

5.1 EQ: How do you simplify with exponents?

$3 \square 4$  base  $\rightarrow$   $3^4$  ← exponent  
 $= 3 \cdot 3 \cdot 3 \cdot 3 = 81$   
"3 to the 4th power"

$$x^0 = 1$$

$$3^0 = 1$$

$$3,000,000^0 = 1$$

$$(xyz)^0 = 1$$

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

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

$$\frac{x^{-7}}{y^{-4}} = \frac{y^4}{x^7}$$

## Simplifying Exponent Expressions:

- Go one rule at a time (zero or negative)
- Go until no more rules to do
- Leave fractions in your answers

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

Example 1: Simplify each expression.

a)  $4^{-3}$

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

$$\boxed{\frac{1}{64}}$$

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b)  $(-5)^0$

$$\boxed{1}$$

\*parentheses matter!

c)  $3^{-2}$

$$\frac{1}{3^2}$$

$$\boxed{\frac{1}{9}}$$

d)  $(-4)^{-2}$

$$\frac{1}{(-4)^2}$$

$$\boxed{\frac{1}{16}}$$