

Rules for Exponents

Multiplying: When you multiply variables with Exponents, you ADD the exponents.

$$\text{Ex. } x^3 (x^6) = x^{6+3} = x^9$$

Power to Power: When you have an exponent on another exponent MULTIPLY the exponents.

$$\text{Ex. } (x^3)^6 = x^{3(6)} = x^{18}$$

Power to Power distributing: Take any exponent outside the parenthesis and distribute it to each part of the term inside the parenthesis.

$$\text{Ex. } (5xy^6)^3 = 5^3 x^3 y^{6(3)} = 125x^3y^{18}$$

Zero Exponents: When anything is to the zero power it is equal to 1.

$$\text{Ex. } (312x y^4)^0 = 1$$

Advanced Exponent Rules

Fractions: When you have exponent problems that involve fractions, simply apply the exponent to the numerator and denominator.

Ex. $(\frac{1}{4}x y^4)^3 (2x^3 y)^2 =$

$$1^3 / 4^3 x^3 (y^4)^3 (2^2 (x^3)^2 y^2)$$

Distribute your exponent

$$1/64 x^3 y^{4(3)} (4x^{3(2)} y^2)$$

Multiply your power to power exponents and

$$1/64 x^3 y^{12} (4x^6 y^2)$$

do your coefficients normal.

$$4/64 x^{3+6} y^{12+2}$$

Multiply fractions across, multiply variables by adding exponents.

$$1/16 x^9 y^{14}$$

Reduce fraction and finish simplifying exponents on variables.

Negatives: If any of your exponents **outside of the innermost parenthesis** are even, then your answers must be positive.

Ex. $(-x^2)^3 = (-x^2) (-x^2) (-x^2) = (-x^{2+2+2}) = -x^6$

This answer is negative because $(-)(-)(-) = -$ answer

Ex. $(-x^3)^2 = (-x^3) (-x^3) = (x^{3+3}) = x^6$

This answer is positive because $(-)(-) = +$ answer

