

Logarithm Laws

$$b^y = x \quad \leftarrow \text{logarithm}$$

$$y = \log_b x$$

$$a^m \cdot a^n = a^{m+n}$$

$$\rightarrow \frac{a^m}{a^n} = a^{m-n}$$

$$a^0 = 1 \quad \frac{a^m}{a^m} = \left(\frac{a^m}{a^m} = a^{m-m} = a^0 \right)$$

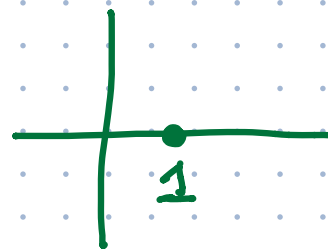
$$\frac{1}{a^m} = a^{-m}$$

$$(a^m)^n = a^{mn}$$

$$\log_{m+n}(xy) = \log_m x + \log_n y$$

$$\log_{m-n} \left(\frac{x}{y} \right) = \log_m x - \log_n y$$

$$\log 1 = 0$$



$$\log \left(\frac{1}{x} \right) = -\log x$$

$$\begin{aligned} (\log 1 - \log x) &= 0 - \log x \\ &= -\log x \end{aligned}$$

$$\log(x^r) = r \log x$$