Practice

Form G

Completing the Square

Find the value of *c* such that each expression is a perfect-square trinomial.

1. $x^2 + 4x + c$ **4**

2. $b^2 + 12b + c$ **36**

3. $g^2 - 20g + c$ **100**

4. $a^2 - 7a + c$ $\frac{49}{4}$

5. $w^2 + 18w + c$ **81**

6. $n^2 - 9n + c$ $\frac{81}{4}$

Solve each equation by completing the square. If necessary, round to the nearest hundredth.

7. $z^2 - 19z = 66$
  22; −3

8. $p^2 - 5p = -4$
  4; 1

9. $b^2 + 6b = 16$
  −8; 2

10. $c^2 - 4c = 21$
  7; −3

11. $a^2 - 2a = 15$
  5; −3

12. $v^2 + 8v = 15$
  −9.57; 1.57

13. $y^2 + 16y = 17$
  −17; 1

14. $x^2 + 4x + 3 = 0$
  −3; −1

15. $h^2 + 4h = 1$
  −4.24; 0.24

16. $r^2 + 8r + 13 = 0$
  −5.73; −2.27

17. $d^2 - 2d - 4 = 0$
  3.24; −1.24

18. $m^2 - 24m + 44 = 0$
  22; 2

Solve each equation by completing the square. If necessary, round to the nearest hundredth.

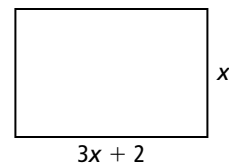**19.** $3y^2 + 5y = 12$
  $\frac{4}{3}$**; −3**

20. $2h^2 - 5h = -1$
  0.22, 2.28

21. $4k^2 + 4k = 5$
  0.72; −1.72

22. $2c^2 + 7c + 3 = 0$
  −3; $-\frac{1}{2}$

23. $3f^2 - 2f = 1$
  1; $-\frac{1}{3}$

24. $9x^2 - 42x + 49 = 0$
  $\frac{7}{3}$

25. The rectangle shown at the right has an area of 56 m^2.
What is the value of *x*?
  4 m

3*x* + 2

Practice (continued)   *Form G*

Completing the Square

26. What are all of the values of c that will make $x^2 + cx + 49$ a perfect square?

14 or −14

27. What are all of the values of c that will make $x^2 + cx + 121$ a perfect square?

22 or −22

Solve each equation. If necessary, round to the nearest hundredth. If there is no solution, write *no solution*.

28. $k^2 - 24k + 4 = -2$ **23.7; 0.25**

29. $4x^2 - 20x + 25 = 0$ $\frac{5}{2}$

30. $2b^2 + 10b + 15 = 3$ **−2; −3**

31. $p^2 + 3p + 2 = -1$ **no solution**

32. $5m^2 + 10m - 80 = 75$ **−6.66; 4.66**

33. $2a^2 - 3a + 4 = 0$ **no solution**

34. $5a^2 - 12a + 28 = 0$ **no solution**

35. $5t^2 - 6t = 35$ **−2.11; 3.31**

36. Writing Discuss the strategies of graphing, factoring, and completing the square for solving the quadratic equation $x^2 + 4x - 6 = 0$.

By graphing, the *x*-intercepts represent the values of *x* that solve the equation. By completing the square, you can algebraically find the solution. The given equation cannot be factored.

37. The height of a triangle is $4x$ inches and the base is $(5x + 1)$ inches. The area of the triangle is 500 square inches. What are the dimensions of the base and height of the triangle?

27.8 in.; 35.85 in.

38. The formula for finding the volume of a rectangular prism is $V = lwh$. The height h of a rectangular prism is 12 centimeters. The prism has a volume of 10,800 cubic centimeters. The prism's length l is modeled by $3x$ centimeters and its width w by $(2x + 1)$ centimeters. What is the value of x? What are the dimensions of the length and the width?

x = 12 ; l = 36 cm; w = 25 cm

39. Writing In order to solve a quadratic equation by completing the square, what does the coefficient of the squared term need to be? If the coefficient is not equal to this, what does your first step need to be to complete the square?

1; divide each term by the coefficient of x^2