# Laws of indices

## The Laws

$a^m \times a^n = a^{m+n}$
$a^m - a^n = a^{m-n}$
$(a^m)^n = a^{m \times n}$
$(ab)^m = a^m \times b^m$
$a^{\frac{1}{m}} = \sqrt[m]{a}$
$a^{\frac{n}{m}} = \sqrt[m]{a^n}$
$a^{-m} = \frac{1}{a^m}$

## Special results

$$a^0 = 1$$
$$0^m = 0$$

It therefore logically follows that $0^0$ is undefined, as something to the power of zero in all other cases is 1, yet 0 to the power of something in all other cases is 0.

## Why is $a^0=1$?

This is because it fits the sequence:

$10^3 = 1000$
$10^2 = 100$
$10^1 = 10$
$10^0 = 1$
$10^{-1} = 0.1$

etc.