LESSON MAKER PRO

Power Moves

Use integer exponent rules to simplify expressions.

GRADE 8 · 8.NR.2.1

8.NR.2.1 "Apply the properties of integer exponents to generate equivalent numerical expressions."

NAME _____ DATE _____

EXPONENT RULES

When multiplying powers with the same base, add exponents. When dividing powers with the same base, subtract exponents, and when raising a power to a power, multiply exponents. The negative-exponent reciprocal rule applies only to nonzero bases: for nonzero x, $x^{-n} = 1/x^n$ when n is positive, and expressions such as 0^{-n} are undefined.

WORKED EXAMPLE

Simplify: $(13^{17} * 13^{-14}) / 13^{-12}$

1. Multiply the numerator: $13^{17} * 13^{-14} = 13^{(17 + -14)} = 13^3$.
2. Divide powers with the same base: $13^3 / 13^{-12} = 13^{(3 - -12)}$.
3. Simplify the exponent: 13^{15}.

Answer: 13^{15}

PRACTICE 6 problems

1 Simplify: $2^3 * 2^5$

ANSWER _____

2 Simplify: $9^6 / 9^2$

ANSWER _____

3 Simplify to one power: $(4^2)^3$

ANSWER _____

4 Write as a fraction: 5^{-3}

ANSWER _____

5 Write as a fraction in simplest form: $6^{10} * 6^{-11}$

ANSWER _____

6 Write as a fraction in simplest form: $10^9 / 10^{11}$

ANSWER _____

APPLY IT Show your work

1 In a video game tournament, a player earns 2^{10} bonus points. A penalty divides the bonus by 2^4. Write the remaining bonus as one power, then find the number of points.

WORK SPACE

ANSWER _____

2 A game world has 3^4 zones. Each zone contains 3^4 collectible badges. How many collectible badges are in the whole game world?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Simplify and write as a fraction in simplest form: $((3^{-2})^5 * 3^9) / 3^4$

WORK SPACE AND ANSWER

ANSWER KEY

Power Moves

GRADE 8 · 8.NR.2.1

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Simplify: $2^3 * 2^5$	**$2^8 = 256$**
2	Simplify: $9^6 / 9^2$	**$9^4 = 6561$**
3	Simplify to one power: $(4^2)^3$	**4^6**
4	Write as a fraction: 5^{-3}	**1/125**
5	Write as a fraction in simplest form: $6^{10} * 6^{-11}$	**1/6**
6	Write as a fraction in simplest form: $10^9 / 10^{11}$	**1/100**

PART 2 · APPLY IT

1. **$2^6 = 64$ points** Subtract the exponents when dividing powers with base 2: $2^{(10 - 4)} = 2^6 = 64$.
2. **$3^8 = 6561$ badges** Multiply the number of zones by the badges in each zone: $3^4 * 3^4 = 3^8 = 6561$.

CHALLENGE

$3^{-5} = 1/243$

Accept equivalent forms that follow the exponent rules, such as 2^8 or 256. For negative exponents, accept a correct negative-exponent form and its equivalent simplified fraction when the problem does not require a fraction.