4 CHAPTER REVIEW

4.9 Graph and Solve Quadratic Inequalities

pp. 300–307

EXAMPLE

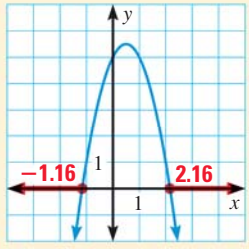
Solve $-2x^2 + 2x + 5 \leq 0$.

The solution consists of the x-values for which the graph of $y = -2x^2 + 2x + 5$ lies on or below the x-axis. Find the graph's x-intercepts by letting $y = 0$ and using the quadratic formula to solve for x.

$$x = \frac{-2 \pm \sqrt{2^2 - 4(-2)(5)}}{2(-2)}$$

$$= \frac{-2 \pm \sqrt{44}}{-4} = \frac{-1 \pm \sqrt{11}}{-2}$$

$x \approx -1.16$ or $x \approx 2.16$



Sketch a parabola that opens down and has -1.16 and 2.16 as x-intercepts. The solution of the inequality is approximately $x \leq -1.16$ or $x \geq 2.16$.

EXERCISES

EXAMPLE 5 on p. 302 for Exs. 42–44

Solve the inequality by graphing.

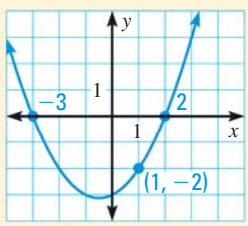
42. $2x^2 - 11x + 5 < 0$ **43.** $-x^2 + 4x + 3 \geq 0$ **44.** $\frac{1}{2}x^2 + 3x - 6 > 0$

4.10 Write Quadratic Functions and Models

pp. 309–315

EXAMPLE

Write a quadratic function for the parabola shown.



Because you are given the x-intercepts $p = -3$ and $q = 2$, use the intercept form $y = a(x - p)(x - q) = a(x + 3)(x - 2)$.

Use the other given point, $(1, -2)$, to find a.

$-2 = a(1 + 3)(1 - 2)$ **Substitute 1 for x and -2 for y.**

$-2 = -4a$ **Simplify coefficient of a.**

$\frac{1}{2} = a$ **Solve for a.**

▸ A quadratic function for the parabola is $y = \frac{1}{2}(x + 3)(x - 2)$.

EXERCISES

EXAMPLES 1 and 2 on p. 309 for Exs. 45–48

Write a quadratic function whose graph has the given characteristics.

45. x-intercepts: -3, 2
passes through: (3, 12)

46. passes through:
(5, 2), (0, 2), (8, -6)

47. vertex: (2, 7)
passes through: (4, 2)

48. SOCCER The parabolic path of a soccer ball that is kicked from the ground passes through the point (0, 0) and has vertex (12, 7) where the coordinates are in feet. Write a quadratic function that models the soccer ball's path.