A quick guide to \LaTeX

Text decorations

Your text can be italics (\textit{italics}), boldface (\textbf{boldface}), or underlined (\underline{underlined}).

Your math can contain boldface, \( \mathbf{R} \) (\texttt{mathbf{R}}), or blackboard bold, \( \mathbb{R} \) (\texttt{mathbb{R}}). You may want to use these to express the sets of real numbers (\( \mathbb{R} \)) or integers (\( \mathbb{Z} \)).

To have text appear in a math expression use \texttt{\textit{text}}.

\[
(0,1) \setminus \{x \in \texttt{mathbb{R}} : x > 0 \text{ and } x \leq 1\} \text{ yields } (0,1) \setminus \{x \in \mathbb{R} : x > 0 \text{ and } x \leq 1\}.
\]

Spaces and new lines

\LaTeX\ ignores extra spaces and new lines. For example,

This sentence will look fine after it is compiled.

This sentence will look fine after it is compiled.

Leave one full empty line between two paragraphs. Place \verb|\\| at the end of a line to create a new line (but do not create a new paragraph).

This compiles like this.

This compiles like this.

Use \texttt{\textbf{\texttt{\begin{smallerindent}}} to prevent a paragraph from indenting.

Comments

Use \% to create a comment. Nothing on the line after the \% will be typeset.

\% this is the sine function yields \( f(x) = \sin(x) \)

\midx{Delimiters}

\midx{The basics}

\midx{Lists}

Lists

You can produce ordered and unordered lists.

\begin{itemize}
  \item Thing 1
  \item Thing 2
\end{itemize}

\begin{enumerate}
  \item Thing 1
  \item Thing 2
\end{enumerate}

\midx{Math vs. text vs. functions}

In properly typeset mathematical variables appear in italics (e.g., \( f(x) = x^2 + 2x - 3 \)). The exception to this rule is predefined functions (e.g., \( \sin(x) \)). Thus it is important to always treat variables, text, and functions correctly. See the difference between \( x \) and \( x \), -1 and \( 1 \), and \( \sin(x) \) and \( \sin(x) \).

There are two ways to present a mathematical expression—inline or as an equation.

\midx{Inline mathematical expressions}

Inline expressions occur in the middle of a sentence. To produce an inline expression, place the math expression between dollar signs (\$). For example, typing \$90^\circ \text{ cm} \$ is the same as \texttt{\$\frac{\pi}{2}\$ radians} yields 90° is the same as \( \frac{\pi}{2} \) radians.

Equations

Equations are mathematical expressions that are given their own line and are centered on the page. These are usually for important equations that deserve to be showcased on their own line or for large equations that cannot fit inline. To produce an inline expression, place the mathematical expression between the symbols \( \[ \text{and} \] \). Typing

\[ x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \]

yields

\[
x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}
\]

\midx{Displaystyle}

To get full-sized inline mathematical expressions use \texttt{\textbf{\texttt{\begin{displaystyle}}}}. Use this sparingly. Typing

\[ \sum_{n=1}^{\infty} \frac{1}{n} \]

not this \texttt{\textbf{\texttt{\begin{smaller}...}}} yields

\[
\sum_{n=1}^{\infty} \frac{1}{n}
\]

I want this \texttt{\textbf{\texttt{\begin{smaller}}}...} not this \texttt{\textbf{\texttt{\begin{smaller}...}}} \texttt{\end{smaller}} yields

\[
\sum_{n=1}^{\infty} \frac{1}{n}
\]

I want this \texttt{\textbf{\texttt{\begin{smaller}}}...} not this \texttt{\textbf{\texttt{\begin{smaller}}}...} \texttt{\end{smaller}} yields

Images

You can put images (pdf, png, jpg, or gif) in your document. They need to be in the same location as your\.tex file when you compile the document. Omit [\texttt{width=\.5in}] if you want the image to be full-sized.

\begin{figure}[ht]
  \begin{itemize}
    \item [\texttt{width=\.5in}] [\texttt{imagename\.jpg}]
  \end{itemize}
  \caption{The (optional) caption goes here.}
\end{figure}

\midx{Stylistic variants}

\midx{Symbols (in math mode)}
### Calculus

<table>
<thead>
<tr>
<th>Description</th>
<th>Command</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>derivative</td>
<td>( \frac{df}{dx} )</td>
<td>df/dx</td>
</tr>
<tr>
<td>partial derivative</td>
<td>( \frac{\partial f}{\partial x} )</td>
<td>( \partial f/\partial x )</td>
</tr>
<tr>
<td>integral</td>
<td>( \int )</td>
<td>( \int )</td>
</tr>
<tr>
<td>double integral</td>
<td>( \iiint )</td>
<td>( \iiint )</td>
</tr>
<tr>
<td>triple integral</td>
<td>( \iiiiint )</td>
<td>( \iiiiint )</td>
</tr>
<tr>
<td>limits</td>
<td>( \lim_{x \to \infty} )</td>
<td>( \lim_{x \to \infty} )</td>
</tr>
<tr>
<td>summation</td>
<td>( \sum_{n=1}^{\infty} )</td>
<td>( \sum_{n=1}^{\infty} )</td>
</tr>
<tr>
<td>product</td>
<td>( \prod_{n=1}^{\infty} )</td>
<td>( \prod_{n=1}^{\infty} )</td>
</tr>
</tbody>
</table>

### Logic

<table>
<thead>
<tr>
<th>Description</th>
<th>Command</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>not</td>
<td>( \neg )</td>
<td>~</td>
</tr>
<tr>
<td>and</td>
<td>( \land )</td>
<td>&amp;</td>
</tr>
<tr>
<td>or</td>
<td>( \lor )</td>
<td>\lor</td>
</tr>
<tr>
<td>if...then</td>
<td>( \implies )</td>
<td>\rightarrow</td>
</tr>
<tr>
<td>if and only if</td>
<td>( \iff )</td>
<td>\leftrightarrow</td>
</tr>
<tr>
<td>logical equivalence</td>
<td>( \equiv )</td>
<td>\equiv</td>
</tr>
<tr>
<td>therefore</td>
<td>( \therefore )</td>
<td>\therefore</td>
</tr>
<tr>
<td>there exists</td>
<td>( \exists )</td>
<td>\exists</td>
</tr>
<tr>
<td>for all</td>
<td>( \forall )</td>
<td>\forall</td>
</tr>
</tbody>
</table>

### Linear algebra

<table>
<thead>
<tr>
<th>Description</th>
<th>Command</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>vector</td>
<td>( \mathbf{v} )</td>
<td>( \mathbf{v} )</td>
</tr>
<tr>
<td>norm</td>
<td>( |\mathbf{v}| )</td>
<td>( |\mathbf{v}| )</td>
</tr>
</tbody>
</table>
| matrix | \[
\begin{bmatrix}
1 & 2 & 3 \\
4 & 5 & 6 \\
7 & 8 & 0
\end{bmatrix}
\] | \[
\begin{bmatrix}
1 & 2 & 3 \\
4 & 5 & 6 \\
7 & 8 & 0
\end{bmatrix}
\] |
| determinant | \( \det(A) \) | \( \det(A) \) |
| trace | \( \text{trace}(A) \) | \( \text{trace}(A) \) |
| dimension | \( \dim(V) \) | \( \dim(V) \) |