Exponential Functions

$$f(x) = ac^{b(x-h)} + k$$

Asymptote: y = k

Logarithmic Functions

$$f(x) = a\log_c b(x-h) + k$$

Asymptote: x = h

Logarithmic Laws

1. $\log_c c = 1$
2. $\log_c 1 = 0$
3. $\log_c c^n = n$
4. $\log_c M + \log_c N = \log_c (M \times N)$
5. $\log_c M - \log_c N = \log_c \left(\frac{M}{N}\right)$
6. $\log_c M^n = n \log_c M$
7. $\log_{1/c} M = -\log_c M$
8. $\log_c M = \frac{\log M}{\log c}$

Exponential Expression to Logarithmic Expression

$y = a^x \leftrightarrow \log_a y = x$

Theorems

$if\ c^x = c^y, then\ x = y$

$if\ a^x = b^y, then\ \log a^x = \log b^y$

Exponential Growth and Decay

$$A(t) = A_o(1 + \frac{r}{k})^{kt}$$

A(t) = Amount after t time

A_o = Initial Amount

r = Rate, expressed as a decimal

k = Compounding Constant

$A(t) = ac^{kt}$

a = initial amount

c = rate of change

k = rate constant

A(t) = amount after t time