
Rational Exponents

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Time Required10 – 15 minutes

Activity Overview

In this activity, students will substitute numbers from a given list into an expression with a fractional exponent to discover the connection between rational exponents and radicals.

Topic: Rational Exponents

Evaluating expressions with rational exponents

Teacher Preparation and Notes

This activity is meant as an introduction to rational exponents. Students will discover the rule that a fractional exponent is the same as finding a root of a number. Students should have previous experience simplifying square roots, cube roots, and n^{th} roots. Students also need previous experience writing conjectures based upon numerical observations.

The Classroom

Each student should have the RationalExponents.tns file on the Nspire handheld. Students should work through the document in pairs or small groups, writing down their conjectures on the handout along with the numeric solutions or on a separate sheet of paper as notes. At the end of the activity, have groups share their conjectures and explanations. From this point, the lesson should continue with rational expressions containing variables.



Associated Materials

- RationalExponents.tns
- RationalExponentsStudent.doc
- RationalExponentsTchr.doc

Getting Started

Students will open the document RationalExponents.tns

Students can take notes on their own paper, making sure to write down their conjectures or write their results on the RationalExponentsStudent.doc.

It may be necessary to remind students to press   to move from the top of the screen to the bottom.

It may be helpful for the teacher to demonstrate selecting the number in the box and changing that number to a different value from the given list.

Students need to examine the results on the right side and make a conjecture.

Activity Instructions and Answers

Press **ctrl** **tab** to move from the top of the screen to the bottom. Once on the bottom of the screen, move the cursor to select the value in the box by clicking on it. Once selected, change the value to one of the values for a in the list. The answer on the right will change.

Suggested conjecture response:

When the base is raised to the one-half power, the result is the square root of the base.

1.1 1.2 1.3 1.4 RAD AUTO REAL

Substitute vaules for a from the list
{1, 4, 9, 16, 25, 36}.

Write a conjecture on your paper.

$a = 1$ $a^{\left(\frac{1}{2}\right)} = 1$

Suggested conjecture response:

When the base is raised to the one-third power, the result is the cube root of the base.

1.1 1.2 1.3 1.4 RAD AUTO REAL

Substitute vaules for a from the list
{1, 8, 27, 64, 125, 216}.

Write a conjecture on your paper.

$a = 1$ $a^{\left(\frac{1}{3}\right)} = 1$

Suggested conjecture response:

When the base is raised to the two-thirds power, the result is the cube root of the base, then that answer is squared.

1.1 1.2 1.3 1.4 RAD AUTO REAL

Substitute vaules for a from the list
{1, 8, 27, 64, 125, 216}.

Write a conjecture on your paper.

$a = 1$ $a^{\left(\frac{2}{3}\right)} = 1$

Suggested conjecture response:

When the base is raised to the three-fourths power, the result is the fourth root of the base, then that answer is cubed.



1.2 1.3 1.4 1.5 RAD AUTO REAL

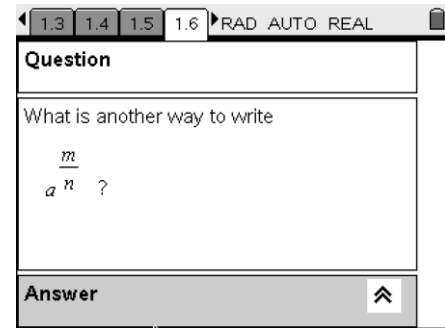
Substitute vaules for a from the list
{1, 16, 81, 256, 625, 1296}.

Write a conjecture on your paper.

$a = 1$ $a^{\left(\frac{3}{4}\right)} = 1$

Summarizing question. After completing the previous activities, students should be able to connect fraction exponents to radicals. In the class discussion, identify the denominator as the index of the radical. The numerator is the power.

  will allow the student to see the suggested answer to the question.




1.3 1.4 1.5 1.6 ▸ RAD AUTO REAL

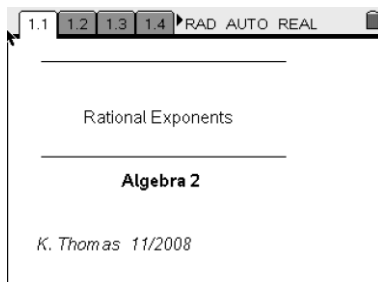
Question

What is another way to write

$$a^{\frac{m}{n}} ?$$

Answer 

Screen Shots

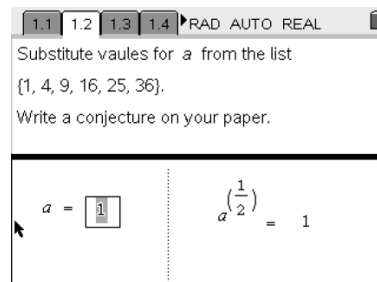


1.1 1.2 1.3 1.4 ▸ RAD AUTO REAL

Rational Exponents

Algebra 2

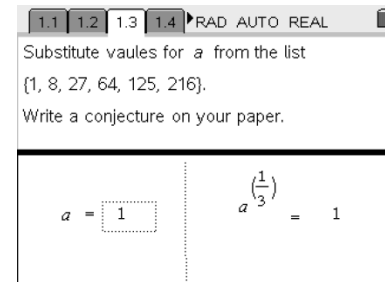
K. Thomas 11/2008



1.1 1.2 1.3 1.4 ▸ RAD AUTO REAL

Substitute vaules for a from the list
{1, 4, 9, 16, 25, 36}.

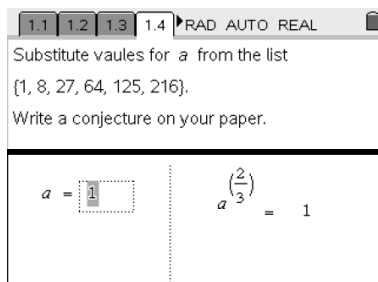
Write a conjecture on your paper.

$$a = 1 \quad a^{\left(\frac{1}{2}\right)} = 1$$


1.1 1.2 1.3 1.4 ▸ RAD AUTO REAL

Substitute vaules for a from the list
{1, 8, 27, 64, 125, 216}.

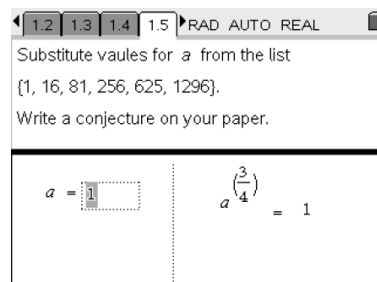
Write a conjecture on your paper.

$$a = 1 \quad a^{\left(\frac{1}{3}\right)} = 1$$


1.1 1.2 1.3 1.4 ▸ RAD AUTO REAL

Substitute vaules for a from the list
{1, 8, 27, 64, 125, 216}.

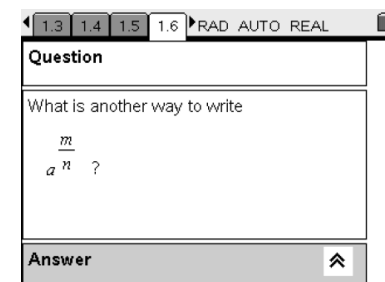
Write a conjecture on your paper.

$$a = 1 \quad a^{\left(\frac{2}{3}\right)} = 1$$


1.2 1.3 1.4 1.5 ▸ RAD AUTO REAL

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$$a = 1 \quad a^{\left(\frac{3}{4}\right)} = 1$$


1.3 1.4 1.5 1.6 ▸ RAD AUTO REAL

Question

What is another way to write

$$a^{\frac{m}{n}} ?$$

Answer 