

Logarithms

$$a^{\log_a b} = b$$

$$\log_2 32 = 5$$

$$\log_3 \frac{1}{9} = -2$$

$$\log_9 27 = \frac{3}{2}$$

$$\log_5 1 = 0$$

$$\log_4 0 \neq \emptyset$$

$$\log_a b^n = n \log_a b$$

$$\log 100 = 2$$

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

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

$$a^n \div a^m = a^{n-m}$$

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

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

$$\left(\frac{a}{b}\right)^{-n} = \left(\frac{b}{a}\right)^n$$

$$a \neq 0 \quad b \neq 0$$

$$(ab)^n = a^n b^n$$

$$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n} \quad b \neq 0$$

$$\sqrt[n]{a^m} = a^{\frac{m}{n}}$$

$$\log_a bc = \log_a b + \log_a c$$

$$\log_a \frac{b}{c} = \log_a b - \log_a c$$

$$\log_a b \cdot \log_b a = 1$$

$$\log_a b^m = \frac{m}{n} \log_a b$$

$$\log 0.1 = -1$$

$$\log_e e^x = x \quad \text{for } x \in \mathbb{R}$$

$$\log_a b = \frac{1}{\log_b a}$$