Properties of Logarithms

Logarithm of a product: $\log_b(xy) = \log_b(x) + \log_b(y)$

Logarithm of a quotient: $\log_b\left(\frac{x}{y}\right) = \log_b(x) + \log_b(y)$

Logarithm of a power: $\log_b(x^k) = k \cdot \log_b(x)$

one error in each section (2 errors total)

Change of base

(we will learn change of base soon!)

Examples

Condense into a single logarithm:

$\log 3 - \log x - \log x$

$= \log 3 - 2\log x$

$= \log 3 - \log x^2$

$= \log\left(\frac{3}{x^2}\right)$

Expand: $\log_5\left(z\sqrt[3]{xy}\right)$

$= \log_5\left(zxy^{1/3}\right)$

$= \log_5 z + \log_5 x + \log_5 y^{1/3}$

$= \log_5 z + \log_5 x + \frac{1}{3}\log_5 y$

$= \log_5 z + \log_5 x + \frac{\log_5 y}{3}$