\textbf{\LaTeX \ TIPS}

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\textbf{N.B.} I prefer using \texttt{\documentclass\{amsart\}} because it automatically includes most of the enhancements provided by the AMS version of \LaTeX. Hence, if you are using \texttt{\documentclass\{article\}} and something does not work as I describe below, then the problem may be caused by not using the \texttt{amsart} document class.

1. \textbf{Nonmath Stuff}

1.1. \textbf{Sections, subsections, etc.} Let \LaTeX handle your section headings and spacing. The sectioning commands available in the \texttt{article} or \texttt{amsart} document classes are

\section, \subsection, \subsubsection, \paragraph, \subparagraph.

For example, we are in a subsection right now, and the code beginning this subsubsection is \texttt{\subsection\{Sections, subsections, etc\}}. \LaTeX will automatically number the sections.

To tell \LaTeX to not number the section, use the starred version of the command, e.g., \texttt{\subsection*\{An Unnumbered Section Here\}}. This may be helpful if you are typing up homework and want to use the problem number as the heading, e.g., \texttt{\subsection*\{p. 118, \# 3\}}.

1.2. \textbf{Title, author, date.} The following code snippet should make this clear:

\begin{verbatim}
\documentclass\{article\}
\title\{Tractatus Logico-Philosophicus\}
\author\{Ludwig Wittgenstein\}
\date\{WW I\}
\begin{document}
\maketitle
\end{document}
\end{verbatim}

1.3. \textbf{Commenting.} Use the \% character to tell \LaTeX to ignore everything after the \% on that line. This is handy when debugging, or for documentation. For example, we might have this in our source file

\begin{verbatim}
M(x,y) \, dx \wedge dy \% the \, adds a thinspace
\end{verbatim}

Use the \texttt{comment} package to comment out a whole block of text by just enclosing it in a \texttt{comment} environment. For example,

\begin{verbatim}
\subsection*\{Extra Credit\}
Find all compositions of 100 with distinct parts.
\begin{comment}
\subsection*\{Solution\}
\end{comment}
\end{verbatim}

\textit{Date:} Fall 2008.
I'll uncomment this block when I want to show the solution.
\end{comment}

To use the \texttt{comment} package, just make sure you have \texttt{\usepackage{comment}} in the preamble, i.e., somewhere between \texttt{\documentclass{article}} and \texttt{\begin{document}}.

1.4. Your own commands. Use \texttt{\newcommand} and \texttt{\renewcommand} to define your own time-saving commands. For example, to make it easier to code $\frac{\partial f}{\partial x}$, use this code in your preamble

\begin{verbatim}
\newcommand{\pfx}{\frac{\partial f}{\partial x}}
\end{verbatim}

Then you can just type $\pfx$ to get $\frac{\partial f}{\partial x}$.

You can have variables with your commands too. For example,

\begin{verbatim}
\newcommand{\pd}[2]{\frac{\partial #1}{\partial #2}}
\end{verbatim}

will allow you type $\pd{f}{x}=\pd{g}{y}$ to get $\frac{\partial f}{\partial x} = \frac{\partial g}{\partial y}$. The [2] just says how many arguments your command has. And \{#1\} and \{#2\} are just where your arguments will be substituted.

\texttt{renewcommand} just lets you redefine a command that is already defined. That is, if you use \texttt{newcommand} and the name of your command is already in use for something else, \LaTeX{} will complain. To force \LaTeX{} to use your new definition, use \texttt{renewcommand} instead of \texttt{newcommand}. This is more powerful than just allowing you to use a name you really like. For example, there are two typeset versions of the Greek letter phi, $\phi$ and $\varphi$ with commands \texttt{\phi} and \texttt{\varphi}, respectively.

If you prefer the $\varphi$ style and want to type $\phi$ instead of $\varphi$, then use \texttt{\renewcommand{\phi}{\varphi}}.

1.5. Page numbering, headers, footers. If your document is just one page, \LaTeX{} will usually put a page number at the bottom of the page. Use

\begin{verbatim}
\thispagestyle{empty}
\end{verbatim}

to suppress the page number. N.B. this needs to be after the \texttt{\begin{document}} statement; otherwise \LaTeX{} can’t figure out what page ‘thispage’ is.

You can also use one of

\begin{verbatim}
\pagestyle{empty}
\pagestyle{plain}
\pagestyle{headings}
\end{verbatim}

to get different headers and footers on your pages. Put one of these in the preamble to see what it does.

1.6. Quotation marks. There is a “special” way to make \LaTeX{} do quotation marks correctly, i.e., I typed ‘‘special’’ to get “special”. Contrast this with "special" which results from "special".
2. Math Stuff

2.1. Matrices. An easy way to get a matrix is to use one of the \texttt{matrix} environments. We have \texttt{matrix}, \texttt{bmatrix}, \texttt{pmatrix}, and \texttt{vmatrix}. For example,

\[
\begin{bmatrix}
0 & E_z & -E_y \\
-E_z & 0 & E_x \\
E_y & -E_x & 0
\end{bmatrix},
\[
\begin{pmatrix}
0 & E_z & -E_y \\
-E_z & 0 & E_x \\
E_y & -E_x & 0
\end{pmatrix},
\text{ and } \left| \begin{array}{ccc}
0 & E_z & -E_y \\
-E_z & 0 & E_x \\
E_y & -E_x & 0
\end{array} \right|
\]

were all typeset with
\begin{verbatim}
\begin{matrix}
0 & E_z & -E_y \\
-E_z & 0 & E_x \\
E_y & -E_x & 0
\end{matrix}
\end{verbatim}
or the corresponding \texttt{bmatrix}, \texttt{pmatrix}, \texttt{vmatrix} versions.

To get a small matrix that looks good with inline text, we can use \texttt{smallmatrix}, e.g., \begin{verbatim}$\begin{smallmatrix}1&0\\0&1\end{smallmatrix}$\end{verbatim} yields $\begin{pmatrix}1 & 0 \\ 0 & 1\end{pmatrix}$.

2.2. Spacing. Sometimes a thin space (\,) makes things look better, e.g.,

\[
\int \int e^{xy} \, dx \, dy
\]

looks better than
\[
\int \int e^{xy} \, dx \, dy
\]