

The *index laws* are the rules by which indices (powers) may be combined.

The basic rules are:

$$\begin{aligned}a^1 &= a \\ a^m \cdot a^n &= a^{m+n} \\ (a^m)^n &= a^{mn} \\ a^m \cdot b^m &= (ab)^m\end{aligned}$$

From these we can derive other important rules:

$$\begin{aligned}a^0 &= 1 \\ \frac{a^m}{a^n} &= a^{m-n} \\ a^{-m} &= \frac{1}{a^m} \\ a^{1/n} &= \sqrt[n]{a}\end{aligned}$$

These rules are valid for a and b positive real numbers and m and n rational numbers, or a and b any numbers and m and n integers.