

exponents	logarithms
(All laws apply for any positive a , b , x , and y .)	
$x = b^y$ is the same as $y = \log_b x$	
$b^0 = 1$	$\log_b 1 = 0$
$b^1 = b$	$\log_b b = 1$
$b^{(\log_b x)} = x$	$\log_b b^x = x$
$b^x b^y = b^{x+y}$	$\log_b (xy) = \log_b x + \log_b y$
$b^x / b^y = b^{x-y}$	$\log_b (x / y) = \log_b x - \log_b y$
$(b^x)^y = b^{xy}$	$\log_b (x^y) = y \log_b x$
	$(\log_a b) (\log_b x) = \log_a x$
	$\log_b x = (\log_a x) / (\log_a b)$
	$\log_b a = 1 / (\log_a b)$