

Name Key

Date \_\_\_\_\_

LESSON  
6.1

Rewrite the expression using rational exponent notation.

2.  $(\sqrt[3]{6})^2 = 6^{\frac{2}{3}}$

3.  $(\sqrt[5]{14})^4 = 14^{\frac{4}{5}}$

5.  $(\sqrt[8]{11})^7 = 11^{\frac{7}{8}}$

Rewrite the expression using radical notation.

7.  $17^{1/3} = \sqrt[3]{17}$

9.  $33^{2/3} = (\sqrt[3]{33})^2$

11.  $(-28)^{7/5} = (\sqrt[5]{-28})^7$

Evaluate the expression without using a calculator.

13.  $(\sqrt[3]{8})^2 = 2^2 = 4$

16.  $36^{3/2} = (\sqrt{36})^3 = 6^3 = 216$

15.  $(\sqrt[4]{81})^4 = 81$

18.  $27^{2/3} = (\sqrt[3]{27})^2 = 3^2 = 9$

21.  $(-32)^{3/5} = (\sqrt[5]{-32})^3 = (-2)^3 = -8$

20.  $(-8)^{1/3} = \sqrt[3]{-8} = -2$

Evaluate the expression using a calculator. Round the result to two decimal places when appropriate.

23.  $\sqrt[6]{112} \approx 2.20$

26.  $(-133)^{1/3} \approx -5.104$

29.  $(356)^{5/9} \approx 26.150$

Solve the equation. Round the result to two decimal places when appropriate.

32.  $x^3 + 17 = 132$

$-17 -17$

$x^3 = 115$

$\sqrt[3]{x^3} = \sqrt[3]{115}$

$x \approx 4.86$

33.  $2x^5 + 73 = 53$

$-73 -73$

$\frac{2x^5}{2} = \frac{-20}{2}$

$x^5 = -10$

$\sqrt[5]{x^5} = \sqrt[5]{-10}$

$x \approx -1.58$

34.  $(x + 3)^4 = 362$

$\sqrt[4]{(x+3)^4} = \sqrt[4]{362}$

$x+3 = 4.36$

$-3 -3$

$x \approx 1.36$

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**LESSON 6.2**

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

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

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

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

3.  $(6^{2/3})^{3/4} = 6^{6/12} = 6^{1/2} = \sqrt{6}$

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

12.  $\frac{\sqrt[5]{5}}{\sqrt[3]{27}} = \frac{5^{1/5}}{3^{2/3}} = 5^{1/5} \cdot 3^{-2/3} = \frac{\sqrt[5]{5 \cdot 3^2}}{3} = \frac{\sqrt[5]{45}}{3}$

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

14.  $\sqrt{x^{2/5}} = (x^{2/5})^{1/2} = x^{2/10} = x^{1/5}$

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

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

22.  $(x\sqrt{2})^{3\sqrt{2}} = x^{3\sqrt{2}} = x^{3 \cdot 2} = x^6$

**Perform the indicated operation. Assume all variables are positive.**

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

27.  $2\sqrt{27} - 3\sqrt{48} = 2 \cdot \sqrt{9 \cdot 3} - 3 \cdot \sqrt{16 \cdot 3} = 2 \cdot 3\sqrt{3} - 3 \cdot 4\sqrt{3} = 6\sqrt{3} - 12\sqrt{3} = -6\sqrt{3}$

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

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

31.  $\sqrt[4]{3x^7y^9z^3}$   
 $= \sqrt[4]{3x^4x^3y^8y^1z^3}$   
 $= xy^2\sqrt[4]{3x^3yz^3}$

33.  $\sqrt[3]{\frac{81x^2y^3}{8xy^4z}} = \sqrt[3]{\frac{81x}{8yz}} = \frac{\sqrt[3]{27 \cdot 3x}}{\sqrt[3]{8yz}} = \frac{3\sqrt[3]{3x}}{2\sqrt[3]{yz}}$   
 $= \frac{3\sqrt[3]{3x}}{2(yz)^{1/3}} \cdot \frac{(yz)^{2/3}}{(yz)^{2/3}} = \frac{3\sqrt[3]{3xy^2z^2}}{2yz}$