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1 Basics

1.1 Basic latex source file structure

```
\documentclass{} % always as the first line in a latex source
[preamble]
\begin{document}
contents
\end{document}
```

1.2 Organize Contents

A new document might need to be compiled multiple times to get a correct table of contents. available sectioning commands:

```
\section{...}
\subsection{...}
\subsubsection{...}
\paragraph{...}
\subparagraph{...}
```

1.3 Environment

`\begin{environment} text \end{environment}`

Where environment is the name of the environment. Environments can be nested within each other as long as the correct nesting order is maintained.

`\begin{aaa}...\begin{bbb}...\end{bbb}...\end{aaa}`

2 Development Environment

I'm using vim + *vimtex* to edit latex

`NOTE: in my vim config <localleader> is "\"`

some useful shortcuts:

key	Command	MODE
`<localleader>ll`	vimtex-compile-toggle	n
`<localleader>lo`	vimtex-compile-output	n
`<localleader>le`	vimtex-errors	n
`]]`	vimtex-delim-close (close the current environment)	i

3 Lists

1. ordered list item 1 {enumerate}
2. ordered list item 2:
   - unordered list item {itemize}
3. description list item 3:

   desc1 item {description}

   desc2 item

- item start with dash item 4

4 Equations

. . . when Einstein introduced his formula

$$e = m \cdot c^2 \ , \tag{1}$$

"which is at the 'same' time the most widely known and the least well understood physical formula."

$$\sum_{k=1}^{n} I_k = 0 \ . \tag{2}$$

5 Math Equations

Package: amsmath (ams == American Mathematical Society)

5.1 text style

text style means an equation located in-line within a paragraph between two '$'.

5.2 display style

display style means an equation breaks a paragraph between `\begin{equation}` and `\end{equation}`

5.3 Example

This is text style: $\lim_{n\to\infty} \sum_{k=1}^{n} \frac{1}{k^2} = \frac{\pi^2}{6}$.
This is display style:

$$\lim_{n\to\infty} \sum_{k=1}^{n} \frac{1}{k^2} = \frac{\pi^2}{6} \tag{3}$$

and this is a equation ref (3)

5.4 Greeks

Command	Letter
`$\alpha$`	α
`$A$`	A (uppercase alpha)
`$\sigma$`	σ
`$\Sigma$`	Σ

5.5 misc

p_{ij}^{3} m_{Knuth} $\sum_{k=1}^{3} k$

$a^{x} + y \neq a^{x+y}$ $e^{x^2} \neq e^{x2}$ $\sqrt{x} \Leftrightarrow x^{1/2}$ $\sqrt[3]{2}$ $\sqrt{x^2 + \sqrt{y}}$ $\sqrt{[x^2 + y^2]}$