

# R.2 – Integer Exponents, Scientific Notation, and Order of Operations

## Skills

- R.2a - Simplify powers with integer exponents. Includes negative exponents and 0 exponents.
- R.2b - Simplify expressions that contain integer exponents using the Product Rule.
- R.2c - Simplify expressions that contain integer exponents using the Quotient Rule.
- R.2d - Simplify expressions that contain integer exponents using the Power Rule.
- R.2e - Simplify expressions that contain integer exponents using a combination of rules.

## Introduction

For any positive integer  $n$ ,

$$a^n = \underbrace{a \cdot a \cdot a \cdots a}_{n \text{ factors}}$$

where  $a$  is the **base** and  $n$  is the **exponent**.

For any nonzero real number  $a$  and any integer  $m$ ,

$$a^0 = 1 \quad \text{and} \quad a^{-m} = \frac{1}{a^m}.$$

### **Properties of Exponents**

For any real numbers  $a$  and  $b$  and any integers  $m$  and  $n$ , assuming 0 is not raised to a nonpositive power:

$$a^m \cdot a^n = a^{m+n} \quad \text{Product rule}$$

$$\frac{a^m}{a^n} = a^{m-n} \quad (a \neq 0) \quad \text{Quotient rule}$$

$$(a^m)^n = a^{mn} \quad \text{Power rule}$$

$$(ab)^m = a^m b^m \quad \text{Raising a product to a power}$$

$$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m} \quad (b \neq 0) \quad \text{Raising a quotient to a power}$$

Product Rule

Quotient Rule

Zero Exponent

Negative Exponent

Power Rule

Raising a Product to a Power

Raising a Quotient to a Power

Work for Example 1 and 2

1)

7)

Example 3

5)

Example 4

15)

39)

## **R.2 - EXTRA PRACTICE**

**Extra Practice for R.2b on p.14 #7-26** - Follow the instructions in the book and complete the problems.


**Extra Practice R.2c on p.14 #31-38** - Follow the instructions in the book and complete the problems.


**Extra Practice R.2e on p.14 #27-30 and #39-46 and #47-50** - Follow the instructions in the book and complete the problems.


## R.2 - IXL PRACTICE

IXL - A1-R.1 Powers with integer bases

Date				Final
Grade				
Initials				

R.2a

IXL - A1-R.2 Powers with decimal and fractional bases

Date				Final
Grade				
Initials				

R.2a

IXL - A1-R.3 Negative exponents

Date				Final
Grade				
Initials				

R.2a

IXL - A1-R.4 Multiplication rule for exponents

Date				Final
Grade				
Initials				

R.2b

IXL - A1-R.7 Simplify exponential expressions using the multiplication rule

Date				Final
Grade				
Initials				

R.2b

IXL - A1-R.5 Division rule for exponents

Date				Final
Grade				
Initials				

R.2c

IXL - A1-R.8 Simplify exponential expressions using the division rule

Date				Final
Grade				
Initials				

R.2c

IXL - A1-R.6 Power rule for exponents

Date				Final
Grade				
Initials				

R.2d

IXL - A1-R.12 Evaluate expressions using exponent rules

Date				Final
Grade				
Initials				

R.2e

Closing Reflection: