Ch 8.3 Multiplying Exponents

Activity: Exponents With the Same Base and Multiplication

1. Copy and complete the table.
2. What is true for $2^2 \cdot 2^2$ and $2^3 \cdot 2^1$?
3. **Patterns** What relationship do you see between the sum of the exponents of 2 in the first column and the exponent of 2 in the third column?

Factors	Product Using Repeated Factors	Power of 2
$2^1 \cdot 2^1$	$2 \cdot 2$	2^2
$2^2 \cdot 2^2$		
$2^3 \cdot 2^1$		
$2^4 \cdot 2^2$		
$2^3 \cdot 2^3$		

Property Multiplying Powers With the Same Base

For every nonzero number a and integers m and n, $a^m \cdot a^n = a^{m+n}$.

Examples $3^5 \cdot 3^4 = 3^{5+4} = 3^9$ $\quad h^2 \cdot h^9 = h^{2+9} = h^{11}$

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1 EXAMPLE Multiplying Powers

Rewrite each expression using each base only once.

a. $11^4 \cdot 11^3$ [redacted]

b. $5^{-2} \cdot 5^2$ [redacted]

1 Rewrite each expression using each base only once.

a. $5^3 \cdot 5^6$ **b.** $2^4 \cdot 2^{-3}$ **c.** $7^{-3} \cdot 7^2 \cdot 7^6$

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2 EXAMPLE Multiplying Powers in an Algebraic Expression

Simplify each expression.

a. $2n^5 \cdot 3n^{-2} =$ [redacted]

b. $5x \cdot 2y^4 \cdot 3x^8 =$ [redacted]

2 Simplify each expression.

a. $n^2 \cdot n^3 \cdot 7n$ **b.** $2y^3 \cdot 7x^2 \cdot 2y^4$ **c.** $m^2 \cdot n^{-2} \cdot 7m$

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3 EXAMPLE Multiplying Numbers in Scientific Notation

Simplify $(7 \times 10^2)(4 \times 10^5)$. Write the answer in scientific notation.

$(7 \times 10^2)(4 \times 10^5) =$ [redacted]

3 Simplify each expression. Write each answer in scientific notation.

a. $(2.5 \times 10^8)(6 \times 10^3)$ **b.** $(1.5 \times 10^{-2})(3 \times 10^4)$ **c.** $(9 \times 10^{-6})(7 \times 10^{-9})$

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