Patterns with Integer Exponents

-1 from exponent

$2^3 = 8$ $\div 2$ | $3^3 = 27$ $\div 3$ | $4^3 = 64$ $\div 4$

$2^2 = 4$ $\div 2$ | $3^2 = 9$ $\div 3$ | $4^2 = 16$ $\div 4$

$2^1 = 2$ | $3^1 = 3$ | $4^1 = 4$

What if we kept the pattern going?

$2^0 = 1$ $\quad 3^0 = 1$ $\quad 4^0 = 1$

* Any number to the power of 0 = 1

Except : 0^0 = undefined

Lets keep Going!

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

$2^{-2} = \frac{1}{4} = \frac{1}{2^2}$ $\quad 3^{-2} = \frac{1}{9} = \frac{1}{3^2}$ $\quad 4^{-2} = \frac{1}{16} = \frac{1}{4^2}$

$2^{-3} = \frac{1}{8} = \frac{1}{2^3}$ $\quad 3^{-3} = \frac{1}{27} = \frac{1}{3^3}$ $\quad 4^{-3} = \frac{1}{64} = \frac{1}{4^3}$

Let's Generalize :

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

Ex:) Simplify:

5^{-2}

$\frac{1}{5^2}$

$\boxed{\frac{1}{25}}$

Ex:) 2^{-7}

$\frac{1}{2^7}$

$\boxed{\frac{1}{128}}$

040:) 3^{-4}

$\frac{1}{3^4}$

$\boxed{\frac{1}{81}}$

040:) 6^{-3}

$\frac{1}{6^3}$

$\boxed{\frac{1}{216}}$