LESSON MAKER PRO

Radical Rewrite Lab

Move smoothly between roots and rational exponents.

HIGH SCHOOL · HSN-RN.A.2

CCSS.Math.Content.HSN-RN.A.2 "Rewrite expressions involving radicals and rational exponents using the properties of exponents."

NAME _____ DATE _____

EXPONENT AND ROOT CONNECTIONS

For a > 0, a^(m/n) means the nth root of a^m. You can take the root first, then raise the result to the numerator power. A negative rational exponent means take the reciprocal: a^(-m/n) = 1/(a^(m/n)).

WORKED EXAMPLE

Rewrite and simplify 81^(3/4).

1. 81^(3/4) = (4th root of 81)^3
2. 4th root of 81 = 3
3. 3^3 = 27

Answer: 27

PRACTICE 6 problems

1 Rewrite 25^(1/2) as a radical, then simplify.

ANSWER _____

2 Rewrite 32^(2/5) as a radical, then simplify.

ANSWER _____

3 Rewrite 49^(-1/2) without a negative exponent, then simplify.

ANSWER _____

4 For x > 0, rewrite (x^6)^(1/2) as a single power of x.

ANSWER _____

5 For y >= 0, rewrite y^(5/6) in radical form.

ANSWER _____

6 For z > 0, rewrite 1/(z^(7/8)) using a negative rational exponent.

ANSWER _____

APPLY IT Show your work

1 A student council is planning a square esports area with an area of 196 square feet. The side length can be written as 196^(1/2) feet. Rewrite and simplify the expression to find the side length.

WORK SPACE

ANSWER _____

2 A phone backup app stores a video clip at 1/(128^(1/7)) of its original size. Rewrite the expression using a negative rational exponent, then simplify the fraction of the original size.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Assume a > 0. Rewrite (a^(7/6) * a^(-1/2))/a^(1/6) as a single power of a. Explain how the exponents combine.

_____

_____

ANSWER KEY

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Rewrite 25^(1/2) as a radical, then simplify.	**5**
2	Rewrite 32^(2/5) as a radical, then simplify.	**4**
3	Rewrite 49^(-1/2) without a negative exponent, then simplify.	**1/7**
4	For x > 0, rewrite (x^6)^(1/2) as a single power of x.	**x^3**
5	For y >= 0, rewrite y^(5/6) in radical form.	**6th root(y^5)**
6	For z > 0, rewrite 1/(z^(7/8)) using a negative rational exponent.	**z^(-7/8)**

PART 2 · APPLY IT

1. **14 feet** 196^(1/2) is the square root of 196. Since 14^2 = 196, the side length is 14 feet.
2. **1/2 of the original size** Rewrite the expression as 128^(-1/7). Since the 7th root of 128 is 2, the expression equals 1/2.

CHALLENGE

a^(1/2); add the exponents in the numerator, then subtract 1/6 for division.

Accept equivalent radical forms, such as (6th root of y)^5 for 6th root(y^5). For variable expressions, accept equivalent forms only when the stated domain conditions are preserved.