

# Properties Of Exponential Expressions

Many problems often contain expressions that involve exponents. Simplifying these exponential expressions make these problems easier to solve. The following properties of exponents should be familiar to students **and understood** by students.

$$x^m \cdot x^n = x^{m+n} \quad \text{Product of exponential expressions with the same base}$$

$$\frac{x^m}{x^n} = x^{m-n} \quad \text{Quotient of exponential expressions with the same base}$$

$$x^{-n} = \frac{1}{x^n}; \quad x \neq 0 \quad \text{Negative exponent Property}$$

$$\frac{1}{x^{-n}} = x^n; \quad x \neq 0 \quad \text{Negative exponent Property}$$

$$x^0 = 1; \quad x \neq 0 \quad \text{Zero Exponent Property}$$

$$x^{1/2} = \sqrt{x}; \quad x \geq 0 \quad \text{One-half Exponent Property}$$

$$x^{1/3} = \sqrt[3]{x} \quad \text{One-third Exponent Property}$$

$$x^{m/n} = \sqrt[n]{x^m} = \left(\sqrt[n]{x}\right)^m \quad \text{Fractional Exponent Property}$$

$$\left(x^m\right)^n = x^{mn} \quad \text{Power of a Power Property}$$

$$\left(xy\right)^n = x^n y^n \quad \text{Power of a Product Property}$$

$$\left(\frac{x}{y}\right)^n = \frac{x^n}{y^n} \quad \text{Power of a Quotient Property}$$