

Name: _____

Logarithms are Exponents:

If $x > 0$ and $0 < b \neq 1$, then: $y = \log_b(x)$ if and only if $b^y = x$

The Common Logarithmic Function:

$f(x) = \log_{10} x = \log x$, therefore $y = \log x$ if and only if $10^y = x$

The Natural Logarithmic Function

$f(x) = \log_e x = \ln(x)$, therefore $y = \ln x$ if and only if $e^y = x$

Properties of Logarithmic Functions

Let b , R , and S be **positive** real numbers with $b \neq 1$, and c any real number.

Product Rule: $\log_b(RS) = \log_b R + \log_b S$

Quotient Rule: $\log_b\left(\frac{R}{S}\right) = \log_b R - \log_b S$

Power Rule: $\log_b(R^c) = c \log_b R$

Change each exponential to logarithm form

1. $81 = 3^4$ 2. $2^x = 7.2$ 3. $a^x = m$

Change each logarithm to exponential

1. $\log_4 64 = 3$ 2. $\log_6 1 = 0$ 3. $\log_2 8 = x$

The Logarithmic Function

1. $\log_2 8 =$ 2. $\log_3 \sqrt{3}$ 3. $\log_5 \frac{1}{25}$