LESSON MAKER PRO

Exponent Power-Up

Use exponent laws to rewrite expressions.

GRADE 8 · MA.8.AR.1.1

MA.8.AR.1.1 "Apply the Laws of Exponents to generate equivalent algebraic expressions, limited to integer exponents and monomial bases."

NAME _____ DATE _____

EXPONENT RULES

When you multiply powers with the same base, add exponents. When you divide powers with the same base, subtract exponents, and when a power is outside parentheses, multiply the exponents inside. For any nonzero base, a zero exponent equals 1, and a negative exponent can be written as a reciprocal.

WORKED EXAMPLE

Simplify: x^{12} / x^{7}

1. Keep the base x.
2. Subtract the exponents: $x^{(12 - 7)}$.
3. Simplify: x^{5}.

Answer: x^{5}

PRACTICE 6 problems

1 Simplify: $a^{6} * a^{2}$

ANSWER _____

2 Simplify: m^{9} / m^{3}

ANSWER _____

3 Simplify: $(p^{3})^{2}$

ANSWER _____

4 Simplify: $q^{-4} * q^{10}$

ANSWER _____

5 Simplify: $r^{8} * s^{-2} * r^{0} * s^{6}$

ANSWER _____

6 Simplify: $(3x^{2})^{4}$

ANSWER _____

APPLY IT Show your work

1 A music app combines a bass setting represented by t^4 with an adjustment represented by t^{-1}. The combined setting is $t^4 * t^{-1}$. Write the setting as one power of t.

WORK SPACE

ANSWER _____

2 A robotics club uses the expression $(3p^2)^2$ in its program to represent a scaled power setting. Rewrite the expression without parentheses.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Simplify completely: $((a^6b^{-3}) / (a^2b))^2$

WORK SPACE AND ANSWER

ANSWER KEY

Exponent Power-Up

GRADE 8 · MA.8.AR.1.1

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Simplify: $a^6 * a^2$	**a^8**
2	Simplify: m^9 / m^3	**m^6**
3	Simplify: $(p^3)^2$	**p^6**
4	Simplify: $q^{-4} * q^{10}$	**q^6**
5	Simplify: $r^8 * s^{-2} * r^0 * s^6$	**r^8s^4**
6	Simplify: $(3x^2)^4$	**$81x^8$**

PART 2 · APPLY IT

1. **t^3** Add the exponents because the powers have the same base. 4 + (-1) = 3.
2. **$9p^4$** Square both factors inside the parentheses. $3^2 = 9$ and $(p^2)^2 = p^4$.

CHALLENGE

a^8b^{-8}

Accept equivalent forms with positive or negative exponents when they are mathematically equivalent. For problem 5, r^0 equals 1, but the factor r^8 remains in the product.