Standard 8.EE.1

Zero and Negative Exponents

Exponent Unit Day 1

Properties: Zero and Negative Exponents		
Zero as an Exponent	For every nonzero number a, $a^0 = 1$	Examples:
Negative Exponent	For every nonzero number *a* and integer *n*, $a^{-1} = \frac{1}{a^n}$	Examples:

Zero Base and Zero Exponents

Why can't you use 0 as a base and an exponent? Solve each of the following.

$3^0 =$ $2^0 =$ $1^0 =$ $0^0 =$

However, consider the following pattern.

$0^3 =$ $0^2 =$ $0^1 =$ $0^0 =$

It is not possible for 0^0 to equal both 1 and 0. Therefore, 0^0 is _____.

Simplifying Powers

What is the simplified form of each expression?

a) $9^{-2} =$ b) $3.6^0 =$

Got it? What is the simplified form of each expression?

a) $4^{-3} =$ b) $(-5)^0 =$ c) $3^{-2} =$ d) $6^{-1} =$ e) $(-4)^{-2} =$

Simplifying Exponential Expressions

What is the simplified form of each expression?

a) $5a^3b^{-2}$ b) $\frac{1}{x^{-5}} =$

Got it? What is the simplified form of each expression?

a) $x^{-9} =$ b) $\frac{1}{n^{-3}} =$ c) $4c^{-3}b =$ d) $\frac{2}{a^{-3}} =$ e) $\frac{n^{-5}}{m^2} =$

Evaluating an Exponential Expression

What is the value of $3s^3t^{-2}$ for s = 2 and t = -3?

Got it? What is the simplified form of each expression if n = - 2 and w = 5?

a) $n^{-4}w^0$ b) $\frac{n^{-1}}{w^2}$ c) $\frac{n^0}{w^6}$ d) $\frac{1}{nw^{-1}}$

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5.2 Division Properties of Exponents

Day 1

Dividing Powers with the Same Base		
To divide powers with the same base, subtract the exponents.	$\frac{a^m}{a^n} =$	Examples: $\frac{x^4}{x^7} =$

Why it Works: Use repeated multiplication to rewrite the product of powers: $3^8 \div 3^6 = ?$

1. Expand each into the product numbers to the right.

$$\frac{3^8}{3^6} = \left(\text{\_\_\_\_\_} \right) =$$

Dividing Algebraic Expressions

What is each expression written using each base only once?

a) $\frac{4x^8}{2x^3} =$ b) $\frac{9m^2n^4}{-12m^5n^3} =$ c) $\frac{-9k^6j^2}{36kj^5} =$ d) $\frac{5^{-2}a^{-3}b^7}{2a^5b^2} =$

Raising a Quotient to a Power		
To raise a quotient to a power, raise the numerator and the denominator to the power and simplify.	$\left(\frac{a}{b}\right)^n =$	Examples: $\left(\frac{3}{5}\right)^3 =$

Why it Works: Use repeated multiplication to rewrite the product of powers: $\left(\frac{x}{y}\right)^3$

1. Expand each into the product numbers to the right.

$$\left(\frac{x}{y}\right)^3 = \text{\_\_\_\_\_} = \text{\_\_\_\_\_} =$$

Raising a Quotient to a Power

a) What is the simplified form of $\left(\frac{z^4}{5}\right)^3$?

b) What is the simplified form of $\left(\frac{4}{x^3}\right)^2$?

Raising a Quotient to a Negative Power		
To raise a quotient to a negative power, raise the numerator and the denominator to the power and simplify.	$\left(\frac{a}{b}\right)^{-n} =$	Examples: $\left(\frac{h}{g}\right)^{-3} =$

Simplifying an Exponential Expression

a) What is the simplified form of $\left(\frac{2x^6}{y^4}\right)^{-3}$?

b) What is the simplified form of $\left(\frac{a}{5b}\right)^{-2}$?