SM3: Properties 5-1 (exponents)

Multiply Powers Property: when you multiply same-based powers, you add the exponents.

$$(x^2)(x^3) = (x*x)(x*x*x) = x^5 \qquad x^2x^3 = x^{2+3} = x^5$$

Exponent of a Power Property: a power (base and an exponent) that has another exponent $(x^2)^3$ is simplify by multiplying the exponents

$$(x^2)^3 = (x*x)(x*x)(x*x) \quad = x^{2*3} = x^6$$

Exponent of a Product Property: (an exponent of two or more different-based powers that are being multiplied together) is simplified by multiplying the exponent outside of the parentheses by each of the exponents inside of the parentheses. $(xy^3)^2 = (xy^3)(xy^3) = xxy^3y^3 = x^2y^6$

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

This makes it seem that there is a "distributive property of exponents" → ***there is NOT.***

$$(x+y)^2 \neq x^2 + y^2$$

$$(x+y)^2 = x^2 + 2xy + y^2$$

Negative Exponent Property actually means the reciprocal of the number. Another way to understand it is "grab and drag." When you "Grab and drag" the base and its exponent across the "boundary line" between numerator and denominator, you just change the sign of the exponent.

$$x^{-2} = \frac{1*x^{-2}}{1} = \frac{1}{x^2}$$

Zero Exponent Property Any base raised to the zero power simplifies to one.

$$10^3 = 1000 \qquad 10^2 = 100 \qquad 10^1 = 10 \qquad 10^0 = 1$$