4-1 Exponent Rules Review

4-1a: I can use properties of exponents to simplify and evaluate exponential expressions.

Like-terms review

Group the like terms and then combine

x^3 x $-5x$ $-x^2$ x^2 $7x^2$ $2x^3$ $-6x^3$ $3x$

EXPONENT RULES

Graphic Organizer

Name	Rule	Examples
ADDING & SUBTRACTING MONOMIALS	**COMBINE LIKE TERMS!!!** (DO NOT CHANGE common variables and exponents!)	**1.** $9x^2y - 10x^2y =$ **2.** Subtract $6w$ from $8w$.
PRODUCT RULE	$x^a \cdot x^b =$	**1.** $h^2 \cdot h^6 =$ **2.** $(-2a^2b) \cdot (7a^3b) =$
POWER RULE	$(x^a)^b =$	**1.** $(x^2)^3 =$ **2.** $(-2m^5)^2 \cdot m^3 =$
QUOTIENT RULE	$\frac{x^a}{x^b} =$	**1.** $\frac{27x^5}{42x} =$ **2.** $\frac{(y^2)^2}{y^4} =$
NEGATIVE EXPONENT RULE	$x^{-a} =$	**1.** $-5x^{-2} =$ **2.** $\frac{4k^2}{8k^5} =$
ZERO EXPONENT RULE	$x^0 =$	**1.** $7x^0 =$ **2.** $\frac{(w^4)^2}{w^8} =$

ADDING & SUBTRACTING MONOMIALS

COMBINE LIKE TERMS!!!

(DO NOT CHANGE common variables and exponents!)

1. $9x^2y - 10x^2y =$ $-1x^2y = -x^2y$

2. Subtract $6w$ from $8w$.

$8w - 2w = 2w$

PRODUCT RULE | $x^a \cdot x^b = x^{a+b}$

1. $h^2 \cdot h^6 = h^8$

2. $(-2a^2b^1) \cdot (7a^3b^1) = -14a^5b^2$

$$x^a \cdot x^b = x^{a+b}$$

$$x^2 \cdot x^3 = x \cdot x \cdot x \cdot x \cdot x$$

$$= x^5 \longrightarrow x^{2+3}$$

POWER RULE | $(x^a)^b = x^{a \cdot b}$

1. $(x^2)^3 = x^6$

2. $(-2m^5)^2 \cdot m^3 =$ $\rightarrow 4m^{13}$

$4m^{10} \cdot m^3$

$(-2)^2 \cdot (m^5)^2$

$$(x^a)^b = x^{a \cdot b}$$

$$(x^2)^3 = x^2 \cdot x^2 \cdot x^2$$

$$= x \cdot x \cdot x \cdot x \cdot x \cdot x$$

$$= x^6 \rightsquigarrow x^{2 \cdot 3} \checkmark$$

$27 < 3, 9, 3, 3$ $\quad 42 < 7, 6 < 3, 2$

QUOTIENT RULE

$$\frac{x^a}{x^b} = x^{a-b}$$

1. $\frac{27x^5}{42x^1} = \frac{9x^4}{14}$ or $\frac{9}{14}x^4$

2. $\frac{(y^2)^2}{y^4} = \frac{y^4}{y^4} = y^0 = 1$

$$\frac{x^a}{x^b} = x^{a-b}$$

$$\frac{x^7}{x^3} = \frac{\cancel{x}\cancel{x}\cancel{x}xxxx}{\cancel{x}\cancel{x}\cancel{x}} = x^4$$

x^{7-3} ✓

$$\frac{x^a}{x^b} = x^{a-b}$$

$$\frac{1 \cdot x^3}{x^9} = x^{-6}? \quad \frac{1}{x^6}?$$

NEGATIVE EXPONENT RULE

$$x^{-a} = \frac{1}{x^a}$$

1. $-5x^{-2} = \frac{-5}{x^2}$

2. $\frac{4k^2}{8k^5} = \frac{1}{2k^3}$

ZERO EXPONENT RULE

$$x^0 = 1$$

1. $7x^0 = 7 \cdot x^0 = 7 \cdot 1 = 7$

2. $\dfrac{(w^4)^2}{w^8} = \dfrac{w^8}{w^8} = 1$

More Practice!

$$\frac{9p^{-2}q^{5}}{15p^{2}q^{3}}$$

$$4x^{2}y \cdot -3x^{-5}y^{2}$$

$$\left(\frac{-9c^{3}d}{c^{2}d^{2}}\right)^{2}$$

Simplify each of the following:

$x \bullet x \bullet x \bullet x \bullet x =$

$x^4 \bullet x^9 =$

$(ab)^{14} =$

$\left(\frac{a}{2}\right)^4 =$

$\frac{k^{12}}{k^5} =$

$\left(\frac{1}{4}\right)^0 =$