EXTRA PRACTICE 47
Graphs of Quadratic Functions
Use after Section 11.6 **Name**_____

Example: Graph $f(x) = x^2 - 2x - 3$.

The y-intercept is found by finding $f(0)$. In $f(x) = x^2 - 2x - 3$, the y-intercept is $(0,-3)$.

The x-intercept(s) are found when $f(x) = 0$. Solve $x^2 - 2x - 3 = 0$ either by factoring or using the quadratic formula.

$$x^2 - 2x - 3 = 0$$
$$(x-3)(x+1) = 0$$
$$x = 3 \text{ or } x = -1$$

The x-intercepts are $(3,0)$ and $(-1,0)$.

The x-coordinate of the vertex is found by using $-\frac{b}{2a}$ from the quadratic equation $f(x) = ax^2 + bx + c$. The second coordinate of the vertex is found by substituting $-\frac{b}{2a}$ for x and computing $f\left(-\frac{b}{2a}\right)$. In $f(x) = x^2 - 2x - 3$, $a = 1$ and $b = -2$.

The x-coordinate of the vertex is $-\frac{b}{2a} = -\frac{(-2)}{2(1)} = \frac{2}{2} = 1$

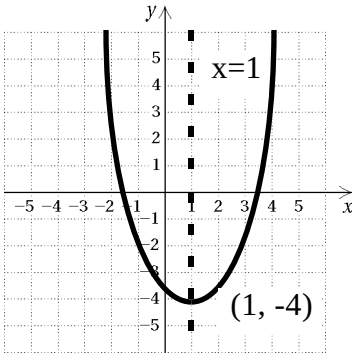
We substitute 1 for x to find the second coordinate of the vertex:

$$f(x) = x^2 - 2x - 3 = (1)^2 - 2(1) - 3 = -4.$$

The vertex is $(1,-4)$. The axis of symmetry is $x = 1$.

We can also look at other points on the parabola and then draw a smooth graph.

x	y $f(x) = x^2 - 2x - 3$	$(x, f(x))$
–2	5	$(-2,5)$
–1	0	$(-1,0)$
0	–3	$(0,-3)$
1	–4	$(1,-4)$
2	–3	$(2,-3)$

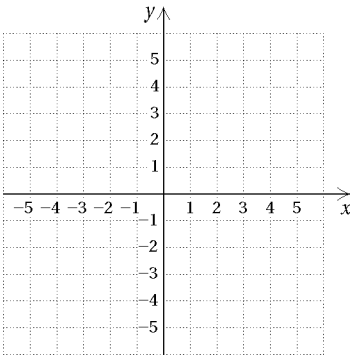


$f(x) = x^2 - 2x - 3$

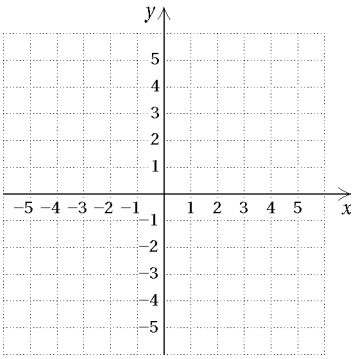
EXTRA PRACTICE 47 (continued)
Graphs of Quadratic Functions
Use after Section 11.6 **Name**_____

Graph the quadratic function. Find the vertex, the line of symmetry, and the maximum or minimum value.

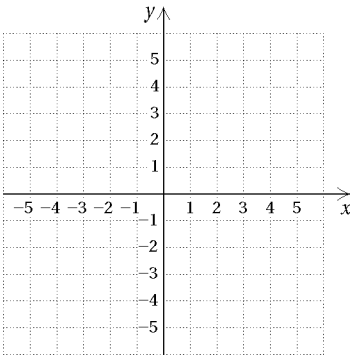
1. $f(x) = 4x^2$



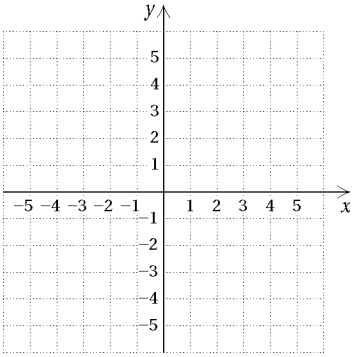
2. $f(x) = x^2 + 3$



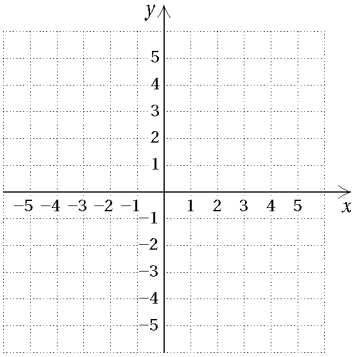
3. $f(x) = -x^2 + 4x$



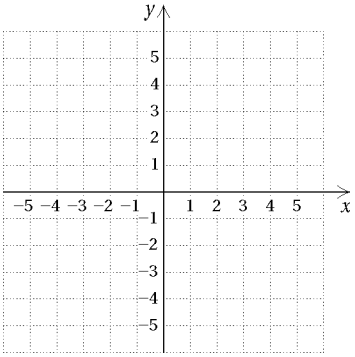
4. $f(x) = x^2 - x - 2$



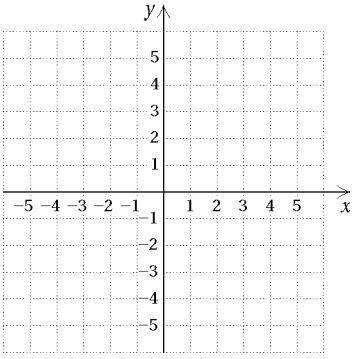
5. $f(x) = x^2 + 4x + 4$



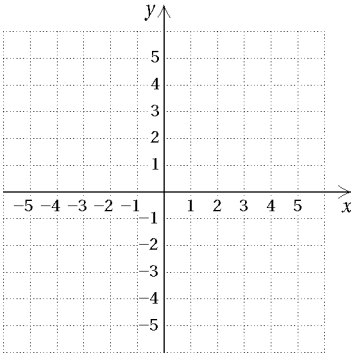
6. $f(x) = -\frac{1}{3}x^2$



7. $f(x) = -x^2 + 2x + 3$



8. $f(x) = 1.5x^2$



9. $f(x) = 4 - x^2$