



TAYLOR'S UNIVERSITY

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# $\text{\LaTeX}$ Introduction

Raja Sher Afgun Usmani

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- 1 Introduction to  $\text{\LaTeX}$
- 2 What is  $\text{\LaTeX}$  ?
- 3  $\text{\LaTeX}$ : Components and Features
- 4  $\text{\LaTeX}$  Vs Ms-Word
- 5 How to Install?
- 6 Mikitex.exe Installation.
- 7 TeXStudio Installation
- 8 Mathematical symbols
- 9 Examples
- 10 Totorial

- ▶ L<sup>A</sup>T<sub>E</sub>X (pronounced lay-tek) is a document preparation system for producing professional-looking documents
- ▶ It is not a **MS-Word** processor

# What is $\text{\LaTeX}$

- ▶  $\text{\LaTeX}$  is a bundle of software used by researchers to prepare their research documents.

$\text{\LaTeX}$  is...

- 1 Document preparation system
- 2 High-quality typesetting
- 3 Used for medium-to-large technical or scientific documents
- 4 Not a word processor

# Features and Components of $\text{\LaTeX}$

$\text{\LaTeX}$  can be used for:

- ① Typesetting journal articles, technical reports, books, and slide presentations
- ② Managing large documents containing sectioning, cross-references, tables and figures
- ③ Typesetting of complex mathematical formulas
- ④ Automatic generation of bibliographies and indexes
- ⑤ Multi-lingual typesetting

- ▶ Microsoft Word is 'What You See Is What You Get' (WYSIWYG), this means
- ▶ You can see how the final document will look as you are typing. —
- ▶ When working in this way you will probably make changes to the document's appearance (such as line spacing, headings, page breaks) as you type.  
But
- ▶ With L<sup>A</sup>T<sub>E</sub>X you do not see how the final document will look while you are typing it — this allows you to concentrate on the content rather than appearance.

# Before you Start

- ▶ Actions for you to carry out are bulleted with an arrow  $\Rightarrow$
- ▶ Text you type is written in this font.
- ▶ Menu commands and button names are shown in bold.

```
\documentclass[a4paper,12pt]{article}
```

```
\begin{document}
```

A sentence of text.

```
\end{document}
```



# How to Install....??

- ▶ Very easy to install.
- ▶ Just two steps for installation.

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# Installation Process

https://miktex.org/download

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## Getting MiKTeX

MiKTeX is available for selected operating systems. Please check the [prerequisites](#) in order to find out whether your system is supported.

If your system is not (yet) supported: it is not too difficult to [build MiKTeX](#).

Windows Mac Linux Docker All downloads

## Install on Windows

Installer [Portable Edition](#) [Command-line installer](#)

### Installer

To install a basic TeX/LaTeX system on Windows, download and run this installer.

Please read the [tutorial](#), if you want step-by-step guidance.

Date: 4/3/2019

File name: `basic-miktex-2.9.7031-x64.exe`

Size: 194.1 MB


SHA-256: `f074270f9f96ce6e309a5a7d912a414b354ef2aa31a1241657d4e8a7871bf81f`

Download

# Installation Process

https://www.texstudio.org

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LaTeX made comfortable


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## Welcome to TeXstudio

TeXstudio is an integrated writing environment for creating LaTeX documents. Our goal is to make writing LaTeX as easy and comfortable as possible. Therefore TeXstudio has numerous features like syntax-highlighting, integrated viewer, reference checking and various assistants. For more details see the [features](#).

TeXstudio is open source and is available for all major operating systems.

**Download now**  
TeXstudio 2.12.14 (Windows-Installer)



## News

# Basic Body for latex using...

When  $\text{\LaTeX} 2_{\epsilon}$  processes an input file, it expects it to follow a certain structure. Thus every input file must start with the command

```
\documentclass{...}
```

This specifies what sort of document you intend to write. After that, add commands to influence the style of the whole document, or load packages that add new features to the  $\text{\LaTeX}$  system. To load such a package you use the command

```
\usepackage{...}
```

When all the setup work is done, you start the body of the text with the command

```
\begin{document}
```

Now you enter the text mixed with some useful  $\text{\LaTeX}$  commands. At the end of the document you add the

```
\end{document}
```

---

```
\documentclass{article}
\begin{document}
Small is beautiful.
\end{document}
```

---



# Main Body for latex

```
\documentclass[options]{class}
```

```
\documentclass[11pt,twoside,a4paper]{article}
```

```
\usepackage[options]{package}
```

# How to use in mathematics

As earlier mentioned that:

- ▶ It helps in writing mathematical equations
- ▶ Different methods or packages are used
- ▶ Normally dollar sign \$ is used to write the equations.
- ▶ Examples are shown in coming slides

# Mathematical Equations

Add  $a$  squared and  $b$  squared  
to get  $c$  squared. Or, using  
a more mathematical approach:  
 $a^2 + b^2 = c^2$

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$\tau\epsilon\chi$  is pronounced as  
 $\tau\epsilon\chi$   
100 m<sup>3</sup> of water  
This comes from my  $\heartsuit$

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# Mathematical Equations

Add  $a$  squared and  $b$  squared to get  $c$  squared. Or, using a more mathematical approach

```
\begin{equation}
a^2 + b^2 = c^2
\end{equation}
```

Einstein says

```
\begin{equation}
E = mc^2 \label{clever}
\end{equation}
```

He didn't say

```
\begin{equation}
1 + 1 = 3 \tag{dumb}
\end{equation}
```

This is a reference to `\eqref{clever}`.

This is text style:

```
 $\lim_{n \rightarrow \infty} \sum_{k=1}^n \frac{1}{k^2}$ 
 $= \frac{\pi^2}{6}$ 
```

And this is display style:

```
\begin{equation}
\lim_{n \rightarrow \infty} \sum_{k=1}^n \frac{1}{k^2}
\end{equation}
```

Add  $a$  squared and  $b$  squared to get  $c$  squared. Or, using a more mathematical approach

$$a^2 + b^2 = c^2 \quad (3.1)$$

Einstein says

$$E = mc^2 \quad (3.2)$$

He didn't say

$$1 + 1 = 3 \quad (\text{dumb})$$

This is a reference to (3.2).

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

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

# Mathematical Equations

A  $d_{e_p}$  mathematical expression followed by a  $h^{i^g_h}$  expression. As opposed to a smashed  $\smash{d_{e_p}}$  expression followed by a  $\smash{h^{i^g_h}}$  expression.

A  $d_{e_p}$  mathematical expression followed by a  $h^{i^g_h}$  expression. As opposed to a smashed  $d_{e_p}$  expression followed by a  $h^{i^g_h}$  expression.

$\overline{3} = \underline{\underline{1/3}}$

$0.\overline{3} = \underline{\underline{1/3}}$

# Mathematical Equations

```
\begin{equation*}
\sum_{\substack{0 < i < n \\ j \subseteq i}} P(i,j) = Q(i,j)
\end{equation*}
```

$$\sum_{\substack{0 < i < n \\ j \subseteq i}}^n P(i,j) = Q(i,j)$$

```
\begin{multline}
a + b + c + d + e + f \\
+ g + h + i \\
\\
= j + k + l + m + n
\end{multline}
```

$$\begin{aligned} a + b + c + d + e + f + g + h + i \\ = j + k + l + m + n \end{aligned} \quad (3.4)$$

# Mathematical Equations

```
\begin{align}
a &= b + c \\
&= d + e + f + g + h + i \\
&+ j + k + l \nonumber \\
&+ m + n + o \\
&= p + q + r + s
\end{align}
```

$$a = b + c \quad (3.9)$$

$$= d + e + f + g + h + i + j + k + l \quad (3.10)$$

$$= p + q + r + s \quad (3.11)$$

```
\begin{equation*}
P = \frac{\sum_{i=1}^n (x_i - x)(y_i - y)}{\left[ \sum_{i=1}^n (x_i - x)^2 \sum_{i=1}^n (y_i - y)^2 \right]^{1/2}}
\end{equation*}
```

$$P = \frac{\sum_{i=1}^n (x_i - x)(y_i - y)}{\left[ \sum_{i=1}^n (x_i - x)^2 \sum_{i=1}^n (y_i - y)^2 \right]^{1/2}}$$

# How to write the different brackets??

# \$ % ^ & \_ { } ~ \

```
\# \$ \% \^{} \& \_ \{ \} \~{}  
\textbackslash
```

# \$ % ^ & \_ { } ~ \



# Important Symbols Used in Mathematics

$\alpha$	<code>\alpha</code>	$\theta$	<code>\thetaeta</code>	$o$	<code>o</code>	$\upsilon$	<code>\upsilonlilon</code>
$\beta$	<code>\betaeta</code>	$\vartheta$	<code>\varthetaeta</code>	$\pi$	<code>\pi</code>	$\phi$	<code>\phi</code>
$\gamma$	<code>\gamma</code>	$\iota$	<code>\iota</code>	$\varpi$	<code>\varpi</code>	$\varphi$	<code>\varphi</code>
$\delta$	<code>\delta</code>	$\kappa$	<code>\kappa</code>	$\rho$	<code>\rho</code>	$\chi$	<code>\chi</code>
$\epsilon$	<code>\epsilon</code>	$\lambda$	<code>\lambda</code>	$\varrho$	<code>\varrho</code>	$\psi$	<code>\psi</code>
$\varepsilon$	<code>\varepsilon</code>	$\mu$	<code>\mu</code>	$\sigma$	<code>\sigma</code>	$\omega$	<code>\omega</code>
$\zeta$	<code>\zeta</code>	$\nu$	<code>\nu</code>	$\varsigma$	<code>\varsigma</code>		
$\eta$	<code>\eta</code>	$\xi$	<code>\xi</code>	$\tau$	<code>\tau</code>		
$\Gamma$	<code>\Gamma</code>	$\Lambda$	<code>\Lambda</code>	$\Sigma$	<code>\Sigma</code>	$\Psi$	<code>\Psi</code>
$\Delta$	<code>\Delta</code>	$\Xi$	<code>\Xi</code>	$\Upsilon$	<code>\Upsilon</code>	$\Omega$	<code>\Omega</code>
$\Theta$	<code>\Theta</code>	$\Pi$	<code>\Pi</code>	$\Phi$	<code>\Phi</code>		

$<$	<code>&lt;</code>	$>$	<code>&gt;</code>	$=$	<code>=</code>
$\leq$	<code>\leq or \le</code>	$\geq$	<code>\geq or \ge</code>	$\equiv$	<code>\equiv</code>
$\ll$	<code>\ll</code>	$\gg$	<code>\gg</code>	$\doteq$	<code>\doteq</code>
$\prec$	<code>\prec</code>	$\succ$	<code>\succ</code>	$\sim$	<code>\sim</code>
$\preceq$	<code>\preceq</code>	$\succeq$	<code>\succeq</code>	$\simeq$	<code>\simeq</code>
$\subset$	<code>\subset</code>	$\supset$	<code>\supset</code>	$\approx$	<code>\approx</code>
$\subseteq$	<code>\subseteq</code>	$\supseteq$	<code>\supseteq</code>	$\cong$	<code>\cong</code>
$\sqsubset$	<code>\sqsubset</code>	$\sqsupset$	<code>\sqsupset</code>	$\Join$	<code>\Join</code>
$\sqsubseteq$	<code>\sqsubseteq</code>	$\sqsupseteq$	<code>\sqsupseteq</code>	$\bowtie$	<code>\bowtie</code>
$\in$	<code>\in</code>	$\ni$	<code>\ni</code>	$\propto$	<code>\propto</code>
$\vdash$	<code>\vdash</code>	$\dashv$	<code>\dashv</code>	$\models$	<code>\models</code>
$\mid$	<code>\mid</code>	$\parallel$	<code>\parallel</code>	$\perp$	<code>\perp</code>
$\smile$	<code>\smile</code>	$\frown$	<code>\frown</code>	$\asymp$	<code>\asymp</code>

# Important Symbols Used in Mathematics

## Binary Operators.

$+$	<code>+</code>	$-$	<code>-</code>	$\triangleleft$	<code>\triangleleft</code>
$\pm$	<code>\pm</code>	$\mp$	<code>\mp</code>	$\triangleright$	<code>\triangleright</code>
$\cdot$	<code>\cdot</code>	$\div$	<code>\div</code>	$\star$	<code>\star</code>
$\times$	<code>\times</code>	$\setminus$	<code>\setminus</code>	$\ast$	<code>\ast</code>
$\cup$	<code>\cup</code>	$\cap$	<code>\cap</code>	$\circ$	<code>\circ</code>
$\sqcup$	<code>\sqcup</code>	$\sqcap$	<code>\sqcap</code>	$\bullet$	<code>\bullet</code>
$\vee$	<code>\vee</code> , <code>\lor</code>	$\wedge$	<code>\wedge</code> , <code>\land</code>	$\diamond$	<code>\diamond</code>
$\oplus$	<code>\oplus</code>	$\ominus$	<code>\ominus</code>	$\uplus$	<code>\uplus</code>
$\odot$	<code>\odot</code>	$\oslash$	<code>\oslash</code>	$\amalg$	<code>\amalg</code>
$\otimes$	<code>\otimes</code>	$\bigcirc$	<code>\bigcirc</code>	$\dagger$	<code>\dagger</code>
$\bigtriangleup$	<code>\bigtriangleup</code>	$\bigtriangledown$	<code>\bigtriangledown</code>	$\ddagger$	<code>\ddagger</code>
$\triangleleft$	<code>\lhd</code> <sup>a</sup>	$\triangleright$	<code>\rhd</code> <sup>a</sup>	$\wr$	<code>\wr</code>
$\untriangleleft$	<code>\unlhd</code> <sup>a</sup>	$\untriangleright$	<code>\unrhd</code> <sup>a</sup>		

## BIG Operators.

$\sum$	<code>\sum</code>	$\bigcup$	<code>\bigcup</code>	$\bigvee$	<code>\bigvee</code>
$\prod$	<code>\prod</code>	$\bigcap$	<code>\bigcap</code>	$\bigwedge$	<code>\bigwedge</code>
$\coprod$	<code>\coprod</code>	$\bigsqcup$	<code>\bigsqcup</code>	$\biguplus$	<code>\biguplus</code>
$\int$	<code>\int</code>	$\oint$	<code>\oint</code>	$\bigodot$	<code>\bigodot</code>
$\bigoplus$	<code>\bigoplus</code>	$\bigotimes$	<code>\bigotimes</code>		

# Important Symbols Used in Mathematics

## Arrows.

$\leftarrow$	<code>\leftarrow</code> or <code>\gets</code>	$\longleftarrow$	<code>\longleftarrow</code>
$\rightarrow$	<code>\rightarrow</code> or <code>\to</code>	$\longrightarrow$	<code>\longrightarrow</code>
$\leftrightarrow$	<code>\leftrightarrow</code>	$\longleftrightarrow$	<code>\longleftrightarrow</code>
$\Leftrightarrow$	<code>\Leftrightarrow</code>	$\Longleftarrow$	<code>\Longleftarrow</code>
$\Rightarrow$	<code>\Rightarrow</code>	$\Longrightarrow$	<code>\Longrightarrow</code>
$\Leftrightarrow$	<code>\Leftrightarrow</code>	$\Longleftrightarrow$	<code>\Longleftrightarrow</code>
$\mapsto$	<code>\mapsto</code>	$\longmapsto$	<code>\longmapsto</code>
$\hookleftarrow$	<code>\hookleftarrow</code>	$\hookrightarrow$	<code>\hookrightarrow</code>
$\lhookrightarrow$	<code>\lhookrightarrow</code>	$\rhookrightarrow$	<code>\rhookrightarrow</code>
$\leftharpoonup$	<code>\leftharpoonup</code>	$\rightharpoonup$	<code>\rightharpoonup</code>
$\leftharpoondown$	<code>\leftharpoondown</code>	$\rightharpoondown$	<code>\rightharpoondown</code>
$\rightleftharpoons$	<code>\rightleftharpoons</code>	$\iff$ (bigger spaces)	<code>\iff</code> (bigger spaces)
$\Uparrow$	<code>\uparrow</code>	$\Downarrow$	<code>\downarrow</code>
$\Updownarrow$	<code>\updownarrow</code>	$\Uparrow$	<code>\Uparrow</code>
$\Downarrow$	<code>\Downarrow</code>	$\Updownarrow$	<code>\Updownarrow</code>
$\nearrow$	<code>\nearrow</code>	$\searrow$	<code>\searrow</code>
$\swarrow$	<code>\swarrow</code>	$\nwarrow$	<code>\nwarrow</code>
$\leadsto$	<code>\leadsto</code> <sup>a</sup>		

<sup>a</sup>Use the `latexsym` package to access this symbol

# Important Symbols Used in Mathematics

## Miscellaneous Symbols.

$\dots$	<code>\dots</code>	$\cdots$	<code>\cdots</code>	$\vdots$	<code>\vdots</code>	$\ddots$	<code>\ddots</code>
$\hbar$	<code>\hbar</code>	$\imath$	<code>\imath</code>	$\jmath$	<code>\jmath</code>	$\ell$	<code>\ell</code>
$\Re$	<code>\Re</code>	$\Im$	<code>\Im</code>	$\aleph$	<code>\aleph</code>	$\wp$	<code>\wp</code>
$\forall$	<code>\forall</code>	$\exists$	<code>\exists</code>	$\mho$ <sup>a</sup>	<code>\mho</code>	$\partial$	<code>\partial</code>
$'$	<code>'</code>	$'$	<code>\prime</code>	$\emptyset$	<code>\emptyset</code>	$\infty$	<code>\infty</code>
$\nabla$	<code>\nabla</code>	$\triangle$	<code>\triangle</code>	$\Box$ <sup>a</sup>	<code>\Box</code>	$\diamond$	<code>\Diamond</code> <sup>a</sup>
$\perp$	<code>\bot</code>	$\top$	<code>\top</code>	$\angle$	<code>\angle</code>	$\surd$	<code>\surd</code>
$\diamond$	<code>\diamondsuit</code>	$\heartsuit$	<code>\heartsuit</code>	$\clubsuit$	<code>\clubsuit</code>	$\spadesuit$	<code>\spadesuit</code>
$\neg$	<code>\neg</code> or <code>\not</code>	$\flat$	<code>\flat</code>	$\natural$	<code>\natural</code>	$\sharp$	<code>\sharp</code>

<sup>a</sup>Use the `latexsym` package to access this symbol

## Non-Mathematical Symbols.

These symbols can also be used in text mode.

$\dagger$	<code>\dag</code>	$\S$	<code>\S</code>	$\copyright$	<code>\copyright</code>	$\textregistered$	<code>\textregistered</code>
$\ddagger$	<code>\ddag</code>	$\P$	<code>\P</code>	$\pounds$	<code>\pounds</code>	$\%$	<code>\%</code>

Thank You...!