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Subscripts and superscripts

The use of superscripts and subscripts is very common in mathematical expressions involving exponents, indexes, and in some special operators. This article explains how to write superscripts and subscripts in simple expressions, integrals, summations, etcetera.

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- 2 More detailed examples
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Introduction

Definite integrals are some of the most common mathematical expressions, let's see an example:

`\[\int\limits_0^1 x^2 + y^2 \, dx \]`

$$\int\limits_0^1 x^2 + y^2 \, dx$$

In LaTeX, subscripts and superscripts are written using the symbols `^` and `_`, in this case the `x` and `y` exponents where written using these codes. The codes can also be used in some types of mathematical symbols, in the integral included in the example the `_` is used to set the lower bound and the `^` for the upper bound. The command `\limits` changes the way the limits are displayed in the integral, if not present the limits would be next to the integral symbol instead of being on top and bottom. (see the [reference guide](#))

[Open an example in ShareLaTeX](#)

More detailed examples

The symbols `_` and `^` can also be combined in the same expression, for example:

`\[a_1^2 + a_2^2 = a_3^2 \]`

$$a_1^2 + a_2^2 = a_3^2$$

If the expression contains long superscripts or subscripts, these need to be collected in braces, as LaTeX normally applies the mathematical commands `^` and `_` only to the following character:

`\[x^{2 \, \alpha} - 1 = y_{ij} + y_{ij} \]`

$$x^{2\alpha} - 1 = y_{ij} + y_{ij}$$

Subscripts and superscripts can be nested and combined in various ways. When nesting subscripts/superscripts, however, remember that each command must refer to a single element; this can be a single letter or number, as in the examples above, or a more complex mathematical expression collected in braces or brackets. For example:

`\[(a^n)^{r+s} = a^{nr+ns} \]`

$$(a^n)^{r+s} = a^{nr+ns}$$

[Open an example in ShareLaTeX](#)

Operators using subscripts and superscripts

Some mathematical operators may require subscripts and superscripts. The most frequent cases are those of the integral `\int` (check the [introduction](#)) and the summation (`\sum`) operators, whose bounds are typeset precisely with subscripts and superscripts.

`\[\sum_{i=1}^{\infty} \frac{1}{n^s} = \prod_p \frac{1}{1 - p^{-s}} \]`

$$\sum_{i=1}^{\infty} \frac{1}{n^s} = \prod_p \frac{1}{1 - p^{-s}}$$

For other frequently used operators that require subscripts/superscripts check the [reference guide](#).

[Open an example in ShareLaTeX](#)

Reference guide

Additional examples and operators

LaTeX markup	Renders as
<code>a_{n_i}</code>	a_{n_i}
<code>\int_{i=1}^n</code>	$\int_{i=1}^n$
<code>\sum_{i=1}^{\infty}</code>	$\sum_{i=1}^{\infty}$
<code>\prod_{i=1}^n</code>	$\prod_{i=1}^n$
<code>\cup_{i=1}^n</code>	$\cup_{i=1}^n$
<code>\cap_{i=1}^n</code>	$\cap_{i=1}^n$
<code>\oint_{i=1}^n</code>	$\oint_{i=1}^n$
<code>\coprod_{i=1}^n</code>	$\prod_{i=1}^n$

There are also a `bigcup` and `bigcap` commands similar to `cup` and `cap` but larger for larger expressions.

[Open an example in ShareLaTeX](#)

Further reading

For more information see

- List of Greek letters and math symbols
- Operators
- Integrals, sums and limits
- Mathematical fonts
- Brackets and Parentheses
- The Great, Big list of LaTeX Symbols (a full list of available mathematical symbols in the **amssymb** package)
- The not so short introduction to LaTeX 2_ε
- Aligning equations with amsmath