Name _____ Date _____ Class_____

LESSON 3-1

Understanding Rational Exponents and Radicals

Practice and Problem Solving: A/B

Write the name of the property that is demonstrated by each equation.

1. $(2a)^4 = 16a^4$

2. $(3^6)^3 = 3^{18}$

_____ _____

Simplify each expression.

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

4. $1^{\frac{3}{5}}$

5. $9^{\frac{1}{2}}$

_____ _____ _____

6. $25^{\frac{3}{2}}$

7. $16^{\frac{5}{4}}$

8. $27^{\frac{1}{3}}$

_____ _____ _____

9. $81^{\frac{1}{4}} + 4^{\frac{1}{2}}$

10. $343^{\frac{2}{3}} \cdot 32^{\frac{2}{5}}$

11. $100^{-\frac{1}{2}}$

_____ _____ _____

Find the value of the expression for the value indicated.

12. $6a^{\frac{3}{4}}$ for $a = 16$

13. $c^{\frac{1}{2}} + c^{\frac{1}{3}}$ for $c = 64$

_____ _____

Name _____ Date _____ Class_____

14. $\frac{m^{\frac{3}{5}}}{8}$ for $m = 32$

15. $0.5d^{\frac{5}{7}}$ for $d = 128$

_____ _____

Solve.

16. The equation $t = 0.25d^{\frac{1}{2}}$ can be used to find the number of seconds, t, that it takes an object to fall a distance of d feet. How long does it take an object to fall 64 feet?

_____

17. Show that $\left(16^{\frac{1}{4}}\right)^3$ and $\left(16^3\right)^{\frac{1}{4}}$ are equivalent.

_____

18. The surface area, S, of a cube with volume V can be found using the formula $S = 6V^{\frac{2}{3}}$. Find the surface area of a cube whose volume is 125 cubic inches.

_____

Name _____ Date _____ Class_____

UNIT 2 Polynomial Operations

MODULE 3 Rational Exponents and Radicals

LESSON 3-1

Practice and Problem Solving: A/B

1. Power of a Product Property
2. Power of a Power Property
3. 4
4. 1
5. 3
6. 125
7. 32
8. 3
9. 5
10. 196
11. 0.1
12. 48
13. 12
14. 1
15. 16
16. 2 seconds
17. $\left(16^{\frac{1}{4}}\right)^3 = \left(\sqrt[4]{16}\right)^3 = 2^3 = 8$ and $\left(16^3\right)^{\frac{1}{4}} = 4096^{\frac{1}{4}} = \sqrt[4]{4096} = 8$
18. 150 square inches

Practice and Problem Solving: C

1. 4
2. a^{12}
3. $\frac{1}{125}$, or 0.008
4. $8b^3$
5. 0
6. n
7. 6400
8. $k^{\frac{1}{4}}$
9. w^2
10. 4

11. 3
12. 81
13. 7
14. Sample answer: By the Quotient of Power Property, $\frac{a^m}{a^n} = a^{m-n}$ Suppose $m = n = 2$. Then $\frac{a^2}{a^2} = a^{2-2} = a^0$. And $\frac{a^2}{a^2}$ must also equal 1. So, a^0 must equal 1.
15. Sample answer: Call the number *x*. The cube root of *x* can be written as $x^{\frac{1}{3}}$. Then the square root of the cube root of *x* can be written as $\left(x^{\frac{1}{3}}\right)^{\frac{1}{2}}$. Finally, by the Power of a Power Property, $\left(x^{\frac{1}{3}}\right)^{\frac{1}{2}} = x^{\frac{1}{6}}$, and this is the sixth root of *x*.

Practice and Problem Solving: Modified

1. 4
2. 3
3. 100
4. 2
5. $125^{\frac{1}{3}}$
6. $5^{\frac{3}{4}}$
7. $64^{\frac{5}{6}}$
8. $10^{\frac{1}{2}}$
9. a^9
10. m^6
11. c^{42}
12. 5
13. 2
14. 3