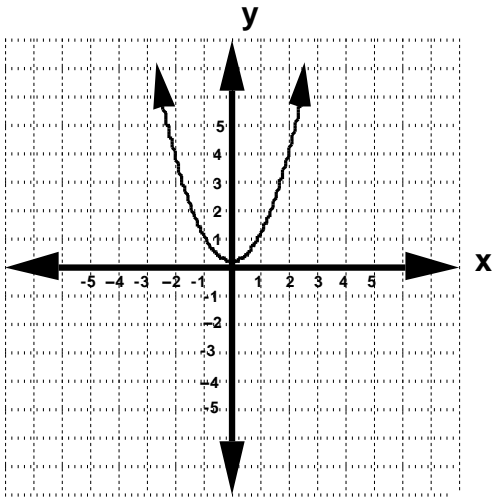   Axis of Symmetry:
    Roots:
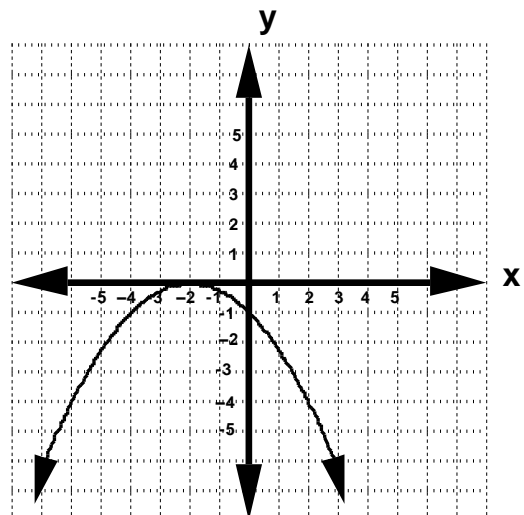
5. Minimum point; (____ , ____)
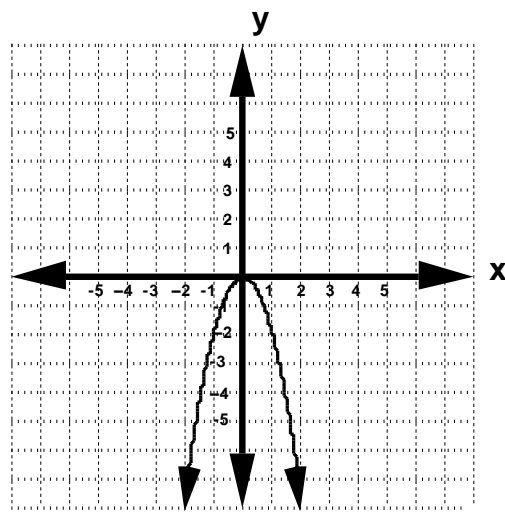   Axis of Symmetry:
   Roots:

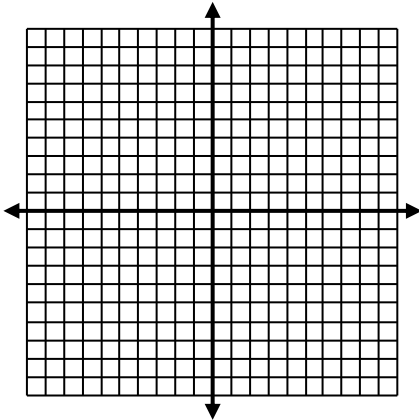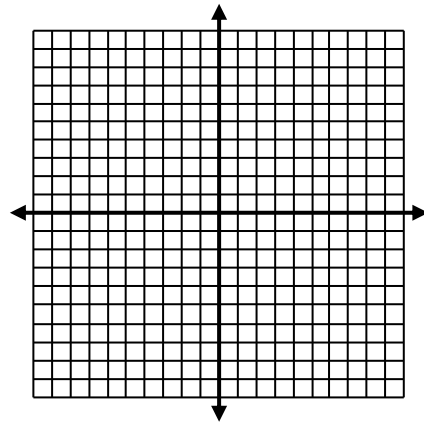6. Maximum point; (____ , ____)
   Axis of Symmetry:
   Roots:

Section 2:

For questions 7 - 16, sketch the graph of the function on the provided graphs. Label the vertex and axis of symmetry.
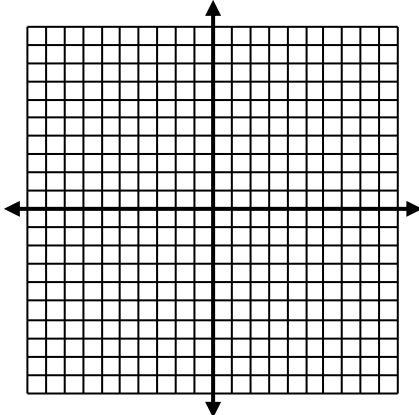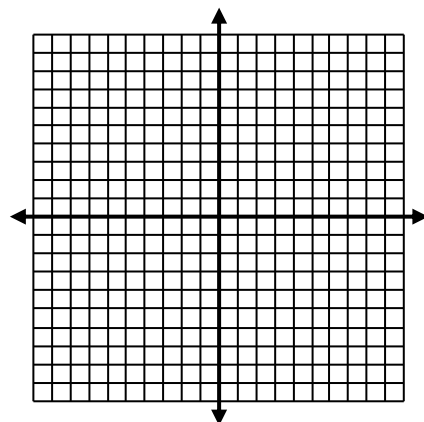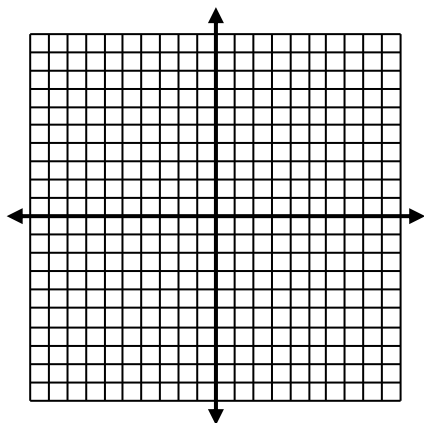
7) $y = x^2 - 2x - 2$

8) $y = (x+2)(x-2)$

9) $y = (x - 3)^2 + 2$
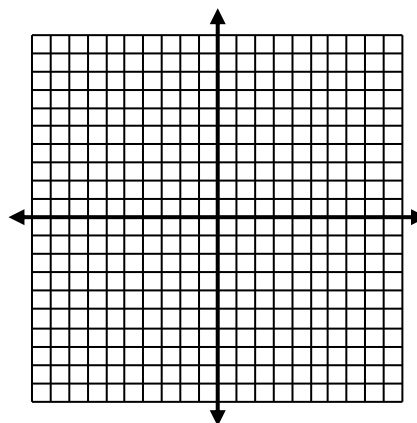

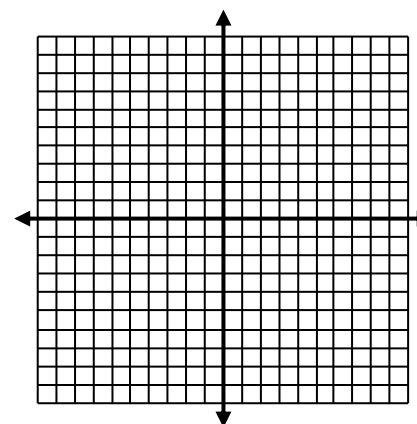10) $y = -x^2 - 4x - 3$

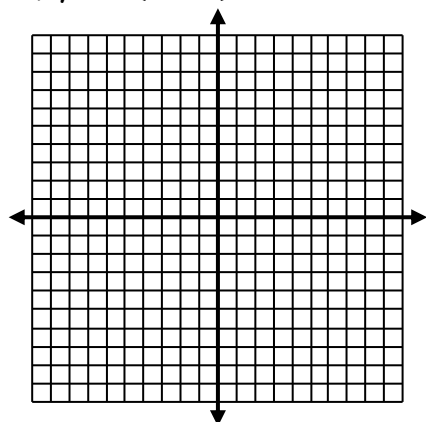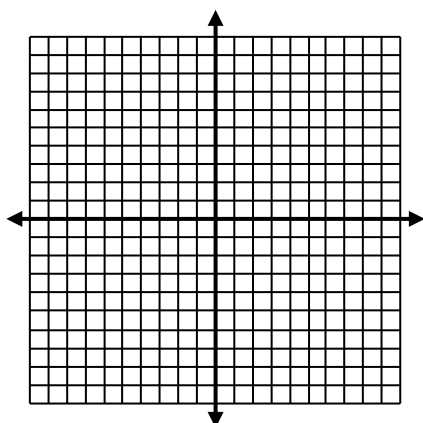11) $y = (x-4)(x-2)$

14) $y= (x-1)(x-3)$

15) $y = -(x-2)^2 - 2$

12) $y = -(x+1)^2 - 3$

16) $y = -x^2 + 4x + 1$

13) $y = x^2 + 4x + 3$