Latex Tutorial

In these notes, we'll walk through some basics of LaTex. You can work through this tutorial during office hours or precentor hours if you would like more guided instruction.

Task 1: Make an Overleaf account if you don't already have one. Go to https://www.overleaf.com/project. You can sign in through your Macalester Gmail account, or use a different email address. (You can also download Latex and an editor onto your computer. I personally prefer working offline and in TexStudio. However, having an Overleaf account will be useful when you are working with your group on writing projects since you will be able to jointly work on the documents without needing to repeatedly download and upload.)

Task 2: Download the .zip file titled "Homework Template." Back in Overleaf, click on New Project in the top left corner, then Upload Project. Drop the "Homework Template" where prompted.

Task 3: You should notice the document class at the very top of the file main.tex. Currently, the document class is article. This is the class you'll want to use when you write your paper. We're going to make a sample homework file, so change the document class to exam.

Task 4: Next, change the title from "Math 279 Template" to "Sample Homework Assignment" and replace my name as author with your name. Finally, replace August 2020 with the date in the form MONTH DAY, YEAR

Task 5: Press the green button that says RECOMPILE to make sure there are no syntax errors.

Task 6: Rename the Introduction section to be called Practice with Equations. Then make a new section (using \section{}) and call this new section Practice with Figures.

Task 7: We're going to begin typing "homework problems". Under the \section{Practice with Equations} heading start a question environment

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\begin{questions}

\end{questions}
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Inside this environment, type \question followed by a space and then the question "What is your favorite equation?" Press the green RECOMPILE button.

Task 8: Now we'll write a "solution" to this question. First create a solution environment

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\begin{solution}

\end{solution}
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directly under the question. In this environment, type
“My favorite equation is
\begin{equation}\label{favorite_equation}

\end{equation}”
and type a math equation inside the equation environment. Try using some built in functions like \sin or \ln. Add exponents using ^, for example: 5^{6x+2}. You can also nicely format fractions using \frac{}{}, for example: 5\left(\frac{\sin(x)}{2x+5}\right). Note that equation environments are assigned numbers and the \label allows us to refer to a particular equation environment later.

Recompile your file. Notice that your solution doesn’t appear. Go back up in your file between the \usepackage lists and the \title, and type \printanswers. Recompile again; your answer should now appear.

Task 9: Within the same question environment (but outside the solution environment) use \question to make the new question “What is your least favorite equation?”

Then create a new solution environment and inside of it write “While my favorite equation is (\ref{favorite equation}) my least favorite equation is…

Then begin an equation environment, label the environment “least_ favorite_equation” and type a different equation.

Task 10: Now we’ll move on to the practice with figures. We won’t use the question and solution environments anymore. Search for a picture that you like on Google or use one that you already have on your computer. In the top left corner of Overleaf, directly below menu, you will see three buttons. Choose the one that says upload, and upload your chosen picture.

Task 11: In the Practice with figures section of your document start a figure environment by typing
\begin{figure}

\end{figure}
Inside of the figuring type \centering. This will center your figure on the page (of course, you may not always want your figure centered, so you don’t always have to use this command). Then type \includegraphics{put_figure_file_name_here}. Try adding a caption using \caption{}, and don’t forget to label your figure with \label{} so that you can refer to it later. If your picture is too large or too small you can scale it, e.g.
\includegraphics[scale=.5]{put_figure_file_name_here} will make your figure half its original size

Task 12: Download your PDF. There is a button to do this two to the right of the Recompile button. Alternatively, you can find the option to download the PDF under the menu tab in the top left corner of the screen.

Now that you have seen some of the basics, explore! You do not need to memorize everything (or anything). Certain tasks will become routine as you will do them often. For example

- Adding inline math like $x^2+7=y$
- Adding displayed math like \[x^2+7=y\] or $$x^2+7=7$$ (compare this to the inline math above)
- Typing fractions using \frac{}{}

However, there are many LaTex resources and references available, and it's okay to look up how to do something. Google is normally very helpful. Overleaf has many tutorials for learning how to do specific tasks as well. Try, for example

- A basic Introduction: https://www.overleaf.com/learn/latex/Learn_LaTeX_in_30_minutes
- Writing in math modes (we used the equations environment but there are other options) https://www.overleaf.com/learn/latex/Mathematical_expressions
- Writing in various math fonts to indicate, for example, the set of real numbers) https://www.overleaf.com/learn/latex/Mathematical_fonts
- Typing fractions https://www.overleaf.com/learn/latex/Fractions_and_Binomials
- Adding multiple columns (for example, if you want to make a two-column journal article) https://www.overleaf.com/learn/latex/Multiple_columns
- Adding theorem and proof environments https://www.overleaf.com/learn/latex/theorems_and_proofs#:~:text=example%20in%20Overleaf-,Theorem%20styles,special%20commands%20to%20accomplish%20this.&text=The%20command%20%5Ctheoremstyle%7B%20%7D%20sets,environment%20defined%20right%20below%20it.
- Defining a new command (if you are frequently typing something long, like \mathbb{R} and want to make a shortcut to reduce typing) https://www.overleaf.com/learn/latex/Commands