



Math Study Strategies

Logarithm Properties

Definition

To find the log of a number, it is necessary to find the exponent that indicates the power to which the number must be raised to produce a given number.

ex. The log of 100 to the base 10 is 2

$y = \log_b x$ is equivalent to $x = b^y$

There are common logarithms (base 10) and natural logarithms (base e , $e = 2.7182818\dots$)

Properties

Product Property

$$\log_b(xy) = \log_b x + \log_b y$$

Quotient Property

$$\log_b(x/y) = \log_b x - \log_b y$$

Power Property

$$\log_b x^r = r \log_b x$$

Logarithm of One

$$\log_b 1 = 0$$

Inverse Property

$$b^{\log_b x} = x \text{ and } \log_b b^x = x$$

One-to-One (1-1) Property

$$\text{If } \log_b x = \log_b y \text{ then } x = y$$

Change of Base

$$\log_a N = \frac{\log_b N}{\log_b a}$$

a = existing base

b = desired base

Note: for these properties, the left side of the equation is called **condensed** and the right side is called **expanded**.

