MATH 3040: Homework #1

Your first assignment is to learn how to use the typesetting package LaTeX (pronounced "lah-tech" or "lay-tech"). It is roughly 100 times more awesome than any word processor and it uses sophisticated algorithms hand-crafted by genius programmers and typesetters to display your text on the page. It's also very easy to insert math into your work, like $2 + 2 = 4$, and it usually does so beautifully. For these reasons, LaTeX is the gold standard for professional mathematicians, physicists, and computer scientists.

Using LaTeX is like writing computer code. You write your document in a text editor or a special LaTeX editor, and then you must run the typesetting program to produce your finished document, which for this class should be a PDF (.pdf).

Your first step is to find some way to run LaTeX code. So find a computer which already has LaTeX installed, install in on your computer, or use an online service like Overleaf (`http://www.overleaf.com/`). For instructions on how to install LaTeX , see

`http://www.latex-project.org/get/`

It's not too tricky to install, but something like Overleaf is also convenient for, say, being able to access your files from anywhere. You need to decide which way is right for you.

Your goal is to download the file from the class website called template.tex and modify it to include:

1. Your name.
2. A title.
3. Two sections
4. A definition
5. A theorem
6. A proof (it doesn't need to be an actual proof, but you should use the proof environment).
7. Two equations including a fraction, an exponent, subscripts, and a Greek letter.

The goal here is not to do math, but merely to get ready to type it up. Your theorem can be as simple as the statement "This is a theorem" and your proof could be "This is a proof." But you *must* include the equations and symbols. For example, you can type up what is on the page below (suitably modified, of course, as you are not the Turing award winning creator of LaTeX), or type up some mathematics from the Numbers handout.

Lastly, everything should come in under one page, and be submitted **as a PDF** through Gradescope.

Definitely Not My First LaTeX Document

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1 The First Section

In this section, we define the term *polynomial.*

Definition 1.1. A polynomial in one variable is a function of the form

$$f(x) = a_n x^n + \cdots + a_1 x + a_0,$$

where the constants a_i are called coefficients.

2 Section Two

We want to show how to add fractions in this section.

Theorem 2.1. *Given two fractions a/b and α/β, their sum is*

$$\frac{a}{b} + \frac{\alpha}{\beta} = \frac{a\beta + \alpha b}{b\beta}.$$

Proof. We first scale the fractions so that they have the same denominator, getting

$$\frac{a}{b} = \frac{a\beta}{b\beta}$$

and

$$\frac{\alpha}{\beta} = \frac{\alpha b}{\beta b}.$$

Then summing the two fractions gives us

$$\frac{a}{b} + \frac{\alpha}{\beta} = \frac{a\beta}{b\beta} + \frac{\alpha b}{\beta b} = \frac{a\beta + \alpha b}{b\beta}.$$

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