

# Mathematical Typesetting Using $\text{\LaTeX}$

Jonathan R. Bacolod

Sauyo High School

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# Overview

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- 2 What are the Features of  $\text{\LaTeX}$ ?
- 3 What is the Structure of a  $\text{\LaTeX}$  file?
- 4 Basic  $\text{\LaTeX}$  Commands
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# What is $\text{\LaTeX}$ ?

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- It is **not** a word processor.

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- Control over large documents containing sectioning, cross-references, tables and figures.
- Typesetting of complex mathematical formulas.
- Automatic generation of bibliographies and indexes.



# What is the Structure of a $\text{\LaTeX}$ file?

## Sample $\text{\LaTeX}$ File

```
\documentclass[11pt,letterpaper]{article} % preamble
\usepackage[margin=1in]{geometry} % preamble

\begin{document}
  Hello, World! % the body
\end{document}
```

# What is the Preamble?

```
\documentclass[11pt,letterpaper]{article} % preamble  
\usepackage[margin=1in]{geometry} % preamble
```

It is a collection of commands that specify the global processing parameters, such as paper format, height and width of the text, automatic page heads and footlines.

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- Examples:

```
\documentclass[twocolumn]{book}  
\documentclass[12pt, twoside]{article}  
\documentclass[11pt, twoside, twocolumn]{report}  
\documentclass[17pt]{beamer}
```

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- Examples:

```
\usepackage[utf8]{inputenc}
\usepackage[T1]{fontenc}
\usepackage{graphicx}
\usepackage[margin=1in, letterpaper]{geometry}

\begin{center}
Text
```

# What is the Body?

```
\begin{document}  
  Hello, World! % the body  
\end{document}
```

It provides the document's visible content.

# What is Our Expected Output during Hands-on?

[Click here](#)

# Basic L<sup>A</sup>T<sub>E</sub>X Commands

Text

**Text**

*Text*

Text

```
\begin{center}
```

```
Text
```

```
\end{center}
```

```
\textbf{Text}
```

```
\textit{Text}
```

```
\underline{Text}
```

# Math Symbols and Notations

`$ \mathbb{R} $`

$\mathbb{R}$

`$ \mathbb{Z} $`

$\mathbb{Z}$

`$ \mathbb{N} $`

$\mathbb{N}$

`$ \mathbb{Q} $`

$\mathbb{Q}$

`$ \mathbb{C} $`

$\mathbb{C}$

`$ \mathbb{Z}_{+} $`

$\mathbb{Z}_{+}$

`$ \mathbb{Z}_{-} $`

$\mathbb{Z}_{-}$

`$ \emptyset $`

$\emptyset$

`\{\}`

$\{\}$

# Math Symbols and Notations

`$ \varnothing $`

$\varnothing$

`$ \subset $`

$\subset$

`$ \cup $`

$\cup$

`$ \cap $`

$\cap$

`$ \in $`

$\in$

`$ A \times B $`

$A \times B$

`$ \infty $`

$\infty$

`$ \frac{1}{2} $`

$\frac{1}{2}$

# Math Symbols and Notations

`$ \dfrac{1}{2} $`

$$\frac{1}{2}$$

`$ x^{2} $`

$$x^2$$

`$ \sqrt{3} $`

$$\sqrt{3}$$

`$ \sqrt[3]{4} $`

$$\sqrt[3]{4}$$

`$ < = > \leq \geq \neq $`

$$< = > \leq \geq \neq$$

`$ \pi $`

$$\pi$$

`$ x_{2} $`

$$x_2$$

# Math Symbols and Notations

```
$ \systeme{3x - 7y < 4,  
           x + y > 5} $
```

```
$ \Delta x $
```

```
$ \sin x $
```

```
$ \cos x $
```

```
$ \tan x $
```

```
$ \log_{\{b\}} n^{\{e\}} $
```

```
$ \sum_{\{1\}}^{\{n\}} x $
```

$$\begin{cases} 3x - 7y < 4 \\ x + y > 5 \end{cases}$$

$$\Delta x$$

$$\sin X$$

$$\cos X$$

$$\tan X$$

$$\log_b n^e$$

$$\sum_1^n x$$



# Thank you!

# Online Sources

<https://www.latex-project.org/about/>

<http://www.personal.ceu.hu/tex/latex.htm>