Exponent Laws (Review)

Zero Power: Always equals 1

$$4^0 = 1$$

Negative Exponents:

Simplify negative exponents by switching them to the opposite part of the fraction

(numerator $\leftrightarrow$ denominator)

$$x^{-3} = \frac{1}{x^3} \qquad \frac{4^5}{x^{-2}} = 4^5 x^2$$

Multiplied Bases: Add the exponents

$$(2^3)(2^5) = 2^8$$

Divided Bases: Subtract the exponents: top minus bottom

$$\frac{3^5}{3^8} = 3^{-3} = \frac{1}{3^3}$$

Power to a Power: Multiply the exponents

$$(2^3)^5 = 2^{15}$$

Product or quotient raised to a power: distribute the exponent to each term

$$(-3x)^5 = (-3)^5x^5$$

$$\left(\frac{x}{5}\right)^5 = \frac{x^5}{5^5}$$

$$(2x^2y^3)^4 = 2^4x^8y^{12}$$

$$(3 + x)^5 \neq 3^5 + x^5$$

This does not work if there is addition or subtraction (Use Pascal's Triangle instead)

Simplify the expression: $\frac{(3^2)^{x+1}}{3^{2+x}.3^{2x}}$

$$\frac{3^{2x+2}}{3^{2+3x}}$$

Power to a power: multiply exponents

Multiplying like bases: add exponents

$$3^{2x+2-(2+3x)}$$

Dividing like bases: subtract exponents

$$3^{-x}$$

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

Negative exponent: switch to opposite place in fraction

(you cannot finish a problem with a negative exponent)