4.2 Graph Quadratic Functions in Vertex or Intercept Form *pp. 245–251*
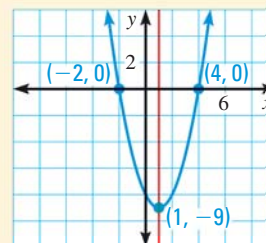
EXAMPLE

Graph $y = (x - 4)(x + 2)$.

Identify the x-intercepts. The quadratic function is in intercept form $y = a(x - p)(x - q)$ where $a = 1$, $p = 4$, and $q = -2$. Plot the x-intercepts at $(4, 0)$ and $(-2, 0)$.

Find the coordinates of the vertex.

$$x = \frac{p + q}{2} = \frac{4 + (-2)}{2} = 1$$
$$y = (1 - 4)(1 + 2) = -9$$

Plot the vertex at $(1, -9)$. Draw a parabola through the plotted points as shown.

EXERCISES

EXAMPLES 1, 3, and 4
on pp. 245–247
for Exs. 8–14

Graph the function. Label the vertex and axis of symmetry.

8. $y = (x - 1)(x + 5)$ **9.** $g(x) = (x + 3)(x - 2)$ **10.** $y = -3(x + 1)(x - 6)$

11. $y = (x - 2)^2 + 3$ **12.** $f(x) = (x + 6)^2 + 8$ **13.** $y = -2(x + 8)^2 - 3$

14. BIOLOGY A flea's jump can be modeled by the function $y = -0.073x(x - 33)$ where x is the horizontal distance (in centimeters) and y is the corresponding height (in centimeters). How far did the flea jump? What was the flea's maximum height?

4.3 Solve $x^2 + bx + c = 0$ by Factoring *pp. 252–258*

EXAMPLE

Solve $x^2 - 13x - 48 = 0$.

Use factoring to solve for x.

$x^2 - 13x - 48 = 0$	**Write original equation.**
$(x - 16)(x + 3) = 0$	**Factor.**
$x - 16 = 0$ or $x + 3 = 0$	**Zero product property**
$x = 16$ or $x = -3$	**Solve for x.**

EXERCISES

EXAMPLE 3
on p. 254
for Exs. 15–21

Solve the equation.

15. $x^2 + 5x = 0$ **16.** $z^2 = 63z$ **17.** $s^2 - 6s - 27 = 0$

18. $k^2 + 12k - 45 = 0$ **19.** $x^2 + 18x = -81$ **20.** $n^2 + 5n = 24$

21. URBAN PLANNING A city wants to double the area of a rectangular playground that is 72 feet by 48 feet by adding the same distance x to the length and the width. Write and solve an equation to find the value of x.