General \LaTeX Information/Template: Symbols and Formatting

Name (or any other reason you’d need an empty line):

1. Write the Greek alphabet backwards.

**Solution:**
The Greek alphabet backwards is \(\omega \psi \chi \phi \upsilon \tau \sigma \rho \pi \sigma \omicron \xi \mu \lambda \kappa \theta \eta \zeta \epsilon \delta \gamma \beta \alpha\).

In display style, my nicely centered solution would be

\[\omega \psi \chi \phi \upsilon \tau \sigma \rho \pi \sigma \omicron \xi \mu \lambda \kappa \theta \eta \zeta \epsilon \delta \gamma \beta \alpha.\]

The uppercase Greek letters (backwards) are

\(\Omega \Psi X \Phi U T \Sigma P \Pi O \Xi N M \Lambda K I \Theta H Z E \Delta \Gamma B A\).

2. Indicate that you know how to represent fractions in \LaTeX.

**Solution:**
I know how to represent fractions (and large delimiters) in \LaTeX because I can do this:

\[
\left\{ \frac{a_n}{x^4 + 2} \right\} \neq \left( \frac{x}{x + \frac{x}{x + \frac{x}{x}}} \right)
\]

3. You need to draw your solution, but you don’t know how. What do you do?

**Solution:**
I leave a massive amount of space (within reason), so that I can draw my solution once I’ve printed my assignment. Like this:

(THE SPACE ABOVE INTENTIONALLY LEFT BLANK.)

4. Display some random elements and symbols that might be useful in this course.

**Solution:**
- Comparisons: \(<, \>, =, \leq, \geq, \neq, \equiv, \sim, \cong, \times\)
- Sets: \(\{x, y, z\} \in A, A \notin D, A \cup B, A \cap B, \emptyset\)
- Subscripts and superscripts: \(a_{ij}^{mn}, h_{\text{superscript}}^{\text{subscript}}\)
- Text styles: \textit{underlined}, \textbf{bold}, \textit{italicized}, \textsc{Small Caps}, \texttt{typewriter}, \textsf{sans serif}
- Text sizes: \footnotesize, \scriptsize, \normalsize, \small, \large, \Large, \LARGE, \huge, \Huge
• Matrices:

\[
\begin{pmatrix}
1 & 2 & 3 & 0 & a_{15} \\
0 & 1 & 0 & 0 & 0
\end{pmatrix}
\quad \text{or} \quad
\begin{bmatrix}
1 & 2 & 3 & 0 & a_{15} \\
0 & 1 & 0 & 0 & 0 \\
1 & 2 & 3 & \ddots & a_{15} \\
0 & \cdots & 0
\end{bmatrix}
\]

• Limits and large delimiters (e.g. parentheses, brackets):

\[
\lim_{\Delta x \to 0} \left[ \frac{f(x + \Delta x) - f(x)}{\Delta x} \right] = ?
\]

• Piecewise functions (and aligned equations): Let \( y = |x| \). Then

\[
\frac{dy}{dx} = \begin{cases} 
1, & \text{if } x \geq 0 \\
-1, & \text{if } x < 0
\end{cases}
\]

• Math arrows: \( \to \), \( \leftarrow \), \( \Rightarrow \), \( \Leftarrow \), \( \leftrightarrow \), \( \Rightarrow \leftrightarrow \), \( \Leftarrow \leftrightarrow \), \( \leftarrow \rightarrow \), \( \leftrightarrow \leftrightarrow \)

• Symbols with special implementation: $, \{ \}, \& , \% , #

• Symbols that MUST be used in math mode: >, <

• Quotations: ‘Hello, World.’ “Hello, World.”

This is what happens when you only use the apostrophe key: ‘Hello, World.’ ”Hello, World.”

• Tables:

\begin{tabular}{cccc}
Column 1 & Column 2 & Column 3 & Column 4 \\
Left-aligned & left-aligned & center-aligned & right-aligned \\
vertical & horizontal & lines are & optional
\end{tabular}

\begin{tabular}{ccc}
Column 1 & Column 2 & Column 3 \\
left-aligned random text & center-aligned less random text & right-aligned longer and non-random text
\end{tabular}

Table 1 has a caption (formal):

<table>
<thead>
<tr>
<th>Column 1</th>
<th>Column 2</th>
<th>Column 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>left-aligned random text</td>
<td>center-aligned less random text</td>
<td>right-aligned longer and non-random text</td>
</tr>
</tbody>
</table>

Table 1: This table is very similar to the previous one. Can you spot the differences?

Table 2 also has a caption:

Table 2: The caption placement for this figure is different.

<table>
<thead>
<tr>
<th>Column 1</th>
<th>Column 2</th>
<th>Column 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>left-aligned random text</td>
<td>center-aligned less random text</td>
<td>right-aligned longer and non-random text</td>
</tr>
</tbody>
</table>

5. Illustrate additional enumerated and itemized lists.

Solution:

Lettered sublist
(a) first item
(b) second item
(c) third item

Note: since we are already using an enumerated list for problem numbers (default), the next level (sublist) has letter labels.

Forced numbered sublist & customization

(1) This is item one.
(2) This is item two.
    • This is item star.
(3) This is where I left off.
    i. subitem 1
    ii. subitem 2

Unordered list
    • first item
    • second item
    • third item


Solution:
7. Remember, for \LaTeX help, Google (or your favorite search engine) is your friend! For more information

![Google search for \LaTeX help](https://i.imgur.com/gQ5Q5.png)

Figure 1: Google screenshot, as of January 16, 2016 (sort of). Also, an example of using both the \texttt{figure} environment, captions, and labels all in one!

on figures in \LaTeX, see

https://en.wikibooks.org/wiki/LaTeX/Floats,_Figures_and_Captions.

8. Show me the lines of \LaTeX code, verbatim, that generated problem 7, without the url.

\textbf{Solution:}

\begin{verbatim}
\begin{figure}[htbp]
  \centering  
  \includegraphics[width=.7\textwidth]{LatexHelp.pdf}
  \caption{Google screenshot, as of \today\space (sort of). Also, an example of using both the \texttt{figure} environment, captions, and labels all in one!}
  \label{fig:google}
\end{figure}
\end{verbatim}