

Pre-Calculus 12 Introduction to Logarithms

For the exponential function $y = a^x$ the inverse is $x = a^y$. This inverse is also a function and is called a logarithmic function. It is written as $y = \log_a x$ (**Read as:** “y equals the log of x in base a”), where “a” is a positive number other than 1.

Log Form	Exponential Form
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$$\log_a x = y$$

$$a^y = x$$

Common log – a log with base 10 (our number system is based on powers of 10)

ie) $\log 25$

Ex. 1) Express the following in logarithmic form

a) $2^3 = 8$

b) $3^{-2} = \frac{1}{9}$

c) $y = 4^x$

d) $A^2 = C$

Ex. 2) Express the following in exponential form

a) $\log_4 16 = 2$

b) $\log \frac{1}{1000} = -3$

c) $y = \log_{\frac{1}{2}} 4$

d) $M = \log_b N$

Ex. 3) Evaluate

a) $\log_2 16$

b) $\log_2 \left(\frac{1}{4}\right)$

c) $\log_3(\sqrt{3})$

d) $\log_3(\log_2 8)$

Ex. 4) Solve

a.) $\log_8 x = \frac{1}{3}$

b) $\log_8 64 = y$

Ex. 5) Without technology, estimate the value of $\log_2 14$ to one decimal place.