

2 Simplify.

18. $\sqrt{-121}$

20. $\sqrt{-100}$

22. $(-3i)(-7i)(2i)$

24. i^{11}

7 26. $(10 - 7i) + (6 + 9i)$

28. $(12 + 5i) - (9 - 2i)$

30. $(1 + 2i)(1 - 2i)$ $(33) \frac{2i}{(1+i)} \cdot \frac{(1-i)}{(1-i)}$

32. $(4 - i)(6 - 6i)$ $= \frac{2i - 2i^2}{1 - i^2} = \frac{2i + 2}{2}$

34. $\frac{5}{2 + 4i}$ $= \frac{2(i+1)}{2} = i+1$

Solve each equation.

36. $4x^2 + 4 = 0$

38. $2x^2 + 50 = 0$

40. $6x^2 + 108 = 0$

19. $\sqrt{-169} = 13i$

21. $\sqrt{-81}$

23. $4i(-6i)^2 = 4i(36i^2) = 144i^2i$

25. $i^{25} = -144i$

27. $(-3 + i) + (-4 - i)$

29. $(11 - 8i) - (2 - 8i) = 9$

31. $(3 + 5i)(5 - 3i) = 15 - 9i + 25i - 15i^2$

33. $\frac{2i}{1+i} = 30 + 16i$

35. $\frac{(5+i)}{3i} \cdot \frac{i}{i} = \frac{5i + i^2}{3i^2}$
 $= \frac{5i - 1}{-3}$

37. $3x^2 + 48 = 0$ $\frac{2x^2}{2} = \frac{-10}{2}$

39. $2x^2 + 10 = 0$ $\sqrt{x^2} = \sqrt{-5}$

41. $8x^2 + 128 = 0$ $x = \pm 4\sqrt{5}$

Understanding

 = Step-by-Step Solutions begin on page R11.

 Go Online! for Self-Check Qu

Solve each equation by using the Square Root Property. Round to the nearest hundredth if necessary.

1. $x^2 + 12x + 36 = 6$

2. $x^2 - 8x + 16 = 13$

3. $x^2 + 18x + 81 = 15$

4. $9x^2 + 30x + 25 = 11$

5. **LASER LIGHT SHOW** The area A in square feet of a projected laser light show is given by $A = 0.16d^2$, where d is the distance from the laser to the screen in feet. At what distance will the projected laser light show have an area of 100 square feet?

Solve each equation by completing the square.

6. $x^2 + 2x - 8 = 0$

7. $x^2 - 4x + 9 = 0$

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

9. $2x^2 + 6x - 12 = 0$

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

11. $x^2 + 8x + 10 = 0$

Write each function in vertex form. Identify the vertex.

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

13. $y = -5x^2 + 20x - 51$

$$\begin{aligned} x^2 - 4x + 2^2 - 2^2 + 9 &= 0 \\ (x-2)^2 + 5 &= 0 \\ (x-2)^2 &= -5 \\ x-2 &= \pm\sqrt{-5} \\ x &= 2 \pm i\sqrt{5} \end{aligned}$$

Problem Solving

Extra Practice is on page

Solve each equation by using the Square Root Property. Round to the nearest hundredth if necessary.

14. $x^2 + 4x + 4 = 10$

15. $x^2 - 6x + 9 = 20$

16. $x^2 + 8x + 16 = 18$

17. $x^2 + 10x + 25 = 7$

18. $x^2 + 12x + 36 = 5$

19. $x^2 - 2x + 1 = 4$

20. $x^2 - 5x + 6.25 = 4$

21. $x^2 - 15x + 56.25 = 8$

22. $x^2 + 32x + 256 = 1$

23. $x^2 - 3x + \frac{9}{4} = 6$

24. $x^2 + 7x + \frac{49}{4} = 4$

25. $x^2 - 9x + \frac{81}{4} = \frac{1}{4}$

Solve each equation by completing the square.

26. $x^2 - 4x + 12 = 0$

27. $x^2 + 2x - 12 = 0$

28. $x^2 + 6x + 8 = 0$

29. $x^2 - 4x + 3 = 0$

30. $2x^2 + x - 3 = 0$

31. $2x^2 - 3x + 5 = 0$

32. $2x^2 + 5x + 7 = 0$

33. $3x^2 - 6x - 9 = 0$

34. $x^2 - 2x + 3 = 0$

35. $x^2 + 4x + 11 = 0$

36. $x^2 - 6x + 18 = 0$

37. $x^2 - 10x + 29 = 0$

38. $3x^2 - 4x = 2$

39. $2x^2 - 7x = -12$

40. $x^2 - 2.4x = 2.2$

41. $x^2 - 5.3x = -8.6$

42. $x^2 - \frac{1}{5}x - \frac{11}{5} = 0$

43. $x^2 - \frac{9}{2}x - \frac{24}{5} = 0$

$$\begin{aligned} 35) \quad x^2 + 4x + 2^2 - 2^2 + 11 &= 0 \\ (x+2)^2 + 7 &= 0 \\ (x+2)^2 &= -7 \\ x+2 &= \pm\sqrt{-7} \end{aligned}$$

$$\begin{aligned} 31) \quad 2x^2 - 3x + 5 &= 0 \\ 2(x^2 - \frac{3}{2}x + (\frac{3}{4})^2) - (\frac{3}{4})^2 + 5 &= 0 \\ 2(x - \frac{3}{4})^2 - \frac{9}{16} + 5 &= 0 \\ 2(x - \frac{3}{4})^2 + \frac{71}{16} &= 0 \\ 2(x - \frac{3}{4})^2 + \frac{71}{8} &= 0 \end{aligned}$$

$$\begin{aligned} 19) \quad 12x^2 + 9x + 15 &= 0 \\ x &= \frac{-9 \pm \sqrt{81 - 4(12)(15)}}{2(12)} \\ x &= \frac{-9 \pm \sqrt{-639}}{24} \end{aligned}$$

$$\frac{1}{2} \cdot \frac{3}{2} = \frac{3}{4}$$

$$(x+2)^2 = -7$$

$$x+2 = \pm\sqrt{-7}$$

$$x = -2 \pm i\sqrt{7}$$

$$2(x - \frac{3}{4})^2 + \frac{3}{2} + \frac{5}{4} = 0$$

$$2(x - \frac{3}{4})^2 + \frac{9+10}{4} = 0$$

$$2(x - \frac{3}{4})^2 + \frac{19}{4} = 0$$

$$2(x - \frac{3}{4})^2 = -\frac{19}{4} (\frac{1}{2})$$

$$\sqrt{2(x - \frac{3}{4})^2} = \sqrt{-\frac{19}{2}}$$

$$x - \frac{3}{4} = \pm i\sqrt{\frac{19}{2}}$$

$$x = \frac{3}{4} \pm i\sqrt{\frac{19}{2}}$$

$$x = \frac{-9 \pm \sqrt{-639}}{24}$$

$$x = \frac{-9 \pm 3i\sqrt{71}}{24}$$

$$x = \frac{3(-3 \pm i\sqrt{71})}{24}$$

4 Solve each equation by using the Quadratic Formula.

14. $x^2 + 45x = -200$

15. $4x^2 - 6 = -12x$

16. $3x^2 - 4x - 8 = -6$

17. $4x^2 - 9 = -7x - 4$

18. $5x^2 - 9 = 11x$

19. $12x^2 + 9x - 2 = -17$

$$x = \frac{-3 \pm i\sqrt{71}}{8}$$

20. **DIVING** Competitors in the 10-meter platform diving competition jump upward and outward before diving into the pool below. The height h of a diver in meters above the pool after t seconds can be approximated by the equation $h = -4.9t^2 + 3t + 10$.

- Determine a domain and range for which this function makes sense.
- When will the diver hit the water?

Complete parts a–c for each quadratic equation.

a. Find the value of the discriminant.

b. Describe the number and type of roots.

c. Find the exact solutions by using the Quadratic Formula.

21. $2x^2 + 3x - 3 = 0$

22. $4x^2 - 6x + 2 = 0$

23. $6x^2 + 5x - 1 = 0$

24. $6x^2 - x - 5 = 0$

25. $3x^2 - 3x + 8 = 0$

26. $2x^2 + 4x + 7 = 0$

27. $-5x^2 + 4x + 1 = 0$

28. $x^2 - 6x = -9$

29. $-3x^2 - 7x + 2 = 6$

30. $-8x^2 + 5 = -4x$

31. $x^2 + 2x - 4 = -9$

32. $-6x^2 + 5 = -4x + 8$

25) $x = \frac{3 \pm \sqrt{9 - 4(3)(8)}}{2(3)}$

$$x = \frac{3 \pm \sqrt{-87}}{6}$$

$$x = \frac{3 \pm i\sqrt{87}}{6}$$