Exponents and Logarithms

Exponents

Exponent Properties

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

$\frac{a^m}{a^n} = a^{m-n}$

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

$a^{\frac{1}{n}} = \sqrt[n]{a}$

$a^{-n} = \frac{1}{a^n}$

$a^0 = 1$

$a^1 = 0$

$a^{\log_a b} = b$

Exponent Functions

These are three common forms of the half-life formula; they will all yield the same results.

Growth and Decay

Linear: $A = A_0 + rt$

Exponential Growth: $A = A_0 e^{rt}$

Exponential Decay: $A = A_0 e^{-rt}$

A, A₀ *- Final, Initial amounts;* ***r*** *- rate;* ***t*** *- time*

Compound Interest

n times per year: $A = P(1 + \frac{r}{n})^{nt}$

Continuously: $A = Pe^{rt}$

A *- Final amount;* ***P*** *- Principal;* ***t*** *- time;* ***r*** *- rate;* ***n*** *- # times compounded per yr*

Half-Life

$A = A_0 e^{kt}$

$A = A_0(2^{-\frac{t}{h}})$

$A = A_0(\frac{1}{2})^{\frac{t}{h}}$

A, A₀ *- Final, Initial amounts;* ***t*** *- time;* ***r*** *- rate;* ***k*** *- constant,* ***h*** *- half-life*

Logarithms

Logarithm Properties

$\log ab = \log a + \log b$

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

$\log a^b = b \log a$

$\log_a b = \frac{\log b}{\log a}$

$\log 1 = 0$

$\log_a a = 1$

$\log_a a^b = b$

$\log \frac{1}{n} = -\log n$

Rev.