LaTeX Example Document

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This is a sample document to show you how to use LaTeX to write nice documents for your homework submission. I have built the document to get you started.

Notice that the text is double-spaced. This is on purpose! I expect you to submit the PDF file to me so I can mark it with comments and return it to you.

1. This is a problem. It deserves to be stated properly, and then solved below!

   Once you have stated a problem, you can solve it below using the `solution` environment.

Solution: This is my solution to the first question. When I write maths, I always enclose it between `\( CONTENTS \)`. This way LaTeX knows I mean to write in-line maths. Something like $e^{i\pi} + 1 = 0$ is in-line maths.

To write display-style maths, I enclose it between `\[ CONTENTS \]`. This way LaTeX knows I mean to write display-style maths. Something like

$$e^{i\pi} + 1 = 0$$

is display-style maths.

For multi-line display-style maths, you will need to make friends with `align*`. This environment uses the symbol `&` for alignment, and uses `\\` for line-breaks. Have a

look at the code for the following to see what I mean.

$$\begin{aligned} S &= \{n \in \mathbb{N} : n + 5 \leq 50\} \\ &= \{n \in \mathbb{N} : n \leq 45\} \\ &= \{n \in \mathbb{Z} : 0 \leq n \leq 45\} \end{aligned}$$

Notice that the symbols `\` and `{` and `}` are special in LaTeX. Every command begins with a `\`, and the `.tex` file won't compile if you have unbalanced braces because they are used to determine limited scopes. To get the \ for set difference, type `\setminus`, and to get the braces for sets, type `\{` and `\}`.

Some commands only make sense in math-mode (i.e. in one of the `\(\)`, `\[\]`, or `\begin{align*}\end{align*}` environments). To make subscripts use an underscore `_`, and to make superscripts use a caret `^`. These are treated differently depending on the math-mode! The command `\sum_{k = 0}^{n} \binom{n}{k} = 2^n` looks like $\sum_{k=0}^{n} \binom{n}{k} = 2^n$ in-line, but like so in display-style.

$$\sum_{k=0}^{n} \binom{n}{k} = 2^n$$

To end your proofs with a tombstone (like I do in class), write `\qed` at the end. □

Using Overleaf makes writing LaTeX fairly straightforward. It comes with many helpful features. If you run into problems, search on Overleaf for the answer.

Using Detexify is good for finding symbols (e.g. γ or an α). There you just handwrite the symbol you want, and the site pattern-matches your symbol to find the command.