

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: $(x^{13} \cdot x^{19}) / x^{17}$

1. $x^{13} \cdot x^{19} = x^{(13 + 19)}$

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: $x^4 \cdot x^7$

ANSWER _____

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

ANSWER _____

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

ANSWER _____

4 Simplify: $\sqrt{50}$

ANSWER _____

5 For $x \geq 0$, simplify: $\sqrt{18x^6}$

ANSWER _____

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

ANSWER _____

APPLY IT Show your work

- 1** A streaming service stores $6 \cdot 10^8$ bytes of video clips equally in $3 \cdot 10^2$ 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

CHALLENGE

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

PART 1 • PRACTICE

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

PART 2 • APPLY IT

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

CHALLENGE

 x^5

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