LearningLatex

```
% Jennifer Pan
% Math Prefresher
% Fall 2011

% This file walks you through some basic things with LaTex
% Thanks to Patrick Lam and Maya Sen for letting me borrow their materials



% COMMANDS
% You have to tell Latex to do everything with commands, which always begin with \



% BARE MINIMUM
\documentclass[10pt]{article}
        % basic article document class
        % can change font size, e.g., 12pt

\begin{document}
        % line of code telling latex that your document is beginning

My text here!

\end{document}
        % line of code telling latex that your document is ending


% Save your file in a directory as a .tex file
% On your .tex file, compile using PDFLaTeX (usually a button or command on your
editor)
% Output files will be in the same directory as your .tex file.

% If you get an error message, something is wrong in your code. Fix errors before
they pile up!
% GOOGLE if you have a question!
% Use Wikipedia, http://en.wikibooks.org/wiki/LaTeX/Formatting is great!



% BASICS: TITLE, AUTHOR, DATE
% Put the following between documentclass{article} and \begin{document}

\title{This is my title}
\author{Jennifer Pan}
\date{August, 2010}
        % if you omit this command, the current date is automatically included

% Put the following after \begin{document}. If you don't, your title, author, date
won't show up

\maketitle

% Compile again and view the document
% Make sure to close the PDF of your document before re-compiling. Else, you'll get
an error.



% BASICS: LINES
% 1) To start a new paragraph, skip a line in your .tex file after "My text here?"
and write:
```

New paragraph: it's automatically indented...as long as I can write enough words to go to the next line.

% Compile and view the document

% 2) To skip a line and start a new line, use \\ and skip a line:

This is my line. \\

This is my new line.

% Compile and view the document

% 3) To put space between lines, use \bigskip, \medskip, or \smallskip
% between "This is my new line. \\" and "
This is another line." (skip lines in between)

% Compile and view the document

% 4) To get rid of the indentation at the start of a new line / paragraph, put:

\noindent This is my new non-indented line.

% Compile and view the document

% BASICS: PACKAGES
% The following standard packages make your life easier
% Put them after "\documentclass{article}":

\usepackage{amsmath}
\usepackage{amssymb}
        % packages that allow mathematical formatting

\usepackage{graphicx}
        % package that allows you to include graphics

\usepackage{setspace}
        % package that allows you to change spacing

\onehalfspacing
        % \onehalfspacing creates 1.5 spaced; \doublespacing for double spaced;
default is single space

\usepackage{fullpage}
        % package that specifies normal margins

% Compile and view the document
% Play with the spacing

% BASICS: SECTIONS AND PARAGRAPHS
% You can create sections with titles using \section{Section Title} (with numbers)
or \section*{Section Title} (without numbers):

\section{My First Numbered Section Title}
Text here

\section*{My First Unnumbered Section Title}
Text here

```
% Compile and view the document
% \subsection and \subsubsection also available. Try and compile!

\subsection{My First Numbered SubSection Title}
Text here

\subsubsection{My First Numbered SubSubSection Title}
Text here

% You can do something similar with \paragraph, but you control the numbering
system:

\paragraph{A)} Text for Paragraph (A) here.

\subparagraph{i)} Text for Sub-Paragraph (A)(i) here.

\subparagraph{ii)} Answer to Problem (A)(ii) here.

% Put this after your "First Numbered SubSubSection," and compile.



% ENVIRONMENTS
% Space in your document for certain types of activites
% Must always "\begin" and "\end" or else you'll get an error



% ENVIRONMENTS: LISTS
% List environment allows you to itemize or enumerate:

My favorite cities:
\begin{itemize}
\item New York
\item Beijing
\item Hong Kong
\item Paris
\end{itemize}

% Compile and view the document


My favorite airlines:
\begin{enumerate}
\item Singapore Airlines
\item Cathay Pacific
\item Qatar Airways
\item Qantas Airways
\end{enumerate}

% Compile and view the document



% ENVIRONMENTS: MATH MODE
% Math environment allows you to type math (one of the biggest advantages of Latex):

% Create a section for math

\section*{My Unnumbered Math Section}

% Use $ Math stuff $ for in line math
For math within a line such as $\alpha$ or $8 > 6$, enclose the math in dollar signs
```

% Compile and view the document

% Use eqnarray for centered math and equations

Simple equation:
\begin{eqnarray}
.80 \cdot \frac{1}{2} & = & \frac{.80}{2} \\
& = & .40
\end{eqnarray}
        % Don't leave any blank lines in eqnarray, or you'll get an error
        % Go to next line using \\
        % the "&" signs tell latex to align the equal signs
        % \frac{num}{dem} for fraction

% Compile and view the document

Slightly more complicated equation:
\begin{eqnarray*}
\hat{\beta}_x = r_{xy|z} \left(\frac{s_y}{s_x} \right)
\left(\frac{\sqrt{1-r^2_{yz}}}{\sqrt{1-r^2_{xz}}} \right)
\end{eqnarray*}
        % Get rid of equation number with *
        % Greek symbols are relatively intuitive, \alpha, \beta, \gamma, \sigma
        % Subscript with _{stuff}
        % Superscript with ^{stuff}
        % Square root is \sqrt{}
        % use \left(and \right) to size brackets to fit what inside

% Compile and view the document

Slightly more complicated equation with matrix:
\begin{eqnarray*}
\textbf{A} =
\begin{pmatrix}
a_{11} & a_{12} & a_{13} \\
a_{21} & a_{22} & a_{23} \\
a_{31} & a_{32} & a_{33} \\
\end{pmatrix}\mbox{ this is a matrix with rounded brackets}
\end{eqnarray*}
        % bold text using \textbf{stuff}
        % put an environment pmatrix inside of another environment eqnarray
        % to type normal text in eqnarray use \mbox{stuff}

% Compile and view the document

Try on your own:
\begin{eqnarray*}
\bm{\hat{\beta}} &=& (\mathbf{X'X})^{-1} \mathbf{X'y} \\
f(x) &=& \frac{1}{\sigma \sqrt{2 \pi}} \exp \left(- \frac{(x -
\mu)^2}{2 \sigma^2} \right)
\end{eqnarray*}

% ENVIRONMENTS: TABLES (AFTER R)
% Table environment allows you to make tables.

```
% Create a section for my table

\section*{My Unnumbered Table Section}


% Create the table:
\begin{table}[!htp]
        % [!htp] forces latex to put the table  exactly here;
        % if that's not possible, then latex will put the table at the top then one
the same page
\begin{center}
        % center the table
\begin{tabular}{l|rrrr||c}
        % use the tabular command, specify the number of (left- right- and
center-justified) columns
        % the "|" command asks latex to include a vertical line
   & West Coast & South & East Coast & Midwest & Total\\
        % use "&" to specify column breaks, number of breaks must match colums
specified
\hline
        % horizontal line
   Men & 3 & 3 & 3 & 0 & 9 \\
   Women & 4 & 1 & 3 & 1 & 9 \\
\hline
   Total & 7 & 4 & 6 & 1 & 18 \\
\end{tabular}
\end{center}
\caption{\textit{Geographic distribution of the contestants on Top Chef}}
\end{table}

% Compile and view the document

% To reference your table in the text of the document, add \label after \caption:
\label{TopChef}

In Table \ref{TopChef}, we can see that...

% You may have to compile more than once to get the references to show up correctly



% ENVIRONMENTS: FIGURES (AFTER R)
% Figure environment allows you to include graphics, e.g., plots, pictures, etc.
% Uses the graphicx package, which we included earlier

% Create a section for my figure

\section*{My Unnumbered Figure Section}

% Include the figure:

\begin{figure}[!htp]
\begin{center}
        % use the "begin{figure} command and then center it
\includegraphics[scale=.50]{yum.pdf}
\caption{\textit{Does anyone look like this after eating?}}
\end{center}
\end{figure}

% Compile and view the document


% We can also reference figures in the text of the document, add \label after
```

```
caption
\label{Yum}

In Figure \ref{Yum}, we can see that...

% You may have to compile more than once to get the references to show up correctly



% ENVIRONMENTS: VERBATIM (AFTER R)
% verbatim environment allows you to easily paste R code, without getting errors

% Create a section for Verbatim

\section*{My Unnumbered Verbatim Section}

\begin{verbatim}
LaTeX will copy everything in the verbatim environment exactly, rather than
interpret it as code.
For example, \begin{itemize}
here is typed out exactly rather than beginning a list.
And line skips when you press enter
\end{verbatim}



% OTHER:

% Footnotes
Use the {\tt footnote} command\footnote{like this}

% New Page
\newpage


% BIBLIOGRAPHY
% Need to use the natbib package (add this to the preamble)
\usepackage{natbib}

% Crate a separate file with .bib extension in the same directory: MyBib.bib
% THE FOLLOWING SHOULD NOT GO INTO YOUR .TEX FILE, BUT INSTEAD THE MyBib.bib file
@ARTICLE{Stasavage05,
        author = "David Stasavage",
        title = "Democracy and Education Spending in Africa",
        journal = "American Journal of Political Science",
        volume = "49",
        year = "2005",
        pages = "343-358",
}

@ARTICLE{Barro99,
        author = "Barro, Robert",
        title = "Determinants of Democracy",
        journal = "Journal of Political Economy",
        volume = "107",
        number = "6",
        year = "1999",
        pages = "S158-S183",
}

@BOOK{AcemogluRobinson06,
        author = "Daron Acemoglu and James Robinson",
        title = "Economic Origins of Dictatorship and Democracy",
```

```
        year = "2006",
        publisher = "Cambridge University Press",
        location = "Cambridge, UK",
}

@inbook{ImaiKingLau07,
        author = "Kosuke Imai and Gary King and Oliva Lau",
        chapter = "oprobit: Ordinal Probit Regression for Ordered Categorical
Dependent Variables",
        title = "Zelig: Everyone's Statistical Software",
        year = "2007",
}
```

% Save the MyBib.bib file but do not compile

% Go back to your .tex file
% In your .tex file, need the line \bibliographystyle{name of a style} which can be
downloaded, like apsr
% Go to http://www.ctan.org/tex-archive/macros/latex/contrib/harvard/
% Put this before \end{document}, but after the content of your paper
\bibliographystyle{apsr}

% In your .tex file, add the line \bibliography{name of bib file w/o .bib extension}
% Put this before \end{document}, but after the content of your paper
\bibliography{MyBib}

% Now compile your .tex file:

% PDFLatex once
% BibTeX once (should be a button or compiling command)
% PDFLatex once
% PDFLatex once more

% References won't show up unless you cite them in your paper, e.g.,

While primary education has a leveling effect, tertiary education may exacerbate
inequalities \citep{Stasavage05}.
        % parenthetical citation (author last name and year inside parentheses)

{\tt Zelig} is used to generate ordinal probit estimates, following
\cite{ImaiKingLau07}.
        % in text citation (only the published year will show up in parentheses)

The literature on regime change and democratization suggest that preferences of the
rich and poor should
diverge with higher income inequality \citep{AcemogluRobinson06, Barro99}.
        % more than 1 author can be cited, but you need to list the authors in
alphabetical order