8.3: Zero and Negative Exponents

Goals: *Simplify expressions raised to the zero power
*Rewrite expressions using all positive exponents

Zero Exponents:

****NOTICE****

$2^5 =$

$2^4 =$

$2^3 =$

$2^2 =$

$2^1 =$

$2^0 = ?$

$5 \cdot 1 = 5$
$4 \cdot 1 = 4$
$b \cdot 1 = b$

Anything times 1 is _____!

****PROOF****

$x^m \cdot x^n = x^{m+n}$ and

$x^3 \cdot \_\_\_\_ = x^3$

$x^3 \cdot x^? = x^{3+?} = x^3$

1)

2)

Negative Exponents:

****NOTICE****

$2^2 =$

$2^1 =$

$2^0 =$

$2^{-1} = \quad = \frac{1}{2^?}$

$2^{-2} = \quad = \frac{1}{2^?}$

****PROOF****

$\frac{a^m}{a^n} = a^{m-n}$

$\frac{2^4}{2^5} = 2^{4-5} = 2^{-1}$

$\frac{2 \cdot 2 \cdot 2 \cdot 2}{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2} = \quad = \frac{1}{2^?}$

Simplify the following expressions. Write your answer using positive exponents.

Ex: x^{-2}

Ex: 4^{-3}

Ex: $\dfrac{1}{y^{-3}}$

Ex: $\left(\dfrac{2}{3}\right)^{0}$

Ex: $(-8)^{-2}$

Ex: $\dfrac{1}{2^{-3}}$

Ex: $(-1)^{0}$

Ex: $\left(\dfrac{2}{3}\right)^{-2}$

Ex: $\dfrac{7^{3}}{7^{5}}$

Ex: $\dfrac{5^{-1}}{5^{2}}$

Ex: $\left(2xy^{-5}\right)^{3}$

Ex: $\dfrac{(2x)^{-2}y^{5}}{-4x^{2}y^{2}}$

Ex: $(3x^{-2}y^{2})^{3}$

Ex: $\dfrac{4x^{-2}y^{4}}{8xy^{6}}$