LaTeX Workshop: Basics and Writing Math

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LaTeX Basics

Document Structure

A basic LaTeX document starts with:

```
\documentclass{article}
\begin{document}
\end{document}
```

You do not need to do anything with these. However, if:

- If you remove `\documentclass{article}` the document will not compile because LaTeX requires a document class to define the structure and formatting.
- If you remove `\begin{document}` and `\end{document}` the content outside of this environment will not be processed correctly, leading to compilation errors.

Packages

Packages add extra functionality. For example, to use advanced math commands:

```
\usepackage{amsmath}
\usepackage{graphicx}
```

You can also import files from different project onto your new project. This is done using the upload button the top left part of the page, then selecting the file that you want to import.

Comments

Use the % symbol to add comments in your LaTeX code:

```
% This is a comment in LaTeX.
```

Shortcuts

Use shortcuts such as:

- Crtl+B to make a text bold `\textbf{}`
- Crtl+I to make a text italics `\textit{}`
- Crtl+S to recompile and save your file

Writing Math in LaTeX

Inline Equations

An inline equation example: $a^2 + b^2 = c^2$.

Displayed Equations

Displayed equations are written in their own line, like this:

$$E = mc^2$$

Common Math Symbols

Some common math symbols in LaTeX:

- Fractions: `\frac{a}{b}` produces $\frac{a}{b}$
- Summation: `\sum` produces $\sum$
- Integral: `\int` produces $\int$
- Greek Letters: `\alpha` produces α, `\pi` produces π

Examples for Calculus

You can write calculus-related expressions using LaTeX:

1. Derivatives: $\frac{dy}{dx}$
2. Integrals: $\int_0^1 x^2\,dx$
3. Limits: $\lim_{x \to 0} \frac{1}{x}$