Got It? **4. a.** What are the solutions of the system? $y = x^2 - 2$, $y = -x$ Use a graphing calculator.

b. Reasoning How else can you solve the system in part (a)? Explain.

Lesson Check

Do you know HOW?

1. Use a graph to solve the system $y = x^2 + x - 2$ and $y = x + 2$.
2. Use elimination to solve the system $y = x^2 - 13x + 52$ and $y = -14x + 94$.
3. Use substitution to solve the system $y = x^2 - 6x + 9$ and $y + x = 5$.
4. Use a graphing calculator to solve the system $y = -x^2 + 4x + 1$ and $y = 2x + 2$.

Do you UNDERSTAND? MATHEMATICAL PRACTICES

5. Use two different methods to solve the system $y = x$ and $y = 2x^2 + 10x + 9$. Which method do you prefer? Explain.
6. **Open-Ended** Write a system of linear and quadratic equations with the given number of solutions.
   a. two **b.** exactly one **c.** none
7. **Compare and Contrast** How are solving systems of linear equations and solving systems of linear and quadratic equations alike? How are they different?

Practice and Problem-Solving Exercises MATHEMATICAL PRACTICES

A Practice

Solve each system by graphing. See Problem 1.

8. $y = x^2 + 1$, $y = x + 1$
9. $y = x^2 + 4$, $y = 4x$
10. $y = x^2 - 5x - 4$, $y = -2x$
11. $y = x^2 + 2x + 1$, $y = x + 1$
12. $y = x^2 + 2x + 5$, $y = -2x + 1$
13. $y = 3x + 4$, $y = -x^2 + 4$

Solve each system using elimination. See Problem 2.

14. $y = -x + 3$, $y = x^2 + 1$
15. $y = x^2$, $y = x + 2$
16. $y = -x - 7$, $y = x^2 - 4x - 5$

17. **Sales** The equations at the right model the numbers y of two portable music players sold x days after both players were introduced. On what day(s) did the company sell the same number of each player? How many players of each type were sold?

Music Player A: $y = 191x - 32$
Music Player B: $y = -x^2 + 200x + 20$

Solve each system using substitution. See Problem 3.

18. $y = x^2 - 2x - 6$, $y = 4x + 10$
19. $y = 3x - 20$, $y = -x^2 + 34$
20. $y = x^2 + 7x + 100$, $y + 10x = 30$
21. $-x^2 - x + 19 = y$, $x = y + 80$
22. $3x - y = -2$, $2x^2 = y$
23. $y = 3x^2 + 21x - 5$, $-10x + y = -1$

Graphing Calculator Solve each system using a graphing calculator. See Problem 4.

24. $y = x^2 - 2x - 2$
$y = -2x + 2$

25. $y = -x^2 + 2$
$y = 4 - 0.5x$

26. $y = x - 5$
$y = x^2 - 6x + 5$

27. $y = -0.5x^2 - 2x + 1$
$y + 3 = -x$

28. $y = 2x^2 - 24x + 76$
$y + 7 = 11$

29. $-x^2 - 8x - 15 = y$
$-x + y = 3$

B Apply

30. The equation $x^2 + y^2 = 25$ defines a circle with center at the origin and radius 5. The line $y = x + 1$ passes through the circle. Using the substitution method, find the point(s) at which the circle and the line intersect.

31. Think About a Plan A company's logo consists of a parabola and a line. The parabola in the logo can be modeled by the function $y = 3x^2 - 4x + 2$. The line intersects the parabola when $x = 0$ and when $x = 2$. What is an equation of the line?

- How can you find the coordinates of the points of intersection?
- Can you write an equation of the line given the points of intersection?

32. Business The daily number of customers y at a coffee shop can be modeled by the function $y = 0.25x^2 - 5x + 80$, where x is the number of days since the beginning of the month. The daily number of customers at a second shop can be modeled by a linear function. Both shops have the same number of customers on days 10 and 20. What function models the number of customers at the second shop?

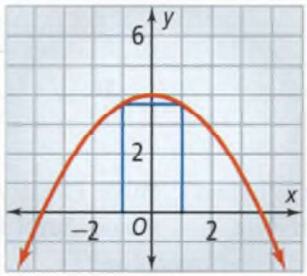
33. Error Analysis A classmate says that the system $y = x^2 + 2x + 4$ and $y = x + 1$ has one solution. Explain the classmate's error.

34. Writing Explain why a system of linear and quadratic equations cannot have an infinite number of solutions.

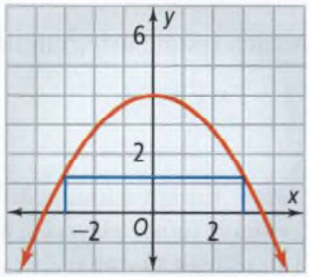
C Challenge

35. Geometry The figures below show rectangles that are centered on the y-axis with bases on the x-axis and upper vertices defined by the function $y = -0.3x^2 + 4$. Find the area of each rectangle.

a.



b.



c. Find the coordinates of the vertices of the square constructed in the same manner. Round to the nearest hundredth.

d. Find the area of the square. Round to the nearest hundredth.

36. What are the solutions of the system $y = x^2 + x + 6$ and $y = 2x^2 - x + 3$? Explain how you solved the system.