

6-4

Practice

Form G

Rational Exponents

Simplify each expression.

1. $125^{\frac{1}{3}}$

2. $64^{\frac{1}{2}}$

3. $32^{\frac{1}{5}}$

4. $7^{\frac{1}{2}} \cdot 7^{\frac{1}{2}}$

5. $(-5)^{\frac{1}{3}} \cdot (-5)^{\frac{1}{3}} \cdot (-5)^{\frac{1}{3}}$

6. $3^{\frac{1}{2}} \cdot 75^{\frac{1}{2}}$

7. $11^{\frac{1}{3}} \cdot 11^{\frac{1}{3}} \cdot 11^{\frac{1}{3}}$

8. $7^{\frac{1}{2}} \cdot 28^{\frac{1}{2}}$

9. $8^{\frac{1}{4}} \cdot 32^{\frac{1}{4}}$

10. $12^{\frac{1}{2}} \cdot 27^{\frac{1}{2}}$

11. $12^{\frac{1}{3}} \cdot 45^{\frac{1}{3}} \cdot 50^{\frac{1}{3}}$

12. $18^{\frac{1}{2}} \cdot 98^{\frac{1}{2}}$

Write each expression in radical form.

13. $x^{\frac{4}{3}}$

14. $(2y)^{\frac{1}{3}}$

15. $a^{1.5}$

16. $b^{\frac{1}{5}}$

17. $z^{\frac{2}{3}}$

18. $(ab)^{\frac{1}{4}}$

19. $m^{2.4}$

20. $t^{-\frac{2}{7}}$

21. $a^{-1.6}$

Write each expression in exponential form.

22. $\sqrt{x^3}$

23. $\sqrt[3]{m}$

24. $\sqrt{5y}$

25. $\sqrt[3]{2y^2}$

26. $(\sqrt[4]{b})^3$

27. $\sqrt{-6}$

28. $\sqrt{(6a)^4}$

29. $\sqrt[5]{n^4}$

30. $\sqrt[4]{(5ab)^3}$

31. The rate of inflation i that raises the cost of an item from the present value P to the future value F over t years is found using the formula $i = \left(\frac{F}{P}\right)^{\frac{1}{t}} - 1$. Round your answers to the nearest tenth of a percent.

- What is the rate of inflation for which a television set costing \$1000 today will become one costing \$1500 in 3 years?
- What is the rate of inflation that will result in the price P doubling (that is, $F = 2P$) in 10 years?

6-4

Practice (continued)

Form G

Rational Exponents

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

32. $(81^{\frac{1}{4}})^4$

33. $(32^{\frac{1}{5}})^5$

34. $(256^4)^{\frac{1}{4}}$

35. 7^0

36. $8^{\frac{2}{3}}$

37. $(-27)^{\frac{2}{3}}$

38. $x^{\frac{1}{2}} \cdot x^{\frac{1}{3}}$

39. $2y^{\frac{1}{2}} \cdot y$

40. $(8^2)^{\frac{1}{3}}$

41. 3.6^0

42. $(\frac{1}{16})^{\frac{1}{4}}$

43. $(\frac{27}{8})^{\frac{2}{3}}$

44. $\sqrt[8]{0}$

45. $(3x^{\frac{1}{2}})(4x^{\frac{2}{3}})$

46. $\frac{12y^{\frac{1}{3}}}{4y^{\frac{1}{2}}}$

47. $(3a^{\frac{1}{2}}b^{\frac{1}{3}})^2$

48. $(y^{\frac{2}{3}})^{-9}$

49. $(a^{\frac{2}{3}}b^{-\frac{1}{2}})^{-6}$

50. $y^{\frac{2}{5}} \cdot y^{\frac{3}{8}}$

51. $(\frac{x^7}{x^3})^{\frac{4}{2}}$

52. $(2a^4)^3$

53. $81^{-\frac{1}{2}}$

54. $(2x^{\frac{2}{5}})(6x^{\frac{1}{4}})$

55. $(9x^4y^{-2})^{\frac{1}{2}}$

56. $(\frac{27x^6}{64y^4})^{\frac{1}{3}}$

57. $\frac{x^{\frac{1}{2}}y^{\frac{2}{3}}}{x^{\frac{1}{3}}y^{\frac{1}{2}}}$

58. $y^{\frac{5}{8}} \div y^{\frac{1}{2}}$

59. $x^{\frac{1}{4}} \cdot x^{\frac{1}{6}} \cdot x^{\frac{1}{3}}$

60. $(\frac{x^{-\frac{1}{3}}y}{x^{\frac{2}{3}}y^{-\frac{1}{2}}})^2$

61. $(\frac{12x^8}{75y^{10}})^{\frac{1}{2}}$

62. In a test kitchen, researchers have measured the radius of a ball of dough made with a new quick-acting yeast. Based on their data, the radius r of the dough ball, in centimeters, is given by $r = 5(1.05)^{\frac{t}{3}}$ after t minutes. Round the answers to the following questions to the nearest tenth of a cm.

- What is the radius after 5 minutes?
- What is the radius after 20 minutes?
- What is the radius after 43 minutes?