1. What is \LaTeX? 

2. The Basics of Document Preparation 

3. Environments 

4. A Cool Example
What is \LaTeX?

Outline

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What is LaTeX?

Software Components

- MikTeX
- TeXnicCenter
- Ghostscript
What is LaTeX?

Installation Instructions

See Handout
What is \LaTeX? 

The History and Development of \LaTeX

- \TeX was developed by Donald Knuth in the 1970’s. He used it to help him typeset the classic volumes *The Art of Computer Programming*.

- \LaTeX was originally a large set of macros developed by Leslie Lamport in 1985.

- \LaTeX has gone through many upgrades since then. Currently the American Mathematical Society has developed AMS-\LaTeX with more symbols and macros.

- Today, in mathematics, it is almost unacceptable to use anything else. Graduate math professors often expect homework handed in via \LaTeX.
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Open a blank document using TeXnicCenter.
Type `\documentclass{article}`
Leave some space and type `\begin{document}`.
Leave some space and type `\end{document}`
Between the statements `\documentclass{article} and `\begin{document}` is called the Preamble.
This is where overall control of your document takes place. We’ll see one package by the end of the day.
The Basics of Document Preparation

The “Body”

- The text between the statements \begin{document} and \end{document} is the body of your document. This is (for the most part) all of the text that you want to see once your document has been compiled.
- In the body, type
  
  This is my first \LaTeX document.
- To compile this document, we use build commend (after selecting the options we want). Set the build mode to \LaTeX \Rightarrow PS.
- Save your file in “My Documents” as “Math291Week1”.
- Open the My Documents folder and you will see a document with a little ghost on it. Open this. This is your document (a postscript file).
The Basics of Document Preparation

Compiling Errors

- Go back to your document file in TeXnicCenter and change the cap X on the end of \LaTeX to a lowercase x.
- Build your document again. At the bottom it should tell you that you have 1 error.
- Press F9. This will take you to a description of the error.
- It should say “undefined control sequence” \LaTeX. Notice the break.
- Fix the mistake. (Remember that the \LaTeX command is case sensitive).
Reserved Symbols in \texttt{\LaTeX}

The Reserved Symbols are $\backslash$, $\sim$, $\$, $\%$, $\&$, $\#$, $\_\_$, $\{\}$, and $\wedge$. The reason these symbols are reserved is that they each perform a special function with \texttt{\LaTeX}. We will discuss the function of most of these later.
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Documents created using \LaTeX are best thought of as being divided into different environments.

We are going to change the statement that we originally wrote to make it a title.

Before the statement write
\begin{center}
After the statement write
\end{center}

Build your document and see what happens.

What if we want the text boldfaced? We could type the commands necessary by hand, but let’s use TeXnicCenter to help us. Highlight the text and click the Boldfaced F on the top of the screen.

Build, and see how the output has changed.
Let’s put our name before the title on this document.

Above the title type

\texttt{<your name> \today}

Next, since we want this text to be in the upper right hand corner, we highlight and click on the flushright icon.

Build and see how the output has been modified.
The main power of \LaTeX{} is its ability to typeset mathematical formulae quickly and easily.

The math environment is invoked by using the symbol: $.$.

To see this, first type

\[ x^n \]

Build your document and see the output.

Next, add

\[ x_n \]

Then build again.
Let’s type a polynomial. Use what you know to add following polynomial to your document.

\[ 2x^{10} - x^8 + 5x^3 \]

How many got

\[ 2x^{10} - x^8 + 5x^3 \]
Anytime you want to apply a command to an object with more than one character or command within it, you need to use \{ and \}.

To get the polynomial from the previous slide we type

$$2x^{10}-x^8+5x^3$$

Try this and build your document.
Typesetting Fractions

- To create the fraction $\frac{1}{2}$, we type \( \frac{1}{2} \).
- Try it and build.
- To create the fraction $\frac{\frac{1}{3}x^3}{\frac{1}{2}x^2}$, we type \( \frac{\frac{1}{3}x^3}{\frac{1}{2}x^2} \).
- Try it and build.
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Suppose you are explaining polynomial long division to a group of people and you don’t want to go through the process of typing out the solutions to all of the examples that you’ve generated.

In your preamble type
\usepackage{polynom}

Now in your document somewhere type
$\polylongdiv{x^3+x^2-1}{x-1}$

Now build your document, and see what happens.

This is the power of \LaTeX.