

keep scrolling to get a  
sneak peak!

This set of guided  
notes will walk Algebra  
2 students through  
rational exponents.  
All you need to do is print  
& make copies for your  
students!

# RATIONAL EXPONENTS

## Algebra 2 Guided Notes

**RATIONAL EXPONENTS & RADICALS**  
Converting between radical expressions

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

Directions: Write each expression in radical form.

**Rational Exponents**

$x^{\frac{3}{4}}$

**PROPERTIES OF RATIONAL EXPONENTS**  
Properties of Rational Exponents

Property	
Product of Powers	
Power of a Power	
Power of a Product	
Negative Exponent	
Zero Exponent	
Quotient of Powers	
Power of a Quotient	

Directions: Use the properties of rational exponents to simplify.

1.  $(6^{1/2} \cdot 4^{1/3})^2$

2.  $(4^5 \cdot 3^5)^{1/2}$

**RATIONAL EXPONENTS & RADICALS**  
Directions: Complete the table.

Radical Form	Rational Exponent Form
$\sqrt{16}$	$16^{\frac{1}{2}}$
$(\sqrt{4})^3$	
	$25^{\frac{1}{2}}$
$\sqrt[3]{64}$	
	$8^{\frac{2}{3}}$
$(\sqrt{9})^3$	

**Math with Ms. Rivera**

Answer key included

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# why do you need this?



It's simple and done-for-you! Just print and make copies!



Students can work on essential Algebra 2 skills.



Aligns to CCSS, TEKS, and VA SOLs!



Suggested and detailed answer keys are included for you!

## Algebra 2 Guided Notes Rational Exponents

**RATIONAL EXPONENTS & RADICAL EXPRESSIONS**

Converting between radical expressions & rational exponents

$a^{\frac{m}{n}}$	
$\sqrt[n]{a^m}$	

Directions: Write each expression as a rational exponent.

**Rational Exponents**

$\sqrt[3]{x^4}$
$(-2)^{\frac{4}{9}}$

**PROPERTIES OF RATIONAL EXPONENTS & RADICAL EXPRESSIONS**

Properties of Rational Exponents

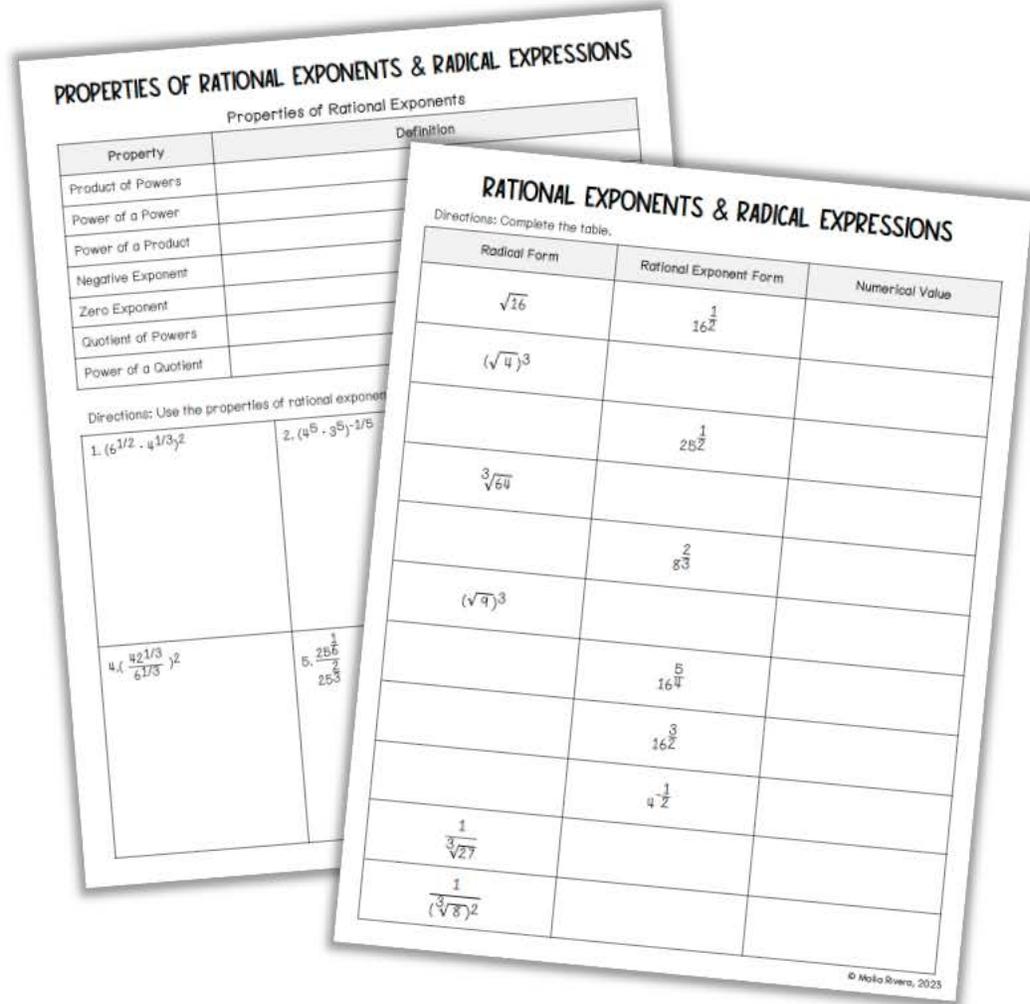
Property	Definition
Product of Powers	
Power of a Power	
Power of a Product	
Negative Exponent	
Zero Exponent	
Quotient of Powers	
Power of a Quotient	

Directions: Use the properties of rational exponents to simplify each expression.

1. $(6^{1/2} \cdot 4^{1/3})^2$	2. $(4^5 \cdot 3^5)^{1/5}$	3. $\frac{5}{5^{1/3}}$
4. $(\frac{4^{2/3}}{6^{1/3}})^2$	5. $\frac{25^6}{25^3}$	6. $\frac{x^3 y^2}{xy^2}$
		7. $\frac{x^3 y^2}{xy^2}$

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# Algebra 2 Guided Notes: Rational Exponents *includes*:



- ✓ 3 pages of guided notes
- ✓ Properties of Rational Exponents
- ✓ Rewriting Radical Expressions to Rational Exponents
- ✓ Rewriting Rational Exponents to Radical Expressions

# Algebra 2 Guided Notes: Rational Exponents includes:

 Detailed answer keys

**CCSS:** HSA-SSE.B.3

**TEKS:** A2.7.G

**VA SOL:** EO.AII.1.b

**PROPERTIES OF RATIONAL EXPONENTS & RADICAL EXPRESSIONS**

Properties of Rational Exponents

Property	Definition
Product of Powers	$a^m \cdot a^n = a^{m+n}$
Power of a Power	$(a^m)^n = a^{mn}$
Power of a Product	$(ab)^m = a^m b^m$
Negative Exponent	$a^{-m} = \frac{1}{a^m}, a \neq 0$ OR $a^m = \frac{1}{a^{-m}}$
Zero Exponent	$a^0 = 1, a \neq 0$
Quotient of Powers	$\frac{a^m}{a^n} = a^{m-n}, a \neq 0$
Power of a Quotient	$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}, b \neq 0$

Directions: Use the properties of rational exponents

1. $(6^{1/2} \cdot 4^{1/3})^2$ $(6^{1/2})^2 \cdot (4^{1/3})^2$ $= 6^{1/2 \cdot 2} \cdot 4^{1/3 \cdot 2}$ $= 6 \cdot 4^{2/3}$ $= 6 \cdot 4^{2/3}$	2. $(4^5 \cdot 3^{5 \cdot -1/5})^{-1}$ $= [(4 \cdot 3)^5]^{-1}$ $= [(12)^5]^{-1}$ $= 12^{5 \cdot -1/5}$ $= 12^{-1}$ $= \frac{1}{12}$
4. $(\frac{42^{1/3}}{6^{1/3}})^2$ $= [\frac{42}{6}]^{1/3 \cdot 2}$ $= [(7)^{1/3}]^2$ $= 7^{2/3}$	5. $\frac{256^{1/2}}{253}$

**RATIONAL EXPONENTS & RADICAL EXPRESSIONS**

Converting between radical expressions & rational exponents

$a^{m/n}$	$(a^{1/n})^m$	$(\sqrt[n]{a})^m$
$a^{-m/n}$	$\frac{1}{a^{m/n}}$	$\frac{1}{(\sqrt[n]{a})^m} \quad a \neq 0$

Directions: Write each expression in its alternate form.

Rational Exponents	Radical Expression
$3 \sqrt[4]{x}$ <i>3 ← power</i> <i>x ← index</i>	$(\sqrt[4]{x})^3$
$11 \frac{7}{8}$	$(\sqrt[8]{11})^7$ <i>denominator</i> <i>numerator</i>
$(-2)^{4/9}$ <i>4 ← power</i> <i>9 ← index</i>	$(\sqrt[9]{-2})^4$

## Check out what *other teachers* are saying:



"This was great practice for my Algebra II students after I presented the lesson. Next Year, I may use them as notes."

- Vonda B.



"Great resource for what we were currently covering in precalc!"

- Megan M.



"I used this in conjunction with another document, but this would have worked fine on its own. The students found it much easier to understand the concept using these guided notes."

- Cheryl W.

You may also enjoy ...

# RADICAL OPERATIONS

Algebra 2 Guided Notes

**RADICAL OPERATIONS**

Subtracting radicals: You can only add and subtract like radicals. This is when the radical has the same index and radicand.

Example:  $2\sqrt{15} - 7\sqrt{15} = -5\sqrt{15}$

**Properties of Radical Expressions**

Property	Definition
Product Property	$\sqrt{a} \cdot \sqrt{b} = \sqrt{a \cdot b}$
Quotient Property	$\frac{\sqrt{a}}{\sqrt{b}} = \sqrt{\frac{a}{b}}$ , $b \neq 0$

Directions: Write the expression in simplest radical form.

1.  $\frac{4\sqrt{15}}{\sqrt{2}}$

2.  $\frac{3\sqrt{27}}{\sqrt{3}}$

3.  $\frac{1}{3 + \sqrt{6}}$

Answer key included

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# SOLVING RADICAL EQUATIONS

Algebra 2 Guided Notes

**SOLVING RADICAL EQUATIONS**

Solve each equation. Be sure to check for extraneous solutions!

1.  $\sqrt{x+1} = 3$   
 $x+1 = 9$   
 $x = 8$   
 Check:  $\sqrt{8+1} = \sqrt{9} = 3$  ✓

2.  $\sqrt{4x-1} = 3$   
 $4x-1 = 9$   
 $4x = 10$   
 $x = \frac{10}{4} = \frac{5}{2}$   
 Check:  $\sqrt{4(\frac{5}{2})-1} = \sqrt{10-1} = \sqrt{9} = 3$  ✓

3.  $\sqrt{x-2} = 4$   
 $x-2 = 16$   
 $x = 18$   
 Check:  $\sqrt{18-2} = \sqrt{16} = 4$  ✓

4.  $\sqrt{3x+4} = 2$   
 $3x+4 = 4$   
 $3x = 0$   
 $x = 0$   
 Check:  $\sqrt{3(0)+4} = \sqrt{4} = 2$  ✓

5.  $\sqrt{2x-1} = 3$   
 $2x-1 = 9$   
 $2x = 10$   
 $x = 5$   
 Check:  $\sqrt{2(5)-1} = \sqrt{10-1} = \sqrt{9} = 3$  ✓

6.  $\sqrt{4x-1} = 3$   
 $4x-1 = 9$   
 $4x = 10$   
 $x = \frac{10}{4} = \frac{5}{2}$   
 Check:  $\sqrt{4(\frac{5}{2})-1} = \sqrt{10-1} = \sqrt{9} = 3$  ✓

**Steps for Solving Radical Equations**

- Isolate the expression with the radical on one side of the equation.
- Raise both sides of the equation to the power that eliminates the radical or eliminate the radical.
- Check your solution(s)! Make sure to check for extraneous solutions. (When you plug it back in and get a false statement, it is an extraneous solution.)

Directions: Solve each equation. Be sure to check for extraneous solutions!

1.  $\sqrt{x-4} = 0$

2.  $\sqrt{x^2+13} = 17$

3.  $(x-2)\sqrt{x} = 6$

4.  $\sqrt{2x-1} = 3$

5.  $\sqrt{3x+4} = 2$

6.  $\sqrt{4x-1} = 3$

Answer key included

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# GRAPHING RADICAL FUNCTIONS

Algebra 2 Guided Notes

**GRAPHING RADICAL FUNCTIONS**

Directions: Graph the function. Identify the domain & range of the function.

1.  $f(x) = \sqrt{x}$

x	-9	-1	0	1	9
y			0	1	3

Domain:  $[-1, \infty)$

Range:  $[-1, \infty)$

Directions: Graph the function. Identify the domain & range of the function.

2.  $f(x) = \sqrt[3]{x}$

x	-8	-1	0	1	8
y	-2	-1	0	1	2

Domain:  $(-\infty, \infty)$

Range:  $(-\infty, \infty)$

Answer key included

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Check out the *year-long bundle!*

# ALGEBRA 2 GUIDED NOTES Year-Long Bundle

**TRANSFORMATIONS OF FUNCTIONS**

Type of Transformation	f(x) Notation
Reflection	$-f(x)$
Vertical Dilation	$af(x)$ $0 <  a  < 1$ $ a  > 1$
Horizontal Dilation	$f(bx)$ $0 <  b  < 1$ $ b  > 1$
Vertical Translation	$f(x) + k$

**LINEAR REGRESSION**

**SCATTER PLOT**  
Definition: A graph of \_\_\_\_\_ points that are \_\_\_\_\_

**SCATTER PLOT RELATIONSHIPS**

**LINE OF BEST FIT**  
Definition: A line that \_\_\_\_\_ as close as possible to all \_\_\_\_\_

**LINEAR REGRESSION**  
Definition: A linear model that is used to \_\_\_\_\_ between two variables.

**LINEAR INTERSECTIONS**  
Estimating Slope \_\_\_\_\_

**GRAPHING QUADRATIC TRANSFORMS**

Reflection over the x-axis

**COMPOSITION OF FUNCTIONS**

Definition: To make the \_\_\_\_\_ another function.

Things to remember:

- Always start with the \_\_\_\_\_ the function on the \_\_\_\_\_
- Tag does not always equal \_\_\_\_\_

$(f \circ g)(x) = \dots$

$g(x) = 2x + 3$  and  $g(x) = x^2$ , find  $(f \circ g)(x)$

$g(x) = 2x + 3$  and  $g(x) = x^2$ , find  $(g \circ f)(x)$

**COMPOUND INEQUALITIES**

Compound inequality has two separate inequalities joined by \_\_\_\_\_

Graph of a compound inequality with "and" of the graphs of the inequalities.

$x > -8$

**POLYNOMIAL FUNCTION CHARACTERISTICS**

Multiplicities	Touch	Inflection

**RELATIVE EXTREMA (Minimum or Maximum)**  
Points on the graph that help to describe the \_\_\_\_\_ of a function. They are also called \_\_\_\_\_ or \_\_\_\_\_.

**INCREASING INTERVALS**  
The interval between \_\_\_\_\_ y-values \_\_\_\_\_ as the x-value \_\_\_\_\_.

**DECREASING INTERVALS**  
The interval between \_\_\_\_\_ y-values \_\_\_\_\_ as the x-value \_\_\_\_\_.

**POSITIVE INTERVALS**  
Intervals where \_\_\_\_\_

**PROPERTIES OF RATIONAL EXPONENTS & RADICALS**

Property	Properties of Rational Exponents
Product of Powers	Definition
Power of a Power	
Power of a Product	
Negative Exponent	
Zero Exponent	
Quotient of Powers	
Power of a Quotient	

Directions: Use the properties of rational exponents to simplify:  $1. (y^{3/2} \cdot y^{1/2})^2$

**ANSWER KEY INCLUDED**



hey there!

My name is Malia and I'm passionate about making learning and practicing math fun. I love creating engaging math resources for my students and I hope your students enjoy these Rational Exponents guided notes for Algebra 2 that can be used all year long!

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