Name _____ Date _____ Class _____

LESSON 2-1

Integer Exponents

Reteach

A positive exponent tells you how many times to multiply the base as a factor. A negative exponent tells you how many times to divide by the base. Any number to the 0 power is equal to 1.

$4^2 = 4 \bullet 4 = 16$ $\quad 4^5 = 4 \bullet 4 \bullet 4 \bullet 4 \bullet 4 = 1{,}024$ $\quad a^3 = a \bullet a \bullet a$

$4^{-2} = \frac{1}{4^2} = \frac{1}{4 \bullet 4} = \frac{1}{16}$ $\quad 4^{-5} = \frac{1}{4^5} = \frac{1}{4 \bullet 4 \bullet 4 \bullet 4 \bullet 4} = \frac{1}{1{,}024}$ $\quad a^{-3} = \frac{1}{a^3} = \frac{1}{a \bullet a \bullet a}$

When you work with integers, certain properties are always true. With integer exponents, there are also certain properties that are always true.

When the bases are the same and you multiply, you add exponents.

$2^2 \bullet 2^4 = 2^{2+4}$

$2 \bullet 2 \bullet 2 \bullet 2 \bullet 2 \bullet 2 = 2^6$

$a^m \bullet a^n = a^{m+n}$

When the bases are the same and you divide, you subtract exponents.

$\frac{2^5}{2^3} = 2^{5-3}$

$\frac{2 \bullet 2 \bullet \cancel{2} \bullet \cancel{2} \bullet \cancel{2}}{\cancel{2} \bullet \cancel{2} \bullet \cancel{2}} = 2^2$

$\frac{a^m}{a^n} = a^{m-n}$

When you raise a power to a power, you multiply.

$(2^3)^2 = 2^{3 \bullet 2}$

$(2 \bullet 2 \bullet 2)^2$

$(2 \bullet 2 \bullet 2) \bullet (2 \bullet 2 \bullet 2) = 2^6$

$(a^m)^n = a^{m \bullet n}$

Tell whether you will add, subtract, or multiply the exponents. Then simplify by finding the value of the expression.

1. $\frac{3^6}{3^3} \rightarrow$ _____

2. $8^2 \bullet 8^{-3} \rightarrow$ _____

3. $(3^2)^3 \rightarrow$ _____

4. $5^3 \bullet 5^1 \rightarrow$ _____

5. $\frac{4^2}{4^4} \rightarrow$ _____

6. $(6^2)^2 \rightarrow$ _____

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LESSON 2-1

Integer Exponents

Practice and Problem Solving: D

Write each expression without exponents. Then find the value. The first one is done for you.

1. $4^{-4} = \frac{1}{4 \times 4 \times 4 \times 4} = \frac{1}{256}$

2. $6^2 =$ _____

3. $3^5 =$ _____

4. $24^0 =$ _____

5. $7^{-2} =$ _____

6. $10^5 =$ _____

Simplify each expression. Show your work. The first is done for you.

7. $\frac{(3 \cdot 2)^6}{(7-1)^4} = \frac{6^6}{6^4} = \frac{6^6}{6^4}$

$= 6^{6-4} = 6^2$

$= 36$

8. $(3)^2 \bullet (3^1)$

9. $4^2 \bullet 4^3$

10. $(4^2)^3$

11. $(4-3)^2 \bullet (5 \bullet 4)^0$

12. $(2+3)^5 \div (5^2)^2$

Answer the question.

13. Find the value of $(2^2)^3$. Then find the value of $(2^3)^2$. What is true about the results? Explain why.