EXAMPLE 6 on p. 423 for Exs. 43–51

VARIABLE EXPRESSIONS **Simplify the expression. Assume all variables are positive.**

43. $x^{1/4} \cdot x^{1/3}$ **44.** $(y^4)^{1/6}$ **45.** $\sqrt[4]{81x^4}$ **46.** $\dfrac{2}{x^{-3/2}}$

47. $\dfrac{x^{2/5}y}{xy^{-1/3}}$ **48.** $\sqrt[3]{\dfrac{x^{15}}{y^6}}$ **49.** $\left(\sqrt[3]{x^2} \cdot \sqrt[6]{x^4}\right)^{-3}$ **50.** $\dfrac{\sqrt[3]{x} \cdot \sqrt{x^5}}{\sqrt{25x^{16}}}$

51. **OPEN-ENDED MATH** Write two variable expressions with noninteger exponents whose quotient is $x^{3/4}$.

EXAMPLE 7 on p. 423 for Exs. 52–59

SIMPLEST FORM **Write the expression in simplest form. Assume all variables are positive.**

52. $\sqrt{49x^5}$ **53.** $\sqrt[4]{12x^2y^6z^{12}}$ **54.** $\sqrt[3]{4x^3y^5} \cdot \sqrt[3]{12y^2}$ **55.** $\sqrt{x^2yz^3} \cdot \sqrt{x^3z^5}$

56. $\dfrac{-3}{\sqrt[5]{x^6}}$ **57.** $\sqrt[3]{\dfrac{x^3}{y^4}}$ **58.** $\sqrt{\dfrac{20x^3y^2}{9xz^3}}$ **59.** $\dfrac{\sqrt[4]{x^6}}{\sqrt[7]{x^5}}$

EXAMPLE 8 on p. 423 for Exs. 60–65

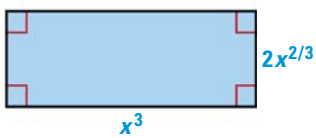
COMBINING VARIABLE EXPRESSIONS **Perform the indicated operation. Assume all variables are positive.**

60. $3\sqrt[5]{x} + 9\sqrt[5]{x}$ **61.** $\dfrac{3}{4}y^{3/2} - \dfrac{1}{4}y^{3/2}$ **62.** $-7\sqrt[3]{y} + 16\sqrt[3]{y}$

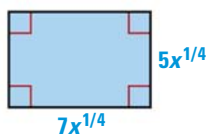
63. $(x^4y)^{1/2} + (xy^{1/4})^2$ **64.** $x\sqrt{9x^3} - 2\sqrt{x^5}$ **65.** $y\sqrt[4]{32x^6} + \sqrt[4]{162x^2y^4}$

GEOMETRY **Find simplified expressions for the perimeter and area of the given figure.**

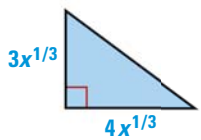
66.



67.



68.



69. **MULTIPLE CHOICE** What is the simplified form of $-\frac{1}{6}\sqrt{4x} - \frac{1}{6}\sqrt{9x}$?

(A) $-\frac{1}{3}\sqrt{x}$ **(B)** $-\frac{1}{3}\sqrt{36x}$ **(C)** $-\frac{5}{6}\sqrt{x}$ **(D)** $-\frac{5}{6}\sqrt{36x}$

DECIMAL EXPONENTS **Simplify the expression. Assume all variables are positive.**

70. $x^{0.5} \cdot x^2$ **71.** $y^{-0.6} \cdot y^{-6}$ **72.** $(x^6y^2)^{-0.75}$ **73.** $\dfrac{x^{0.3}}{x^{1.5}}$

74. $(x^5y^{-3})^{-0.25}$ **75.** $\dfrac{y^{-0.5}}{y^{0.8}}$ **76.** $10x^{0.6} + (4x^{0.3})^2$ **77.** $15z^{0.3} - (2z^{0.1})^3$

IRRATIONAL EXPONENTS **The properties in this lesson can also be applied to irrational exponents. Simplify the expression. Assume all variables are positive.**

78. $\dfrac{x^{5\sqrt{3}}}{x^{2\sqrt{3}}}$ **79.** $(x^{\sqrt{2}})^{\sqrt{3}}$ **80.** $\left(\dfrac{x^{\pi}}{x^{\pi/3}}\right)^2$ **81.** $x^2y^{\sqrt{2}} + 3x^2y^{\sqrt{2}}$

82. **CHALLENGE** Solve the equation using the properties of rational exponents.

a. $\dfrac{3}{9^x} = 243$ **b.** $2^x \cdot 2^{x+1} = \dfrac{1}{16}$ **c.** $(4^x)^{x+2} = 64$