logarithm → exponents.

$\log xy = \log x + \log y$	$a^b \cdot a^c = a^{b+c}$
$\log \frac{x}{y} = \log x - \log y$	$\frac{a^b}{a^c} = a^{b-c}$
$\log x^y = y \cdot \log x$	$(a^b)^c = a^{bc}$

$b = \log_a c$ $\qquad$ $a^b = c$

Misc. prop. of log.

$\log_{10} x = \log x$

$\log x$, $x > 0$

$\boxed{\text{if } \log x \in \mathbb{R}}$

$\log_e x = \ln x$

$\log_a a = 1$

$\log_a 0 \to$ und.

$\log_a 1 = 0$

$$\frac{\log_3 9}{\log_4 2} = 4$$

$\log_2 9 \cdot \log_3 4 = 4$

Prove

$$\log_a b = \frac{\ln b}{\ln a}$$

$$\log_a b = \frac{\log_e b}{\log_e a}$$

$$\log_a b \cdot \log_e a = \log_e b$$

$$\cancel{\log_a a} \cdot \log_e b = \log_e b$$

$$\underbrace{\log_a b = k}\ = \frac{\ln b}{\ln a}$$

$$a^k = b$$

$$\ln a^k = \ln b$$

$$k \ln a = \ln b$$

$$k = \frac{\ln b}{\ln a}$$

$$\log_a b \cdot \log_c d = \log_c b \cdot \log_a d$$

$$\frac{\log b}{\log a} \cdot \frac{\log d}{\log c} = \frac{\log b}{\log c} \cdot \frac{\log d}{\log a}$$

$$\log_2\left(\underbrace{\log_4\left(\log_8(x)\right)}\right) = 1$$

Find X.

$$\log_4\left(\log_8(x)\right) = 2$$

$$\log_8(x) = 16$$

$$2^{48}$$