LaTeX Cheatsheet

(for R Markdown documents)

Prerequisites You should have access to R and RStudio, with `tinytex` installed. If you do not, please see this guide.

Template To access all the LaTeX functionality presented, add the following to your `.Rmd` document's YAML header:

```
header-includes:
  - \usepackage[dvipsnames]{xcolor}
  - \usepackage{amsthm, amsmath, enumitem,
                mathtools, tabularx}
```

Math Mode To write Math in LaTeX, you need to be in Math mode. Math can consist of **display expressions**, which appear on their own line:

$$a^2 + b^2 = c^2$$

or **inline expressions**, such as $a^2 + b^2 = c^2$, which are interspersed with normal text.

Get a display expression with:	`$$a^2 + b^2 = c^2$$`
Get an inline expression with:	`$a^2 + b^2 = c^2$`

To get normal text in Math mode, use the `text` command:

$x = y^2$ for $y \geq 0$ `$x = y^2 \text{for} y \geq 0$`

Subscripts and Superscripts To write subscripts or superscripts, you need to be in Math mode (see above).

x^{24} `x^{24}` x_{24} `x_{24}`

Important Symbols All the symbols below must be used in Math mode. Want a symbol that's not in this list? You can draw it on Detexify to find the LaTeX command for it.

$\cup$	`\cup`	$:=$	`\coloneqq`	α	`\alpha`
$\cap$	`\cap`	$\equiv$	`\equiv`	β	`\beta`
$\subset$	`\subset`	$\forall$	`\forall`	γ	`\gamma`
$\subseteq$	`\subseteq`	$\exists$	`\exists`	δ	`\delta`
$\supset$	`\supset`	$\Rightarrow$	`\Rightarrow`	Δ	`\Delta`
$\supseteq$	`\supseteq`	$>$	`>`	λ	`\lambda`
$\setminus$	`\setminus`	$\geq$	`\geq`	μ	`\mu`
$\in$	`\in`	$<$	`<`	σ	`\sigma`
$\mathbb{N}$	`\mathbb{N}`	$\leq$	`\leq`	Φ	`\Phi`
$\mathbb{Z}$	`\mathbb{Z}`	$\neq$	`\neq`	ε	`\varepsilon`
$\mathbb{R}$	`\mathbb{R}`	$\approx$	`\approx`	ϵ	`\epsilon`
∞	`\infty`	$\cdot$	`\cdot`	$\ldots$	`\ldots`

Greek Letters To get the uppercase version of a lowercase Greek letter, e.g. `\alpha`, capitalize the command: `\Alpha`. However, note that some Greek letters cannot be capitalized.

Letter Decorations The following letter decorations can only be used in Math mode:

$\bar{X}$ `\bar{X}` $\hat{\mu}$ `\hat{\mu}`

Fractions Fractions can only be used in Math mode:

$\frac{a+b}{c+d}$ `\frac{a + b}{c + d}`

Binomial Coefficients Binomial coefficients can only be used in Math mode:

$\binom{n}{k}$ `\binom{n}{k}`

Integrals Both **indefinite** and **definite** integrals can be used in Math mode:

Indefinite: $\int x^2\,dx$ `\int x^2 dx`

Definite: $\int_a^b x^2\,dx$ `\int_{a}^{b} x^2 dx`

Sums Sums can only be used in Math mode:

$\sum_{n=1}^{\infty} n$ `\sum\limits_{n = 1}^{\infty} n`

Limits Limits can only be used in Math mode:

$\lim\limits_{x \to \infty} x^2$ `\lim\limits_{x \to \infty} x^2`

Resizing Brackets You can resize brackets using `\left(` and `\right)` so that they cover the whole expression:

$(\frac{1}{3})$ `(\frac{1}{3})` $\left(\frac{1}{3}\right)$ `\left(\frac{1}{3}\right)`

Piecewise Functions To write a piecewise function, use the `cases` environment from the `amsmath` package:

$$f(x) = \begin{cases} 0 & x > 5 \\ 5 & x \leq 5 \end{cases}$$

```
$$f(x) =
  \begin{cases}
    0 & x > 5 \\
    5 & x \leq 5
  \end{cases}$$
```

Aligning Equations To align equations, use the `align*` environment from the `amsmath` package. The `&` marks where the equations will align, and the `\\` is used for linebreaks:

$$a + b = c$$
$$x^2 + y^2 = 36$$

```
\begin{align*}
  a + b & = c \\
  x^2 + y^2 & = 36
\end{align*}
```

Proofs For proofs, use the `proof` environment from the `amsthm` package, which supports plain text *and* Math mode.

Proof. This is a proof.
$a + b = b + a$ □

```
\begin{proof}
  This is a proof.
  $a + b = b + a$
\end{proof}
```

Lists You can create itemized and enumerated lists. **Itemized lists** are unordered lists, with bullet points:

- Romania
- Bulgaria
- Greece

```
\begin{itemize}
  \item Romania
  \item Bulgaria
  \item Greece
\end{itemize}
```

Enumerated lists are ordered lists, with numbers:

1. Spurs
2. Warriors
3. Rockets

```
\begin{enumerate}
  \item Spurs
  \item Warriors
  \item Rockets
\end{enumerate}
```

Want to Learn More?

The Not So Short Introduction to LaTeX 2ε
The Comprehensive LaTeX Symbol List