

Basic Algebra Rules

Exponential Rules:

$$a^m \cdot a^n = a^{m+n}$$

$$(ab)^m = a^m b^m$$

$$\frac{a^m}{a^n} = a^{m-n}; \quad a \neq 0$$

$$a^0 = 1; \quad a \neq 0$$

$$a^{1/m} = \sqrt[m]{a}$$

$$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}; \quad b \neq 0$$

$$(a^m)^n = a^{mn}$$

Distribution Law:

$$a(b + c) = ab + ac$$

$$\frac{a + b}{c} = \frac{a}{c} + \frac{b}{c}$$

$$\frac{a - b}{c} = \frac{a}{c} - \frac{b}{c}$$

Quadratic Factoring:

$$(a + b)^2 = a^2 + 2ab + b^2$$

$$(a - b)^2 = a^2 - 2ab + b^2$$

$$a^2 - b^2 = (a - b)(a + b)$$

Properties of Logarithm:

$$\log_a(MN) = \log_a M + \log_a N$$

$$\log_a\left(\frac{M}{N}\right) = \log_a M - \log_a N$$

$$\log_a(M)^t = t \log_a M$$

$$\log_a a = 1$$

$$\log_a 1 = 0$$

$$\log_a a^x = x$$

$$a^{\log_a x} = x$$

Change of Base: $\log_a M = \frac{\log_b M}{\log_b a}$

$$\ln(MN) = \ln M + \ln N$$

$$\ln\left(\frac{M}{N}\right) = \ln M - \ln N$$

$$\ln(M)^t = t \ln M$$

$$\ln e = 1$$

$$\ln 1 = 0$$

$$\ln e^x = x$$

$$e^{\ln x} = x$$