

Zero Index  
 $a^0 = 1$

Negative Index  
 $a^{-1} = \frac{1}{a} \quad \left(\frac{a}{b}\right)^{-1} = \frac{b}{a}$

Fractional Index  
 $a^{\frac{1}{n}} = \sqrt[n]{a} \quad a^{\frac{m}{n}} = \sqrt[n]{a^m}$

Law

$$a^m \times a^n = a^{m+n} \quad (ab)^n = a^n b^n$$

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

$$(a^m)^n = a^{m \times n}$$

Index Equation

Logarithm Equation

Fundamental

Indices

Solving

Indices and Logarithms

Logarithm

Properties

Law

Changing Base

$\log_a y = x \Leftrightarrow a^x = y$   
 $\log_a a = 1$   
 $\log_a a^x = x$   
 $\log_a 1 = 0$

$\log_a mn = \log_a m + \log_a n$   
 $\log_a \frac{m}{n} = \log_a m - \log_a n$   
 $\log_a m^n = n \log_a m$

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

