LESSON MAKER PRO

Exponent Power Moves

Rewrite and simplify radicals and rational exponents.

HIGH SCHOOL · MA.912.NSO.1.3

MA.912.NSO.1.3 "Generate equivalent algebraic expressions involving radicals or rational exponents using the properties of exponents."

NAME _____ DATE _____

TWO WAYS TO WRITE A POWER

For a positive base, a^(m/n) means take the nth root, then raise the result to the mth power. You can write a^(m/n) as the nth root of a^m, or as (the nth root of a)^m. Use exponent rules to simplify after rewriting.

WORKED EXAMPLE

Simplify 625^(3/4).

1. 625 = 5^4
2. (5^4)^(3/4) = 5^3
3. 5^3 = 125

Answer: 125

PRACTICE 6 problems

1 For x >= 0, rewrite the 4th root of x^7 using a rational exponent.

ANSWER _____

2 For y >= 0, rewrite y^(5/6) using a radical.

ANSWER _____

3 Simplify 64^(5/6).

ANSWER _____

4 Simplify the 3rd root of 216a^6.

ANSWER _____

5 Rewrite (the 5th root of b)^3 using a rational exponent.

ANSWER _____

6 For c >= 0, simplify (16c^12)^(1/4).

ANSWER _____

APPLY IT Show your work

1 A game designer makes a cube-shaped 3-D map tile with a volume of 2744 cubic meters. Its side length s satisfies s^3 = 2744. Write s using a rational exponent, then find the side length.

WORK SPACE

ANSWER _____

2 A student-made music app models an intensity setting with I = p^4. For one preset, I = 1296. Write the positive value of p using a radical, then find p.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

For x >= 0, simplify (81x^12)^(3/4). Show how the exponent 3/4 affects both factors.

_____

_____

ANSWER KEY

Exponent Power Moves

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	For x >= 0, rewrite the 4th root of x^7 using a rational exponent.	**x^(7/4)**
2	For y >= 0, rewrite y^(5/6) using a radical.	**6th root of y^5**
3	Simplify 64^(5/6).	**32**
4	Simplify the 3rd root of 216a^6.	**6a^2**
5	Rewrite (the 5th root of b)^3 using a rational exponent.	**b^(3/5)**
6	For c >= 0, simplify (16c^12)^(1/4).	**2c^3**

PART 2 · APPLY IT

1. **s = 2744^(1/3) = 14 meters** Use the exponent 1/3 to represent a cube root. Since 14^3 = 2744, the side length is 14 meters.
2. **p = 4th root of 1296 = 6** Take the 4th root of both sides because p is raised to the 4th power. Since 6^4 = 1296, p = 6.

CHALLENGE

27x^9

Accept equivalent radical forms, such as (6th root of y)^5 for y^(5/6). In the challenge, 81^(3/4) = 27 and (x^12)^(3/4) = x^9 under the stated condition.