Introduction to LaTeX for Mathematical Expressions

The goal of the lesson is to become familiar with the TeX language, specifically for the purpose of writing mathematical expressions.

1. Introduction to LaTeX

What is LaTeX?

1. LaTeX is a high-quality typesetting system, primarily used for technical and scientific documents. It is particularly powerful for formatting complex mathematical equations and formulas, making it a preferred choice in academia and research.

What are the advantages of LaTeX?

1. **Precision and Control**: LaTeX allows precise formatting of documents and mathematical expressions.
2. **Consistency**: LaTeX automatically manages references, labels, and numbering, ensuring consistency throughout your document.
3. **Professional Quality**: Documents created in LaTeX look professional and are publication-ready.

Getting Started:

1. **Overleaf**: We will use Overleaf, a free online LaTeX editor, which allows you to write and compile LaTeX documents directly in your browser.
    1. Sign up at Overleaf.
    2. Overleaf offers collaborative features, version control, and a vast library of LaTeX templates.

Basic Document Structure:

```
\documentclass{article}  % Specifies the document class (article, report, book, etc.)
\begin{document}          % Begins the content of the document
% Your content goes here
\end{document}            % Ends the content of the document
```

1. **\documentclass{article}**: Defines the overall layout and style of the document.
2. **\begin{document}** and **\end{document}**: Everything between these commands will be included in the output document.

2. Writing Basic Mathematical Expressions

Inline vs. Display Math

1. **Inline Math**: For mathematical expressions that appear within a line of text, use $…$.
    1. E.g. $E = mc^2$ is written as $E = mc^2$ in LaTeX.

2. **Display Math**: For standalone equations, use $$…$$.
    1. E.g. To display $$E = mc^2$$ on its own line, use $$E = mc^2$$.

Example

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

The equation $E = mc^2$ is famous in physics. It is so important that we can
highlight $$E = mc^2$$ by putting it to a separate line.

\end{document}
```

This code will became:

The equation $E = mc^2$ is famous in physics. It is so important that we can highlight

$$E = mc^2$$

by putting it to a separate line.