Practice

Form G

The Quadratic Formula and the Discriminant

Use the quadratic formula to solve each equation.

1. $7c^2 + 8c + 1 = 0$

$-1; -\frac{1}{7}$

2. $2w^2 - 28w = -98$

7

3. $2j^2 - 3j = -1$

$1; \frac{1}{2}$

4. $2x^2 - 6x + 4 = 0$

$2; 1$

5. $2n^2 - 6n = 8$

$4; -1$

6. $-7d^2 + 2d + 9 = 0$

$-1; \frac{9}{7}$

7. $2a^2 + 4a - 6 = 0$

$-3; 1$

8. $-3p^2 + 17p = 20$

$4; \frac{5}{3}$

9. $4d^2 - 8d + 3 = 0$

$\frac{3}{2}, \frac{1}{2}$

Use the quadratic formula to solve each equation. Round answers to the nearest hundredth.

10. $h^2 - 2h - 2 = 0$

$-0.73; 2.73$

11. $5x^2 + 3x = 1$

$-0.84; 0.24$

12. $-z^2 - 4z = -2$

$0.45; -4.45$

13. $t^2 + 10t = -22$

$-6.73; -3.27$

14. $3n^2 + 10n = 5$

$-3.77; 0.44$

15. $s^2 - 10s + 14 = 0$

$8.32; 1.68$

16. A basketball is passed through the air. The height h of the ball in feet after the distance d in feet the ball travels horizontally is given by $h = -d^2 + 10d + 5$. How far horizontally from the player passing the ball will the ball land on the ground?

about 10.48 ft

Which method(s) would you choose to solve each equation? Justify your reasoning.

17. $h^2 + 4h + 7 = 0$

no solution

18. $a^2 - 4a - 12 = 0$

factoring is easiest

19. $24y^2 - 11y - 14 = 0$

quadratic formula

20. $2p^2 - 7p - 4 = 0$

factor

21. $4x^2 - 144 = 0$

use square roots

22. $f^2 - 2f - 35 = 0$

complete the square

23. Writing Explain how the discriminant can be used to determine the number of solutions a quadratic equation has.

If the discriminant is > 0, there are two real solutions. If the discriminant $= 0$, there is one solution. If the discriminant is < 0, there are no real solutions.

Practice (continued)   *Form G*

The Quadratic Formula and the Discriminant

Find the number of real-number solutions of each equation.

24. $x^2 - 8x + 7 = 0$

two

25. $x^2 - 6x = 0$

two

26. $2x^2 - 5x + 16 = 0$

no real solutions

27. $-3x^2 - 4x - 8 = 0$

no real solutions

28. $7x^2 + 12x - 21 = 0$

two

29. $2x^2 + 4x + 2 = 0$

one

Use any method to solve each equation. If necessary, round answers to the nearest hundredth.

30. $5m^2 - 3m - 15 = 0$

2.06; −1.46

31. $9y^2 + 6y = -12$

no solution

32. $4a^2 = 36$

3; −3

33. $6t^2 - 96 = 0$

4; −4

34. $z^2 + 7z = -10$

−2; −5

35. $-g^2 + 4g + 3 = 0$

4.65; −0.65

Find the value of the discriminant and the number of real-number solutions of each equation.

36. $x^2 + 11x - 10 = 0$

161; two

37. $x^2 + 7x + 8 = 0$

17; two

38. $3x^2 + 5x - 9 = 0$

133; two

39. $-2x^2 + 10x - 1 = 0$

92; two

40. $3x^2 + 6x + 3 = 0$

0; one

41. $6x^2 + x + 12 = 0$

− 287; no real solutions

42. The weekly profit of a company is modeled by the function $w = -g^2 + 120g - 28$. The weekly profit, w, is dependent on the number of gizmos, g, sold. If the break-even point is when $w = 0$, how many gizmos must the company sell each week in order to break even?

120 gizmos

43. Reasoning The equation $4x^2 + bx + 9 = 0$ has no real-number solutions. What must be true about b?

− 12 < b < 12

44. Open-Ended Describe three different methods to solve $x^2 - x - 56 = 0$. Tell which method you prefer. Explain your reasoning.

Factor: (x − 8)(x + 7) = 0 using the zero products property to find that x = 8 or x = − 7; graph and find x –intercepts at x = 8 and x = − 7; use the quadratic formula to find solutions at 8 and − 7; I prefer to factor. It is quickest.