

Logarithm and Exponents:

$$\log(a * b) = \log(a) + \log(b)$$

$$10^{a+b} = 10^a \cdot 10^b$$

$$\log\left(\frac{a}{b}\right) = \log(a) - \log(b)$$

$$10^{a-b} = \frac{10^a}{10^b}$$

$$\log(a)^b = b * \log(a)$$

$$10^{a \cdot b} = (10^a)^b$$

$$a^b = [e^{(\ln(a))}]^b$$

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Base Conversion:

$$10^{\log(a)} = a \quad \Rightarrow \quad \ln(10) \cdot \log(a) = \ln(a) \quad \Rightarrow$$

$$\log(a) = \frac{\ln(a)}{\ln(10)} \quad \text{so...to convert } \log(a) \quad \text{to } \ln \Rightarrow \quad \log(a) = \frac{\ln(a)}{\ln(10)}$$

This path can be used for base conversion in general.