One of the best ways to learn \LaTeX is to look at examples. This document contains many of the things that you might be looking to do as you first begin using \LaTeX. If you’re looking to do something not included here, then Google search is your best friend! There are many examples available online for you to look at and adapt for your own needs.

1 Packages.

Invoking a package in the preamble of a document allows us to use some of the “fancier” features of \LaTeX. In this document, we’ve included some of the more standard packages that are used in \LaTeX documents. It should be noted that many packages are already bundled with the distribution; however it is sometimes necessary to install a package from a repository.

2 Formatting Text.

Formatting text in \LaTeX is relatively simple. For instance, this is standard text. This is \textbf{bold text}. This is \textit{italic text}. This is \textsc{small capital text}. This is \texttt{typewritter text}. This is \textcolor{red}{colored text}.

Environments are very helpful in \LaTeX; they allow for quick formatting for various situations. For instance, if we have a quote:

“Mathematics may be defined as the subject in which we never know what we are talking about, nor whether what we are saying is true.” –Bertrand Russell

Or if we have a poem:

Hyperboloids of wondrous Light
Rolling for aye through Space and Time
Harbour there Waves which somehow Might
Play out God’s holy pantomime. –Alan Turing

Or if we want something to appear exactly as we’ve typed it no matter what:

```latex
\text{jfkldsjlfjsdfkjsdfjdwkl}'' ? { } % @ # + =
\text{fldksjfjdflkdjflkdjsk} \text{jfkldsfkldjsfdjslk} \text{mkfldsjfkl}
\text{hello 5464654543321 35 kfjdwfjldjdsfdkdjs}
\text{lkjdslfjlsdfjdfjkld}
```

It doesn’t even matter that this is off-
2.1 Line Spacing.


2.2 Lists.

Numbered lists may be created as such:

1. This is item one.
2. This is item two.
3. This is item three.

Unnumbered lists may be created as such:

- Here’s an item!
- Here’s an item!
  - Here’s a sub-item!
- Here’s an item!

Here’s another type of list:

**Description 1** Some stuff about it...

**Description 2** Some stuff about it...

**Description 3** Some stuff about it...
3 Typesetting Mathematics.

We may wish to include some math within the text of our document. This can be accomplished as such: \( x^3 + 2x - 4 \) is a polynomial. On the other hand, we may sometimes wish to have the mathematics displayed more prominently:

\[
\begin{align*}
\int_a^b f(x) \, dx &= \lim_{\max \Delta x_k \rightarrow 0} \sum_{k=1}^n f(x_k^*) \Delta x_k \\
A(t) &= P \left( 1 + \frac{r}{m} \right)^{mt} \bigg\{ 1, \frac{1}{2}, \frac{1}{3}, \cdots \bigg\}
\end{align*}
\]

Many operators are already built into \( \LaTeX \), however there are some we may wish to add:

\[
\exp[i \theta] = \cos \theta + i \sin \theta \quad \text{best\{Math, English\} = Math}
\]

Here are some symbols that should be familiar:

\[
\rho \left( \frac{\partial v}{\partial t} + v \cdot \nabla v \right) = -\nabla p + \nabla \cdot T + f
\] (1)

Do you recognize Equation (1)? It’s the general form of the Navier-Stokes Equations which describe fluid motion!
As with standard text formatting, there are also many environments for mathematics. In fact, we’ve already seen some examples – although there are many more. Here’s a fancy way of writing out a theorem:

**Lebesgue Dominated Convergence Theorem.** Let \( \{f_n\} \) be a sequence of measurable functions on \( E \). Suppose there is a function \( g \) that is integrable over \( E \) and dominates \( \{f_n\} \) on \( E \) in the sense that \( |f_n| \leq g \) for all \( n \). Then:

\[ \{f_n\} \to f \text{ pointwise a.e. on } E \quad \Rightarrow \quad f \text{ is integrable over } E \text{ and } \lim_{n \to \infty} \int_E f_n = \int_E f. \]

Here’s an easy way to create boxes for formulas, etc:

**Simple Interest.**

\[
FV = PV(1 + rt) \quad \text{where} \quad \begin{cases} 
FV = \text{future value} \\
PV = \text{present value} \\
r = \text{interest rate} \\
t = \text{time}
\end{cases}
\]

4 **Tables.**

Basic text tables may be created as such:

<table>
<thead>
<tr>
<th>Col 1</th>
<th>Col 2</th>
<th>Col 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>This</td>
<td>This</td>
<td>This</td>
</tr>
<tr>
<td>Column</td>
<td>Column</td>
<td>Column</td>
</tr>
<tr>
<td>Is</td>
<td>Is</td>
<td>Is</td>
</tr>
<tr>
<td>Right</td>
<td>Left</td>
<td>Centered</td>
</tr>
<tr>
<td>Aligned</td>
<td>Aligned</td>
<td></td>
</tr>
</tbody>
</table>

We may also wish to create a table with a bunch of math in it:

<table>
<thead>
<tr>
<th>Col 1</th>
<th>Col 2</th>
<th>Col 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \alpha )</td>
<td>( x )</td>
<td>( \frac{1}{2} )</td>
</tr>
<tr>
<td>( \beta )</td>
<td>( x^2 )</td>
<td>( \frac{1}{3} )</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>( x^3 )</td>
<td>( \frac{1}{4} )</td>
</tr>
</tbody>
</table>
5 Figures.

In general, you may either import a figure that is saved outside of your LaTeX file or you may generate the figure within LaTeX. To include an outside figure, simply use the code:

Alternatively, you may draw figures directly in LaTeX. Here is the plot of a wonderful function:

And here is a graph:
6 \textbf{BibTeX}.

\texttt{BibTeX} is a reference management system that can be used alongside \LaTeX. It is relatively simple to use; however, it does require a \texttt{.bib} file that stores all of the reference information. For in-text citations, you use [2, p. 2]. Once you have made the \texttt{BibTeX} file, then it is very easy to create a reference list (in any format you may choose):

\textbf{References}
