7-5 Exercises

Extra Help On the Web

Look for worked-out examples at the Prentice Hall Web site.
www.phschool.com

A

Simplify as shown. Then use Theorem 7-6 to simplify another way.

1. $\sqrt{(6a)^3}$ 2. $\sqrt{(7y)^3}$ 3. $(\sqrt[3]{16b^2})^2$ 4. $(\sqrt[3]{25r^2})^2$
5. $\sqrt{(18a^2b)^3}$ 6. $\sqrt{(12x^2y)^3}$ 7. $(\sqrt[3]{12c^2d})^2$ 8. $(\sqrt[3]{9x^2y})^2$

Write without rational exponents.

9. $x^{\frac{1}{4}}$ 10. $y^{\frac{1}{5}}$ 11. $(8)^{\frac{1}{3}}$ 12. $(16)^{\frac{1}{2}}$ 13. $(a^2b^2)^{\frac{1}{5}}$
14. $(x^3y^3)^{\frac{1}{4}}$ 15. $a^{\frac{2}{3}}$ 16. $b^{\frac{3}{2}}$ 17. $16^{\frac{3}{4}}$ 18. $4^{\frac{7}{2}}$
19. $(a^5t^3)^{\frac{1}{2}}$ 20. $m^{\frac{5}{6}}$ 21. $y^{\frac{7}{2}}$ 22. $32^{\frac{3}{5}}$ 23. $(m^3n^5)^{\frac{1}{4}}$

Write with rational exponents.

24. $\sqrt[3]{20}$ 25. $\sqrt[3]{19}$ 26. $\sqrt{17}$ 27. $\sqrt{6}$
28. $\sqrt[4]{cd}$ 29. $\sqrt[5]{xy}$ 30. $\sqrt[5]{xy^2z}$ 31. $\sqrt[7]{x^3y^2z^2}$
32. $(\sqrt{3mn})^3$ 33. $(\sqrt[3]{7xy})^4$ 34. $(\sqrt[7]{8x^2y})^5$ 35. $(\sqrt[6]{2a^5b})^7$
36. $(\sqrt[4]{16xy})^5$ 37. $(\sqrt[6]{12ab})^3$ 38. $(\sqrt[8]{2x^4y^6})^3$ 39. $(\sqrt[7]{3a^4b^3})^4$

Write with positive exponents.

40. $x^{-\frac{1}{3}}$ 41. $y^{-\frac{1}{4}}$ 42. $(2rs)^{-\frac{3}{4}}$ 43. $(5xy)^{-\frac{5}{6}}$
44. $\left(\frac{1}{10}\right)^{-\frac{2}{3}}$ 45. $\left(\frac{1}{8}\right)^{-\frac{3}{4}}$ 46. $\frac{1}{x^{-\frac{2}{3}}}$ 47. $\frac{1}{x^{-\frac{5}{6}}}$

Use the properties of exponents to simplify.

48. $5^{\frac{3}{2}} \cdot 5^{\frac{1}{8}}$ 49. $11^{\frac{2}{3}} \cdot 11^{\frac{1}{2}}$ 50. $\frac{7^{\frac{5}{8}}}{7^{\frac{3}{8}}}$ 51. $\frac{9^{\frac{9}{11}}}{9^{\frac{7}{11}}}$
52. $\frac{8.3^{\frac{3}{4}}}{8.3^{\frac{2}{5}}}$ 53. $\frac{3.9^{\frac{3}{5}}}{3.9^{\frac{1}{4}}}$ 54. $(10^{\frac{3}{5}})^{\frac{2}{5}}$ 55. $(5^{\frac{5}{4}})^{\frac{3}{7}}$

Write an exponential expression. Then simplify, if possible. Write radical notation for the answer, if appropriate.

56. $\sqrt[6]{a^4}$ 57. $\sqrt[6]{y^2}$ 58. $\sqrt[3]{8y^6}$ 59. $\sqrt{x^4y^6}$
60. $\sqrt[5]{32c^{10}d^{15}}$ 61. $\sqrt[4]{16x^{12}y^{16}}$ 62. $\sqrt[6]{\frac{m^{12}n^{24}}{64}}$ 63. $\sqrt[5]{\frac{x^{15}y^{20}}{32}}$

Write as a single radical expression.

64. $\sqrt{x}\sqrt[3]{x-2}$ 65. $\sqrt[4]{3x}\sqrt{y+4}$ 66. $\frac{\sqrt[3]{(a+b)^2}}{\sqrt{(a+b)}}$ 67. $\frac{\sqrt[3]{(x+y)^2}}{\sqrt[4]{(x+y)^3}}$
68. $a^{\frac{2}{3}} \cdot b^{\frac{3}{4}}$ 69. $x^{\frac{1}{3}} \cdot y^{\frac{1}{4}} \cdot z^{\frac{1}{6}}$ 70. $\frac{s^{\frac{7}{12}} \cdot t^{\frac{5}{6}}}{s^{\frac{1}{3}} \cdot t^{-\frac{1}{6}}}$ 71. $\frac{x^{\frac{8}{15}} \cdot y^{\frac{4}{5}}}{x^{\frac{1}{3}} \cdot y^{-\frac{1}{5}}}$

7-6 Exercises

Extra Help On the Web

Look for worked-out examples at the Prentice Hall Web site.
www.phschool.com

A

Solve.

1. $\sqrt{2x - 3} = 1$
2. $\sqrt{x + 3} = 6$
3. $\sqrt{y + 1} - 5 = 8$
4. $\sqrt{x - 2} - 7 = -4$
5. $\sqrt[3]{x + 5} = 2$
6. $\sqrt[3]{x - 2} = 3$
7. $\sqrt[4]{y - 3} = 2$
8. $\sqrt[4]{x + 3} = 3$
9. $\sqrt{3y + 1} = 9$
10. $\sqrt{2y + 1} = 13$
11. $3\sqrt{x} = 6$
12. $8\sqrt{y} = 2$
13. $\sqrt[3]{x} = -3$
14. $\sqrt[3]{y} = -4$
15. $\sqrt{y + 3} - 20 = 0$
16. $\sqrt{x + 4} - 11 = 0$
17. $\sqrt{x + 2} = -4$
18. $\sqrt{y - 3} = -2$
19. $8 = \frac{1}{\sqrt{x}}$
20. $3 = \frac{1}{\sqrt{y}}$
21. $\sqrt[3]{6x + 9} + 8 = 5$
22. $\sqrt[3]{3y + 6} + 2 = 3$
23. $\sqrt{3y + 1} = \sqrt{2y + 6}$
24. $\sqrt{5x - 3} = \sqrt{2x + 3}$

LESSON 7-5

Try This a. $\sqrt[3]{8^2} = 4$ $(\sqrt[3]{8})^2 = 4$ b. $(\sqrt{6y})^3 = 6|y|\sqrt{6y}$ $\sqrt{(6y)^3} = 6|y|\sqrt{6y}$ c. $\sqrt[4]{y}$ d. $\sqrt{3a}$ e. $\sqrt[4]{16}$, or 2

f. $(a^3b^2c)^{\frac{1}{2}}$ g. $\left(\frac{x^2y}{16}\right)^{\frac{1}{3}}$ h. $|x|\sqrt{x}$ i. 4 j. $(7abc)^{\frac{4}{3}}$ k. $6^{\frac{7}{5}}$

l. $(x^2y^3)^{\frac{1}{4}}$, or $x^{\frac{1}{2}}y^{\frac{3}{4}}$ m. $\frac{1}{5^{\frac{1}{4}}}$ n. $\frac{1}{(3xy)^{\frac{7}{8}}}$ o. $7^{\frac{14}{15}}$ p. $5^{\frac{1}{3}}$ q. $9^{\frac{3}{5}}$

r. $\sqrt{a}$ s. x t. $\sqrt{2}$ u. xy^3 v. $\sqrt[4]{xy^2}$ w. $\sqrt[4]{63}$ x. $\sqrt[4]{a}\ b$

y. $\sqrt[6]{x^4y^3z^5}$ z. $\sqrt[4]{ab}$

Exercises 1. $6a\sqrt{6a}$ 3. $4b\sqrt[3]{4b}$ 5. $54a^3b\sqrt{2b}$ 7. $2c\sqrt[3]{18cd^2}$ 9. $\sqrt[4]{x}$ 11. 2 13. $\sqrt[5]{a^2b^2}$ 15. $\sqrt[3]{a^2}$ 17. 8 19. $\sqrt{a^5t^3}$ 21. $\sqrt{y^7}$ 23. $\sqrt[4]{m^3n^5}$ 25. $19^{\frac{1}{3}}$ 27. $6^{\frac{1}{2}}$ 29. $(xy)^{\frac{1}{3}}$ 31. $(x^3y^2z^2)^{\frac{1}{7}}$ 33. $(7xy)^{\frac{4}{3}}$ 35. $(2a^5b)^{\frac{2}{6}}$ 37. $(12ab)^{\frac{1}{2}}$ or $2(3ab)^{\frac{1}{2}}$ 39. $(3a^4b^3)^{\frac{4}{7}}$ 41. $\frac{1}{y^{1/4}}$ 43. $\frac{1}{(5xy)^{5/6}}$ 45. $8^{\frac{3}{4}}$ 47. $x^{\frac{5}{6}}$ 49. $11^{\frac{7}{6}}$ 51. $9^{\frac{4}{11}}$ 53. $3.9^{\frac{2}{20}}$ 55. $5^{\frac{15}{28}}$ 57. $\sqrt[3]{y}$ 59. x^2y^3 61. $2x^3y^4$ 63. $\frac{x^3y^4}{2}$ 65. $\sqrt[4]{3xy^2 + 24xy + 48x}$ 67. $\sqrt[12]{(x+y)^{-1}}$ 69. $\sqrt[12]{x^4y^3z^2}$ 71. $\sqrt[5]{xy^5}$ 73. $\sqrt{(a^2 - b^2)}$ 75. $\sqrt{x^2 - y^2}$ 77. $\frac{\sqrt{a-b}}{(a-b)^2}$ 79. $(x+6)^{\frac{1}{2}}$ 81. Answers may vary. Should include the idea that $a^{\frac{m}{n}} \cdot a^{-\frac{m}{n}} = 1$ 83. 45.9 m

Mixed Review 85. No 87. $4x^3 + 3x^2$

LESSON 7-6

Try This a. 100 b. No solution c. 9 d. 5 e. $h = \frac{1}{\pi r^2}\sqrt{S^2 - \pi^2 r^4}$; $h = 4$

Exercises 1. 2 3. 168 5. 3 7. 19 9. $\frac{80}{3}$ 11. 4 13. -27 15. 397 17. No solution 19. $\frac{1}{64}$ 21. -6 23. 5 25. $-\frac{1}{4}$ 27. 3 29. 9 31. 7 33. $\frac{80}{9}$ 35. -1 37. 6, 2 39. No solution