LESSON MAKER PRO

Power Moves

Rewrite and evaluate expressions with integer exponents.

GRADE 7 · 7A.AF.B.14

7A.AF.B.14 "Develop and apply properties of integer exponents to generate equivalent numerical and algebraic expressions."

NAME _____ DATE _____

EXPONENT RULES

For a nonzero base, add exponents when you multiply powers and subtract exponents when you divide powers. A zero exponent gives 1. A negative exponent means take the reciprocal.

WORKED EXAMPLE

Evaluate $13^9/13^7$.

1. Subtract the exponents: 13^{9-7}.
2. Simplify the exponent: 13^2.
3. Evaluate: 169.

Answer: 169

PRACTICE 6 problems

1 Write $3^2 \times 3^4$ as one power of 3.

ANSWER _____

2 Write $10^5/10^3$ as one power of 10.

ANSWER _____

3 Write x^6/x^4 as one power of x. Assume x is nonzero.

ANSWER _____

4 Evaluate $5^0 + 2^3$.

ANSWER _____

5 Evaluate 4^{-2}.

ANSWER _____

6 Evaluate $(2^5 \times 2^{-3})/2^2$.

ANSWER _____

APPLY IT Show your work

1 In a game, each treasure chest holds 3^2 coins. A player opens 3^3 chests. Write the total number of coins as one power of 3, then find its value.

WORK SPACE

ANSWER _____

2 A photo file uses 10^6 bytes. Its thumbnail uses 10^4 bytes. How many times as many bytes does the photo use? Give your answer as a power of 10 and as a number.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A student says $(x^5/x^2) \times x^{-3} = x^0 = 0$. Is the student correct? Explain in two sentences. Assume x is nonzero.

WORK SPACE AND ANSWER

ANSWER KEY

Power Moves

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Write $3^2 \times 3^4$ as one power of 3.	**3^6**
2	Write $10^5/10^3$ as one power of 10.	**10^2**
3	Write x^6/x^4 as one power of x. Assume x is nonzero.	**x^2**
4	Evaluate $5^0 + 2^3$.	**9**
5	Evaluate 4^{-2}.	**1/16**
6	Evaluate $(2^5 \times 2^{-3})/2^2$.	**1**

PART 2 · APPLY IT

1. **3^5 = 243 coins** Multiply the coins per chest by the number of chests. Add the exponents to get 3^5, which equals 243.
2. **10^2 = 100 times as many** Divide the photo's size by the thumbnail's size. Subtract the exponents to get 10^2, or 100.

CHALLENGE

The exponents combine to 5 - 2 - 3 = 0, so the expression is x^0. Since x is nonzero, x^0 = 1, not 0.

For the challenge, accept any two-sentence explanation that combines the exponents correctly and states that a nonzero number raised to the zero power equals 1.