

Name \_\_\_\_\_

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**LESSON**  
**6.3**
**Practice**

For use with pages 428–435

 Let  $f(x) = 7x^{1/2} - 2$ ,  $g(x) = -x^{1/2} + 4$ , and  $h(x) = -4x^{1/2} + 1$ .  
 Perform the indicated operation.

1.  $f(x) + g(x)$   
 $7x^{1/2} - 2 + -x^{1/2} + 4$   
 $6x^{1/2} + 2$

2.  $f(x) + h(x)$   
 $7x^{1/2} - 2 + -4x^{1/2} + 1$   
 $3x^{1/2} - 1$

3.  $h(x) + g(x)$   
 $-4x^{1/2} + 1 + -x^{1/2} + 4$   
 $-5x^{1/2} + 5$

4.  $f(x) - g(x)$   
 $(7x^{1/2} - 2) - (-x^{1/2} + 4)$   
 $8x^{1/2} - 6$

5.  $h(x) - f(x)$   
 $(-4x^{1/2} + 1) - (7x^{1/2} - 2)$   
 $-11x^{1/2} + 3$

6.  $g(x) - h(x)$   
 $(-x^{1/2} + 4) - (-4x^{1/2} + 1)$   
 $3x^{1/2} + 3$

 Let  $f(x) = 4x^2$ ,  $g(x) = -3x^{4/3}$ , and  $h(x) = x^{1/2}$ . Perform the indicated operation.

7.  $f(x) \cdot g(x)$   
 $(4x^2)(-3x^{4/3})$   
 $-12x^{8/3}$

8.  $f(x) \cdot h(x)$   
 $4x^2 \cdot x^{1/2}$   
 $4x$

9.  $h(x) \cdot g(x)$   
 $x^{1/2} \cdot (-3x^{4/3})$   
 $-3x^{4/6} = -3x^{2/3}$

10.  $\frac{f(x)}{g(x)}$   
 $\frac{4x^2}{-3x^{4/3}} = \frac{4x^{2/3}}{-3}$

11.  $\frac{h(x)}{f(x)} = \frac{x^{1/2}}{4x^2} = \frac{1}{4x^{3/2}}$

12.  $\frac{h(x)}{g(x)} = \frac{x^{1/2}}{-3x^{4/3}} = -\frac{1}{3x^{5/6}}$

 Let  $f(x) = 2x + 3$ ,  $g(x) = \frac{3}{x+1}$ , and  $h(x) = \frac{x+5}{2}$ . Perform the indicated operation.

13.  $f(g(x)) = 2\left(\frac{3}{x+1}\right) + 3$   
 $= \frac{6}{x+1} + 3$

14.  $g(h(x)) = \frac{3}{\left(\frac{x+5}{2}\right) + 1} = \frac{3}{\frac{x+7}{2}} = 3 \cdot \frac{2}{x+7} = \frac{6}{x+7}$

15.  $f(h(x)) = 2\left(\frac{x+5}{2}\right) + 3$   
 $= \frac{2x+10}{2} + 3$

16.  $g(f(x)) = \frac{3}{(2x+3)+1} = \frac{3}{2x+4}$

17.  $h(f(x)) = \frac{(2x+3)+5}{2}$   
 $= \frac{2x+8}{2} = x+4$

18.  $g(g(x)) = \frac{3}{\left(\frac{3}{x+1}\right) + 1} = \frac{3}{\frac{3}{x+1} + \frac{x+1}{x+1}} = \frac{3}{\frac{x+4}{x+1}} = 3 \cdot \frac{x+1}{x+4} = \frac{3x+3}{x+4}$

Name Key

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**LESSON 6.2 Practice**  
For use with pages 420-427

Simplify the expression using the properties of radicals and rational exponents.

1.  $7^{1/3} \cdot 7^{4/3}$   
 $7^{5/3}$

2.  $\frac{4^{2/3}}{4^{1/3}} = 4^{1/3}$

3.  $(6^{2/3})^{3/4}$   
 $= 6^{1/2} = 6^{1/2}$

4.  $5^{1/4} \cdot 3^{1/4}$   
 $15^{1/4}$

5.  $\sqrt[4]{2} \cdot \sqrt[4]{8} = \sqrt[4]{16}$   
 $= 2$

6.  $\frac{\sqrt[4]{192}}{\sqrt{6}} = \frac{\sqrt[4]{32}}{\sqrt{6}}$   
 $= \frac{\sqrt[4]{2^5}}{\sqrt{6}} = \frac{\sqrt[4]{2^4 \cdot 2}}{\sqrt{6}} = \frac{2\sqrt[4]{2}}{\sqrt{6}}$

7.  $\frac{11}{\sqrt[4]{11}} = \frac{11}{11^{1/4}}$   
 $= 11^{3/4} = \sqrt[4]{1331}$

8.  $\sqrt[3]{7} \cdot \sqrt[3]{49}$   
 $= \sqrt[3]{343} = 7$

9.  $(3^{3/2})^2$   
 $3^3 = 27$

10.  $\left(\frac{54}{64}\right)^{1/3} = \frac{54^{1/3}}{64^{1/3}} = \frac{(2 \cdot 3^3)^{1/3}}{4}$   
 $= \frac{3 \cdot 2^{1/3}}{4}$

11.  $\frac{\sqrt[4]{32}}{\sqrt{2}} = \frac{\sqrt[4]{16 \cdot 2}}{\sqrt{2}}$   
 $= 2$

12.  $\frac{\sqrt[5]{5}}{\sqrt[3]{27}} = \frac{5^{1/5}}{3^{2/3}}$   
 $= \frac{5^{1/5} \cdot 3^{2/15}}{3^{2/3}} = \frac{5^{1/5} \cdot 3^{2/15}}{3^{10/15}} = \frac{5^{1/5} \cdot 3^{2/15}}{3^2}$   
 $= \frac{5^{1/5} \cdot 3^{2/15}}{9}$

Simplify the expression. Assume all variables are positive.

13.  $x^{5/3} \cdot x^{4/3}$   
 $= x^{9/3} = x^3$

14.  $\frac{x^{2/5}}{x^{9/10}} = x^{4/10 - 9/10} = x^{-1/5} = \frac{1}{x^{1/5}}$

15.  $(x^{1/2})^{2/7}$   
 $x^{1/7} = x^{1/7}$

16.  $\left(\frac{x^2}{27}\right)^{1/3}$   
 $\frac{x^{2/3}}{3}$

17.  $\sqrt[3]{16x^4} = \sqrt[3]{2^4 \cdot x^4}$   
 $= 2x\sqrt[3]{2x}$

18.  $(x^{-3})^{2/5}$   
 $= x^{-6/5} = \frac{1}{x^{6/5}}$

19.  $\frac{x^{7/5}}{x^{4/5}} = x^{3/5}$

20.  $\frac{\sqrt[3]{64x^3y}}{4x^{-3}y} = \frac{4x\sqrt[3]{y}}{4x^{-3}y} = \frac{x^4\sqrt[3]{y}}{y}$

21.  $x^5 \cdot x^{\sqrt{3}}$   
 $x^{5+\sqrt{3}}$

Perform the indicated operation  
Assume all variables are positive

25.  $6\sqrt{5} + 2\sqrt{5}$   
 $8\sqrt{5}$

27.  $2\sqrt{27} - 3\sqrt{48}$   
 $= 2 \cdot 3\sqrt{3} - 3 \cdot 4\sqrt{3}$   
 $= 6\sqrt{3} - 12\sqrt{3}$   
 $= -6\sqrt{3}$

29.  $3(x^{1/2}y^3)^2 - (x^3y^{18})^{1/3}$   
 $3xy^6 - xy^6$   
 $= 2xy^6$

26.  $5\sqrt{5} - \sqrt{45}$   
 $5\sqrt{5} - 3\sqrt{5}$   
 $= 2\sqrt{5}$

28.  $2\sqrt{x} + 7\sqrt{x}$   
 $= 9\sqrt{x}$

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

31.  $\sqrt[3]{3x^7y^9z^3}$   
 $xy^2\sqrt[3]{3x^3y^3z^3}$

32.  $\sqrt{x^3y^4z} \cdot \sqrt{xyz^4}$   
 $= \sqrt{x^4y^5z^5}$   
 $= x^2y^2z^2\sqrt{yz}$

33.  $\sqrt[3]{\frac{81x^2y^3}{8xy^4z}}$   
 $= \sqrt[3]{\frac{81x}{8yz}} = \frac{\sqrt[3]{81x}}{\sqrt[3]{8yz}} = \frac{3\sqrt[3]{3x}}{2\sqrt[3]{yz}} = \frac{3\sqrt[3]{3x}}{2y^{1/3}z^{1/3}}$   
 $= \frac{3\sqrt[3]{3xy^2z}}{2yz}$