LT 3.1 Study Guide and Intervention Graphing Quadratic Functions using a Table

Graph Quadratic Functions

Quadratic Function	A function defined by an equation of the form $f(x) = ax^2 + bx + c$, where $a \neq 0$
In Standard Form	

Example: Make a table of values that includes the vertex. Use this information to graph the function $f(x) = x^2 - 3x + 5$. Label the vertex, the axis of symmetry, and the y-intercept. Use this information to graph the function.

x	$x^2 - 3x + 5$	f(x)	(x,f(x))
0	$0^2 - 3(0) + 5$	5	(0, 5)
1	$1^2 - 3(1) + 5$	3	(1, 3)
3 2	$\left(\frac{3}{2}\right)^2 - 3\left(\frac{3}{2}\right) + 5$	$\frac{11}{4}$	$\left(\frac{3}{2},\frac{11}{4}\right)$
2	$2^2 - 3(2) + 5$	3	(2, 3)
3	$3^2 - 3(3) + 5$	5	(3, 5)



Exercises

Complete parts a-c for each quadratic function.

a. Make a table of values that includes the vertex.

b. Use this information to graph the function.

c. Label *y*-intercept, the x-intercepts, the axis of symmetry, and the vertex.

$1. f(x) = x^2 + 6x + 8$	$2. f(x) = -x^2 - 2x + 2$	$3. f(x) = 2x^2 - 4x + 3$
Use x from -4 to -2	Use x from -2 to 0	Use x from 0 to 2

4. $f(x) = x^2 + 4x - 7$	$5. f(x) = 3x^2 - 6x + 7$
Use x from 1 to 3	Use x from 0 to 2

LT 3.2 Study Guide and Intervention Graphing Quadratic Functions using the equation of the Axis of Symmetry

Graph Quadratic Functions

Quadratic Function In Standard Form	A function defined by an equation of the form $f(x) = ax^2 + bx + c$, where $a \neq 0$
Graph of a	A parabola with these characteristics: <i>y</i> -intercept: <i>c</i> ; axis of symmetry: $x = \frac{-b}{2a}$;
Quadratic Function	<i>x</i> -coordinate of vertex: $\frac{-b}{2a}$

Example: Find the *y*-intercept, the equation of the axis of symmetry, and the *x* & *y*-coordinate of the vertex for the graph of $f(x) = x^2 - 3x + 5$. Use this information to graph the function.

a = 1, b = -3, and c = 5, so the *y*-intercept is 5. The equation of the axis of symmetry is $x = \frac{-(-3)}{2(1)}$ or $\frac{3}{2}$. The *x*-coordinate of the vertex is $\frac{3}{2}$.

x	$x^2 - 3x + 5$	f(x)	(x,f(x))
0	$0^2 - 3(0) + 5$	5	(0, 5)
1	$1^2 - 3(1) + 5$	3	(1, 3)
3 2	$\left(\frac{3}{2}\right)^2 - 3\left(\frac{3}{2}\right) + 5$	$\frac{11}{4}$	$\left(\frac{3}{2},\frac{11}{4}\right)$
2	$2^2 - 3(2) + 5$	3	(2, 3)
3	$3^2 - 3(3) + 5$	5	(3, 5)





Exercises

Complete parts a-c for each quadratic function.

a. Find the *y*-intercept, the equation of the axis of symmetry, and the *x* & *y*-coordinate of the vertex.

- b. Use this information to graph the function.
- c. Label the vertex, the axis of symmetry, and the y-intercept, including where it occurs (the value)

d. Label the x-intercepts.

1.
$$f(x) = 100 - 2x - x^2$$
 2. $f(x) = -x^2 - 4x + 10$ **3.** $f(x) = x^2 - 10x + 5$

4.
$$f(x) = 20 + 6x - x^2$$

5. $f(x) = -6x^2 + 12x + 21$