

Rewriting Exponential Functions as Logarithms

Exponentials and Logarithms are inverses of each other.

Exponential function: $y = a^x$
Logarithmic Function: $y = \log_a x$

You can convert exponential functions to logarithmic functions, and vice versa, by doing the following:

$4^2 = 16$	$3^4 = 81$	}	$\log_2 32 = 5$	$\log_3 9 = 2$
$\log_4 16 = 2$	$\log_3 81 = 4$	}	$2^5 = 32$	$3^2 = 9$

Convert to exponential form.

Ex. 1 Log form: $\log_3 5 = y$ Ex. 2 Log form: $\log_a 7 = -2$ Ex. 3 Log form: $\log_b d = a$

Exponential form: $3^y = 5$ Exponential form: $a^{-2} = 7$ Exponential form: $b^a = d$

Convert to logarithmic form.

Ex. 4 Expo form: $10^3 = 1000$ Ex. 5 Expo form: $2^x = 8$ Ex. 6 Expo form: $y^{-1} = 4$

Logarithmic form: $\log_{10} 1000 = 3$ Logarithmic form: $\log_2 8 = x$ Logarithmic form: $\log_y 4 = -1$

What is the exponent of 2 that gives you 32?

$\log_2 32 = x$ $2^x = 32$ $x = 5$

What is the exponent of 3 that gives you 27?

$\log_3 27 = x$ $3^x = 27$ $x = 3$

What is the exponent of 4 that gives you 2?

$\log_4 2 = x$ $4^x = 2$ $x = \frac{1}{2}$

What is the exponent of 3 that gives you 1?

$\log_3 1 = x$ $3^x = 1$ $x = 0$