# Intermediate Algebra
# Chapter 10 Review

Simplify each of the following. Be sure to use absolute values when appropriate.

1. $3\sqrt{49}$

2. $\sqrt{9+16}$

3. $\sqrt[3]{-27}$

4. $6\sqrt[4]{16x^4}$

5. $\sqrt{(2x-1)^2}$

6. $\sqrt[3]{(4x+2)^3}$

For problems #7-9, use the function $f(x) = \sqrt{9-4x}$.

7. Find the domain of f(x).
8. Find f(2).
9. If f(x)=3, find x.

Convert each radical to a rational exponent, and then use the rules of exponents to simplify. Write your final answer in radical form. Assume that all variables represent positive numbers.

10. $\dfrac{\sqrt[4]{x}}{\sqrt[5]{x^2}}$

11. $\sqrt[5]{\sqrt[3]{2x}}$

Simplify the given radicals. Assume all variables represent positive numbers.

12. $\sqrt{75x^3y^4}$

13. $\sqrt[5]{32x^{11}y^9}$

Perform the indicated operations, and then simplify. Assume all variables represent positive quantities.

14. $\sqrt{5xy} \cdot \sqrt{10xy^2}$

15. $\sqrt[3]{6x^7y} \cdot \sqrt[3]{9x^4y^{12}}$

16. $3\sqrt{32x} - 2\sqrt{18x}$

17. $\sqrt[3]{\dfrac{50x^8}{27y^{12}}}$

18. $\sqrt{5}\left(2x + \sqrt{7}\right)$

19. $\left(6 - \sqrt{11}\right)\left(4 + \sqrt{2}\right)$

Rationalize each denominator. Assume all variables represent positive quantities.

20. $\dfrac{7\sqrt{2x}}{\sqrt{y}}$

21. $\dfrac{2}{\sqrt{x} - 3}$

22. $\dfrac{3 + \sqrt{x}}{4 - \sqrt{x}}$

23. $\dfrac{2x}{\sqrt[3]{3x}}$

24. $\dfrac{5x^2}{\sqrt[4]{3x^2y^3}}$

Solve each radical equation.

25. $\sqrt{2x-3}=7$

26. $x=\sqrt{3x+7}-3$

27. $\sqrt{x-8}=\sqrt{x}-2$

28. $\sqrt[3]{4x-5}=5$

29. $\sqrt{2x+3}+\sqrt{x+1}=1$

Express each of the following in terms of i, and simplify if possible.

30. $\sqrt{-64}$

31. $4\sqrt{-75}$

32. $\sqrt{-64}\cdot\sqrt{-9}$

Perform the indicated operations, and simplify.

33. $(7-2i)(6+5i)$

34. $(7-2i)+(6+5i)$

35. $(7-2i)-(6+5i)$

36. $\dfrac{11}{1-3i}$

37. $\dfrac{6-4i}{5+2i}$

38. $i^{53}$

39. $i^{58}$

**In each of the following problems, use your calculator. Express all answers as decimals rounded to the nearest tenth.**

40. $\sqrt{132}$

41. $4\sqrt{43}$

42. $\sqrt[3]{31}$

43. $\sqrt{11} + \sqrt[5]{5}$

44. $-10^{\frac{2}{3}}$

45. $18^{\frac{1}{5}}$

46. $(-17)^{\frac{2}{3}}$

Follow the given directions for each problem below.

47. Graph the given square root function, $f(x) = \sqrt{x-1}$. Construct a t-chart that has at least five ordered pairs.

48. If $f(x) = \sqrt{x-1}$, find f(4). Round to the nearest tenth.

49. If $f(x) = \sqrt{x-1}$ and f(x) = 7, find x.

50. Police use the function $f(x) = \sqrt{20x}$ to estimate the speed of a car, f(x), in miles per hour, based on the length, x, in feet, of its skid marks upon sudden braking on a dry asphalt road.
    a. A car's skid marks are measured to be 255 feet long. Estimate the speed that the car was traveling.
    b. At a speed of 60 miles per hour, about how far will a car skid before stopping upon sudden braking?

51. The function $T(x) = \sqrt{\dfrac{x}{16}}$ models the time, $T(x)$, in seconds, that it takes and object to fall $x$ feet.
    a. How long will it take a ball dropped from the top of 250-foot building to kit the ground?
    b. If an object falls for 3 seconds, from what height was it dropped?

**Answers to Chapter 10 Review**

| | |
|---|---|
| 1. 21 | 25. $\{26\}$ |
| 2. 5 | 26. $\{-2,-1\}$ |
| 3. $-3$ | 27. $\{9\}$ |
| 4. $12\cdot|x|$ | 28. $\{32.5\}$ |
| 5. $|2x-1|$ | 29. $\{-1\}$ |
| 6. $4x+2$ | 30. $8i$ |
| 7. $\left(-\infty,\frac{9}{4}\right]=\{x\,|\,x\le 9/4\}$ | 31. $20i\sqrt{3}$ |
| 8. $f(2)=1$ | 32. $-24$ |
| 9. $\{0\}$ | 33. $52+23i$ |
| 10. $\dfrac{1}{\sqrt[20]{x^3}}$ | 34. $13+3i$ <br> 35. $1-7i$ |
| 11. $(2x)^{\frac{1}{15}}=\sqrt[15]{2x}$ | 36. $\dfrac{11+33i}{10}$ or $\frac{11}{10}+\frac{33}{10}i$ |
| 12. $5xy^2\sqrt{3x}$ | 37. $(22-32i)/29$ or $\frac{22}{29}-\frac{32}{29}i$ |
| 13. $2x^2y\sqrt[5]{xy^4}$ | 38. $i$ |
| 14. $5xy\sqrt{2y}$ | 39. $-1$ |
| 15. $3x^3y^4\sqrt[3]{2x^2y}$ | 40. 11.5 |
| 16. $6\sqrt{2x}$ | 41. 26.2 |
| 17. $\dfrac{x^2\sqrt[3]{50x^2}}{3y^4}$ | 42. 3.1 <br> 43. 4.7 |
| 18. $2x\sqrt{5}+\sqrt{35}$ | 44. $-4.6$ |
| 19. $24-4\sqrt{11}+6\sqrt{2}-\sqrt{22}$ | 45. 1.8 |
| 20. $\dfrac{7\sqrt{2xy}}{y}$ | 46. 6.6 <br> 47. see graph and t-chart |
| 21. $\dfrac{2\sqrt{x}+6}{x-9}$ | 48. $f(4)\approx 1.7$ <br> 49. $\{50\}$ |
| 22. $\dfrac{12+7\sqrt{x}+x}{16-x}$ | 50a. 71.4 mph <br> 50b. 180 feet |
| 23. $\dfrac{2\sqrt[3]{9x^2}}{3}$ | 51a. 4.0 sec <br> 51b. 144 feet |
| 24. $\dfrac{5x\sqrt[4]{27x^2y}}{3y}$ | |

47.

$$y = \sqrt{x - 1}$$