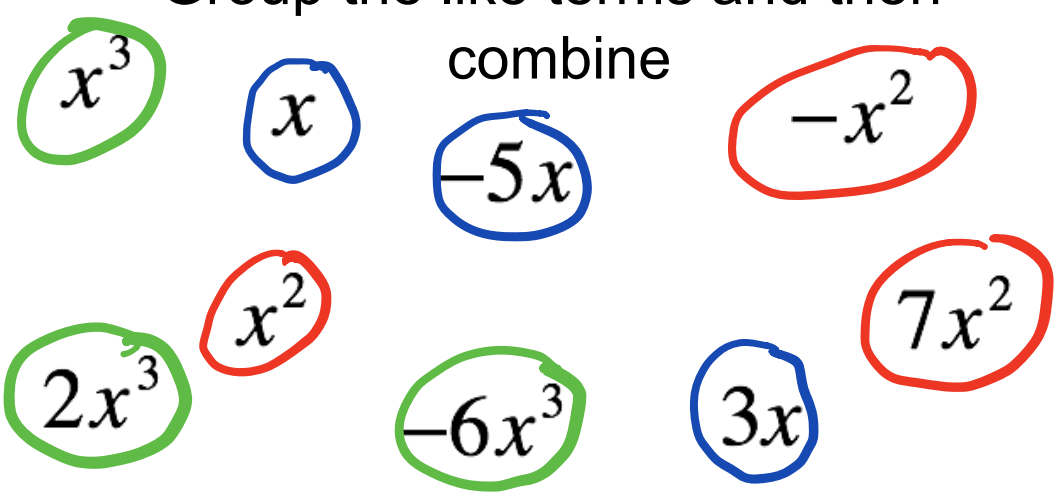
4-1 Exponent Rules Review

Like-terms review

Group the like terms and then combine



$x - 5x + 3x = -1x$

$x^2 - x^2 + 7x^2 = 7x^2$

$x^3 + 2x^3 - 6x^3 = -3x^3$

Get the graphic organizer & fill in as you go.

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!)

Common variables

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

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

$8w - 6w = 2w$

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

1. $h^2 \cdot h^6 = h^{2+6} = h^8$

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

$-14a^{2+3}b^{1+1} = -14a^5b^2$

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

1. $(x^2)^3 = x^{2 \cdot 3} = x^6$

2. $(-2m^5)^2 \cdot m^3 =$

$(-2)^2(m^5)^2 \cdot m^3 = 4m^{5 \cdot 2} \cdot m^3 = 4m^{10} \cdot m^3$

$4m^{10+3} = 4m^{13}$

QUOTIENT RULE

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

simplify

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

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

zero exponent rule ↓ coming up

$\frac{y^4}{y^4} = 1$

NEGATIVE EXPONENT RULE

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

if this ↑ then

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

the negative exponent flips the x.

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

2. $\frac{4k^2}{8k^5} = \frac{4k^{2-5}}{8} =$ simplify

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

ZERO EXPONENT RULE

$$x^0 = 1$$

any thing to the zero power equals 1.

1. $7x^0 = 7(1) = 7$

2. $\frac{(w^4)^2}{w^8} = \frac{w^{4 \cdot 2}}{w^8} = w^{8-8} = w^0 = 1$

Power Rule

Quotient Rull

$\frac{w^8}{w^8} = w^{8-8} = w^0 = 1$

Zero exponent Rule

* Never leave a negative exponent in your answer. Always write as a positive exponent.

More Practice!

simplify

$$\frac{9p^{-2}q^5}{15p^2q^3} = \frac{9p^{-2-2}q^{5-3}}{15} = \frac{9p^{-4}q^2}{15} = \frac{9q^2}{15p^4} = \frac{3q^2}{5p^4}$$

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

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

$$-12x^{2-5} \cdot y^{1+2} = -12x^{-3}y^3 =$$

$$\frac{-12y^3}{x^3}$$

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

$$\frac{(-9c^3d)^2}{(c^2d^2)} = \frac{81c^{3\cdot2}d^{1\cdot2}}{c^{2\cdot2}d^{2\cdot2}} =$$

$$\frac{81c^6d^2}{c^4d^4} = 81c^{6-4}d^{2-4} = 81c^2d^{-2} = \frac{81c^2}{d^2}$$

Simplify each of the following:

$x^1 \cdot x^1 \cdot x^1 \cdot x^1 \cdot x^1 = x^{1+1+1+1+1} = x^5$

$x^4 \cdot x^9 = x^{4+9} = x^{13}$

$(ab)^{14} = a^{1 \cdot 14} \cdot b^{1 \cdot 14} = a^{14} b^{14}$

$\left(\frac{a}{2}\right)^4 = \frac{a^4}{2^4} = \frac{a^4}{16}$

$\frac{k^{12}}{k^5} = k^{12-5} = k^7$

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