LESSON MAKER PRO

Power Moves

Simplify exponents, radicals, and logarithms.

HIGH SCHOOL · MA.912.NSO.1

MA.912.NSO.1 "Generate equivalent expressions and perform operations with expressions involving exponents, radicals or logarithms."

NAME _____ DATE _____

REWRITE AND SIMPLIFY

When bases match, add exponents when you multiply and subtract exponents when you divide. To simplify a radical, factor out perfect-square factors. For logarithms with the same base, $\log_b(M) + \log_b(N) = \log_b(MN)$.

WORKED EXAMPLE

Simplify: $(x^{13} * x^{19}) / x^{17}$

1. $x^{13} * x^{19} = x^{(13 + 19)}$
2. $x^{(13 + 19)} = x^{32}$
3. $x^{32} / x^{17} = x^{(32 - 17)}$
4. $x^{(32 - 17)} = x^{15}$

Answer: x^{15}

PRACTICE 6 problems

1 Simplify: $x^4 * x^7$

ANSWER _____

2 Simplify: x^{10} / x^4

ANSWER _____

3 Simplify: $(2x^3)^4$

ANSWER _____

4 Simplify: sqrt(50)

ANSWER _____

5 For x >= 0, simplify: sqrt($18x^6$)

ANSWER _____

6 Simplify: $\log_2(8) + \log_2(4)$

ANSWER _____

APPLY IT Show your work

1 A streaming service stores $6 * 10^8$ bytes of video clips equally in $3 * 10^2$ folders. How many bytes are stored in each folder? Write your answer in scientific notation.

WORK SPACE

ANSWER _____

2 A student club designs a square backdrop with an area of 288 square feet. What is the exact length of one side of the backdrop?

WORK SPACE

ANSWER _____

CHALLENGE One step up

For $x > 0$, simplify: $(x^3 * \text{sqrt}(8x^5)) / (2\text{sqrt}(2x))$

WORK SPACE AND ANSWER

ANSWER KEY # Power Moves

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Simplify: $x^4 * x^7$	**x^{11}**
2	Simplify: x^{10} / x^4	**x^6**
3	Simplify: $(2x^3)^4$	**$16x^{12}$**
4	Simplify: sqrt(50)	**5sqrt(2)**
5	For x >= 0, simplify: sqrt($18x^6$)	**$3x^3$sqrt(2)**
6	Simplify: $\log_2(8) + \log_2(4)$	**5**

PART 2 · APPLY IT

1. **$2 * 10^6$ bytes** Divide the coefficients, 6 / 3 = 2, and subtract the powers of 10, $10^{(8 - 2)} = 10^6$.
2. **12sqrt(2) feet** The side length is sqrt(288). Factor 288 as 144 * 2, so sqrt(288) = 12sqrt(2).

CHALLENGE

x^5

Accept equivalent forms with factors in a different order, such as $3\text{sqrt}(2)x^3$. For the logarithm problem, $\log_2(32)$ is an equivalent intermediate form, but the fully simplified answer is 5.