Very Basic Mathematical Latex

A document in the article style might be entered between the \maketitle and \end{document} sections below.

\documentclass{article}
%\addtolength{\textheight}{+ .1\textheight}
\title{TITLE}
\author{NAME}
%\date{}
\begin{document}

\maketitle

\end{document}

Paragraphs are separated by a blank line of input. Lines which start with % are viewed as having been commented out.

Most mathematical input is entered in \textit{math mode}. Displayed formulas can be enclosed between \[ and \]; inline formulas between $ and $. A number of examples are given below. You can find long lists of mathematical symbols and accents at the web sites:

- http://www.agu.org/symbols.html
- http://www.giss.nasa.gov/latex/ltx-117.html
- http://www.lacim.uqam.ca/~zabrocki/LATEXmath/latexsym.html
Simple Constructions in Math Mode

Some Simple Displayed Formulas:
The character ^ is for superscripts and _ is for subscripts. Single character subscripts don’t need to be enclosed in {}.
\[ e^{i\theta_1} = \cos \theta_1 + i \sin \theta_1 \]
\[ e^{i \{ i \ \text{theta}_1 \} } = \cos{i \ \text{theta}_1 } + i \ \sin{i \ \text{theta}_1 } \]
\[ \frac{\partial^2 u}{\partial x^2} = \frac{1}{c^2} \frac{\partial^2 u}{\partial t^2} \]

Sometimes it is important not to leave a blank line before the \[ ending a math mode display.
Formulas can also be displayed inline by enclosing in $ signs; e.g. \[ f(x) = \int_a^x f(t) \ dt \] $f(x) = \int_a^x f(t) \ dt$.

Matrices, Systems of Equations, Tables:

A Matrix
\[ A = \left( \begin{array}{rr} a & b \\ b & c \end{array} \right). \]

\[ A = \left\{ \begin{array}{cccc} a & b \\ b & c \end{array} \right\}. \]
The r’s indicate right justification. Alternatives include l or c.

A system of equations:
\[ u \cos(\pi u^3) + v + 1 = x \]
\[ u + v^2 \cos(\pi v) + 1 = y \]
\begin{verbatim}
\begin{eqnarray*}
  u \cos (\{ i \ \text{pi} u^-3\})+v+1 &=& x \\
  u+v^-2\cos (\{ i \ \text{pi} v\})+1 &=& y
\end{eqnarray*}
\end{verbatim}
A Simple Table:

<table>
<thead>
<tr>
<th>T</th>
<th>probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>$\frac{1}{36}$</td>
</tr>
<tr>
<td>3</td>
<td>$\frac{2}{36}$</td>
</tr>
</tbody>
</table>

The vertical bars | and \hline commands control where horizontal and vertical lines appear in the table.

A Conditional Definition

\[
f(x, y) = \begin{cases} \frac{x^2y}{x^4+y^2} & \text{if } (x, y) \neq (0,0) \\ 0 & \text{if } (x, y) = (0,0) \end{cases}
\]

The \right. command closes the left delimiter \{ syntactically without displaying anything.
Lists

The \textit{itemize} environment:

- item1
- item2

\begin{itemize}
\item item1
\item item2
\end{itemize}

The \textit{enumerate} environment:

1. item1
2. item2

\begin{enumerate}
\item item1
\item item2
\end{enumerate}

The \textit{description} environment:

a) item1
b) item2

\begin{description}
\item[$\bf{a)}$] item1
\item[$\bf{b)}$] item2
\end{description}

(The example above chooses to use boldface for the labels.)
Alignment, Font and Size Changes

Alignment
can be forced with

- **left:** \noindent
- **center:** \begin{center} ... \end{center}
- **right:** \begin{flushright} ... \end{flushright}
- **newline:** \newline or \\ 
- **newpage:** \newpage

Text Size
You can change sizes by enclosing your text in brackets as in

- **tiny:** \{\tiny ... \}
- **small:** \{\small ... \}
- **large:** \{\large ... \}
- **large:** \{\Large ... \}
- **large:** \{\LARGE ... \}

Font Changes
are possible as in

- **boldface:** \{\bf ... \}
- **italics:** \{\it ... \}

Vertical Spacing
can be achieved by commands like \bigskip, \smallskip, or \vspace{5mm}. 