

Lesson 4.3- SWBAT rewrite expressions using law of exponents.  
 Kick off- Take out your homework and rewrite the following expressions.

1)  $\frac{18x^3y^5}{-6x^2y}$  2)  $(-3z^4y^{-5})(3zy^7)$

$-3y^4$   $-9z^5y^2$

3)  $(5x^2yz^3)^2$  4)  $\frac{(2x^3)(-3x)^2}{2x}$

$5^2x^4y^2z^6$   $(2x^3)(-3x)(-3x)$

OR  $25x^4y^2z^6$   $\frac{2x}{18x^5}$

$9x^4$

Express in expanded form and use the law of exponents on each of the following:

1)  $\frac{6^2}{6^5} = \frac{6 \cdot 6}{6 \cdot 6 \cdot 6 \cdot 6 \cdot 6} = \frac{1}{6^3}$  2)  $\frac{2^2}{2^5}$

$6^{-3}$   $2^{-2} = \frac{1}{2^2}$

Rule #4: **NEGATIVE POWER**- when a base is raised to a **negative exponent**, the answer will be a **fraction**. Move that base and exponent to the denominator and make it positive! **(change its location!)**

Example:  $\frac{5^3}{5^7} = 5^{-4} = \frac{1}{5^4}$  Example:  $\frac{10x^2}{2x^4} = 5x^{-2}$

$\frac{5}{x^2}$

3)  $4^{-3} = \frac{1}{4^3}$  4)  $7^{-2} = \frac{1}{7^2} \rightarrow \frac{1}{49}$  5)  $(3)^{-4} = \frac{1}{3^4}$

6)  $\frac{9^2}{9^5} = 9^{-3} = \frac{1}{9^3}$  7)  $\frac{7^2}{7^6} = 7^{-4} = \frac{1}{7^4}$  8)  $\frac{y^{-4}}{x^2} = \frac{1}{x^2y^4}$

9)  $-7x^{-2} = \frac{-7}{x^2}$  10)  $\frac{-12y^3x^2}{6yx^9} = \frac{-2y^2}{x^3}$  11)  $5xy^{-2} = \frac{5x}{y^2}$

12)  $\frac{5^2}{3^{-3}} = \frac{5^2 \cdot 3^3}{1}$  13)  $\frac{4y^2z^4}{-15yz^{-13}} = \frac{-2yz^{17}}{x^3}$  14)  $\frac{9x^{-3}}{x^{-5}} = 9x^2$

$(-3 \ominus -5)$

Express in expanded form and use the law of exponents to rewrite.

1)  $\frac{9^3}{9^3} = \frac{9 \cdot 9 \cdot 9}{9 \cdot 9 \cdot 9} = 1 \cdot 1 \cdot 1 = 1$  2)  $\frac{x^2}{x^2} \cdot x^0 = 1$

$9^0 = 1$

Rule #5: **ZERO POWER**- when any base is raised to a zero exponent, the entire thing will equal 1.

Example:  $-100^0$  |      Example:  $y^0$  |

3) $5^0$ 1	4) $18^0$ 1	5) $x^0$ 1
6) $xy^0$ $x(1)$ $1x$ or $x$	7) $(4x)^0$ 1	8) $4x^3y^0$ $4x^3$
9) $\frac{x^3}{x^3} = 1$	10) $\frac{-10x^2y}{5x^2y} = -2$	11) $\frac{18x^2y^2}{3x^2y^7} = \frac{6y^5}{y^5}$

Rule #6: **FRACTIONAL POWER**- when a base has a fraction power, that means it is a root! Rewrite as:

$$\text{base}^{\frac{\text{power}}{\text{root}}} = \sqrt[\text{root}]{\text{base}^{\text{power}}}$$

1) $4^{\frac{3}{2}}$ $\sqrt{4^3}$	2) $x^{\frac{4}{3}}$ $\sqrt[3]{x^4}$	3) $2x^{\frac{1}{2}}$
4) $(4x^2)^{\frac{1}{2}}$	5) $(5x^{-\frac{1}{2}})^3$	6) $3^{\frac{5}{6}}x^{-2}y^0$
7) $(3x)^0$	8) $3x^0$	9) $(-2x^{-2})^3$

7)  $(4x^{\frac{1}{2}})^5$   
 $4^5 x^{\frac{5}{2}}$