Integrals, sums and limits

Contents

Integrals

Integral expression can be added using the

```
\int_{lower}^{upper}
```

command.

Note, that integral expression may seems a little different in *inline* and *display* math mode - in *inline* mode the integral symbol and the limits are compressed.

LaTeX code	Output
`Integral $\int_{a}^{b} x^2 dx$ inside text`	Integral $\int_a^b x^2 dx$ inside text
`$$\int_{a}^{b} x^2 dx$$`	$$\int_a^b x^2 dx$$

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Multiple integrals

To obtain double/triple/multiple integrals and cyclic integrals you must use `amsmath` and `esint` (for cyclic integrals) packages.

LaTeX code	Output
`$$\iint_V \mu(u,v) \,du\,dv$$`	$$\iint_V \mu(u,v)\,du\,dv$$
`$$\iiint_V \mu(u,v,w) \,du\,dv\,dw$$`	$$\iiint_V \mu(u,v,w)\,du\,dv\,dw$$
`$$\iiiint_V \mu(t,u,v,w) \,dt\,du\,dv\,dw$$`	$$\iiiint_V \mu(t,u,v,w)\,dt\,du\,dv\,dw$$
`$$\idotsint_V \mu(u_1,\dots,u_k) \,du_1 \dots du_k$$`	$$\idotsint_V \mu(u_1,\dots,u_k)\,du_1\dots du_k$$
`$$\oint_V f(s) \,ds$$`	$$\oint_V f(s)\,ds$$
`$$\oiint_V f(s,t) \,ds\,dt$$`	$$\oiint_V f(s,t)\,ds\,dt$$

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Sums and products

Like integral, sum expression can be added using the

```
\sum_{lower}^{upper}
```

command.

LaTeX code	Output
`Sum $\sum_{n=1}^{\infty} 2^{-n} = 1$ inside text`	Sum $\sum_{n=1}^{\infty} 2^{-n} = 1$ inside text
`$$\sum_{n=1}^{\infty} 2^{-n} = 1$$`	$$\sum_{n=1}^{\infty} 2^{-n} = 1$$

In similar way you can obtain expression with product of a sequence of factors using the

```
\prod_{lower}^{upper}
```

command.

LaTeX code	Output
`Product $\prod_{i=a}^{b} f(i)$ inside text`	Product $\prod_{i=a}^{b} f(i)$ inside text
`$$\prod_{i=a}^{b} f(i)$$`	$$\prod_{i=a}^{b} f(i)$$

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Limits

Limit expression can be added using the

```
\lim_{lower}
```

command.

LaTeX code	Output
`Limit $\lim_{x\to\infty} f(x)$ inside text`	Limit $\lim_{x\to\infty} f(x)$ inside text
`$$\lim_{x\to\infty} f(x)$$`	$$\lim_{x\to\infty} f(x)$$

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Integer and sum limits improvement

In *inline* math mode the integral/sum/product lower and upper limits are placed right of integral symbol. Similar is for limit expressions. If you want the limits of an integral/sum/product to be specified above and below the symbol in *inline* math mode, use the `\limits` command before limits specification.

LaTeX code	Output
`Integral $\int_{a}^{b} x^2 dx$ inside text`	Integral $\int_a^b x^2 dx$ inside text
`Improved integral $\int\limits_{a}^{b} x^2 dx$ inside text`	Improved integral $\int\limits_a^b x^2 dx$ inside text
`Sum $\sum_{n=1}^{\infty} 2^{-n} = 1$ inside text`	Sum $\sum_{n=1}^{\infty} 2^{-n} = 1$ inside text
`Improved sum $\sum\limits_{n=1}^{\infty} 2^{-n} = 1$ inside text`	Improved sum $\sum\limits_{n=1}^{\infty} 2^{-n} = 1$ inside text

Moreover, adding `\displaystyle` beforehand will make the symbol large and easier to read.

On the other hand, `\mathlarger` command (provided by `relsize` package) is used to get bigger integral symbol in display.

```
$\int\frac{1}{2}dx - \mathlarger{ \int\frac{1}{2}dx}$
```

$$\int \frac{1}{2}dx - \int \frac{1}{2}dx$$

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Further reading

For more information see

- Mathematical expressions
- Subscripts and superscripts
- Fractions and Binomials
- Display style in math mode