

Chapter 6

Lesson 6-1

Simplify each radical expression.

1. $\sqrt{36x^4}$

2. $\sqrt{c^{80}d^{50}}$

3. $\sqrt[4]{81x^{12}}$

4. $\sqrt[3]{-64}$

5. $\sqrt[5]{-32k^5}$

6. $\sqrt[4]{\frac{1}{16}w^{12}}$

7. $\sqrt[4]{m^{18}n^8}$

8. $\sqrt[3]{27y^{15}}$

9. $\sqrt[5]{-243r^{20}}$

10. You can use the expression $D = 1.2 \sqrt{h}$ to approximate the visibility range D , in miles, from a height of h feet above ground.

a. Estimate the visibility from a height of 900 feet.

b. How far above ground is an observer whose visibility range is 84 miles?

11. You can approximate the speed of a falling object as $v = 8\sqrt{d}$, where v is the speed in feet per second and d is the distance, in feet, the object has fallen. Express d in terms of v .

Lesson 6-2

Multiply or divide and simplify. Assume that all variables are positive.

12. $\sqrt{3x^4} \cdot \sqrt{24x^3}$

13. $\sqrt[3]{4} \cdot \sqrt[3]{18}$

14. $\sqrt{5a^3} \cdot \sqrt{20a}$

15. $\frac{\sqrt{80}}{\sqrt{5}}$

16. $\frac{\sqrt{18x^5y}}{\sqrt{2x}}$

17. $\frac{\sqrt[3]{640w^3z^8}}{\sqrt[3]{5wz^4}}$

18. The time T it takes a pendulum to make a full swing in each direction and return to its original position is called the period of the pendulum. The equation $T = 2\pi\sqrt{\frac{\ell}{32}}$ relates the length of the pendulum ℓ , in feet, to its period T , in seconds. How long is a pendulum if its period is 3 seconds? Round the answer to the nearest tenth.

Lesson 6-3

Simplify.

19. $2\sqrt{7} + 3\sqrt{7}$

20. $\sqrt{32} + \sqrt{8}$

21. $\sqrt{7x} + \sqrt{28x}$

22. $3\sqrt{18} + 2\sqrt{72}$

23. $\sqrt{27} + \sqrt{48}$

24. $8\sqrt{45} - 3\sqrt{80}$

25. $(2 + \sqrt{5})(3 + \sqrt{5})$

26. $(6 - \sqrt{7})(1 - \sqrt{7})$

27. $(\sqrt{10} + 3)^2$

28. $(3\sqrt{5} - 2)(3\sqrt{5} + 2)$

29. $\frac{5}{2 - \sqrt{3}}$

30. $\frac{4 - 3\sqrt{7}}{1 + 2\sqrt{7}}$

Lesson 6-4

Write each expression in simplest form. Assume that all variables are positive.

31. $81^{\frac{1}{2}}$

32. $36^{\frac{1}{4}} \cdot 36^{\frac{1}{4}}$

33. $\left(x^{\frac{4}{3}}y^{\frac{3}{5}}\right)^{15}$

34. $\left(x^{\frac{1}{4}}y^{\frac{3}{8}}\right)^{16}$

35. $(8x^{15}y - 9)^{\frac{1}{3}}$

36. $(-27x^{-9}y^6)^{\frac{1}{3}}$

37. $(-32x^{-10}y^{15})^{\frac{1}{5}}$

38. $(32x^{20}y^{-10})^{\frac{1}{5}}$

39. $\left(\frac{81y^{16}}{16x^{12}}\right)^{\frac{1}{4}}$

40. $\left(\frac{16x^{14}}{81y^{18}}\right)^{\frac{1}{2}}$

41. $\sqrt{5} \cdot \sqrt[3]{5}$

42. $\frac{\sqrt[6]{x^2}}{\sqrt[3]{x^5}}$