Math 291 Lab 7 Due Monday April 1, 2019

Instructions: Use LATEX to typeset a document containing each component described below. Turn in your lab in D2L Brightspace. You should submit both your raw TeX (.tex) file and your compiled document (in a form where the web link works, probably pdf). Do *not* submit a .zip file.

You will be graded on both your raw T_EX code and the accuracy of your compiled document. Don't forget to include Lab5 in your filename. Since there is a title page, you do not need the name block.

- Create a document that has:
 - The 'report' document class
 - At least two chapters
 - At least two sections in each chapter
 - At least three subsections within at least one of the sections
 - A couple of subsubsections (they may or may not be in the same subsection, it is up to you)
 - A couple of paragraphs (they may or may not be in the same region of your document, it is up to you)
 - Have a title (which includes the phrase Math 291 LATEX Lab 7), author (you), and date.
 - Have a title page and a table of contents.
 - Has language that refers to each chapter, at least one section, at least one subsection, including at least two references to page numbers for these, all using the LATEX referencing commands.
 - The document also needs to include the following:
 - 1. Create a command in the preamble called \di that is a shortcut for \displaystyle. Then use that command to typeset the following sentence:

The Rieman integral is often defined in Calculus books as $\lim_{n \to \infty} \sum_{i=1}^{n} f(x_i) (\Delta x_i) = \int_{a}^{b} f(x) dx.$

- 2. Create a command that takes two arguments that, when given a number and a function of x, will typeset the limit of the function as x approaches the number. Then use your command to typeset the following. Use the ensuremath command to make sure that your command can be called either in math mode or out of math mode, and acts the same regardless. When using the command to typeset the limits below, call your command within math mode at least once and outside of math mode at least once.
 - (a) $\lim_{x \to 3} (5x^2 7x + 2)$ (b) $\lim_{x \to 5} \left(\frac{x^2 - 25}{x^2 - 6x + 5} \right)$
 - (c) $\lim_{x \to \infty} (\tan^{-1}(x))$
 - (d) $\lim_{x \to \frac{\pi}{2}} (\tan(x))$

3. Create another command similar to that in #2 above, that, when given a number and a function of x, will typeset the limit of the function as x approaches the number, but this time make the number an optional argument with ∞ as the default value. Use it to typeset the following.

(a)
$$\lim_{x \to \infty} \left(\frac{x+3}{x+2}\right)$$

(b) $\lim_{x \to -2^+} \left(\frac{x+3}{x+2}\right)$

- The document also needs a bibliography

- * A bibliography that has at least four items (positioned at the end of your document, as usual for bibliographies).
- * None of the items can be those that are in the example bibliography provided on my website.
- * One of the items must be Dr. Aryal's thesis.
- * At least one of the other items must be a paper by Stephen Hawking.
- * The bibliography should start on a new page.
- * At least a paragraph or so of writing that refers to three of the items in your bibliography.
- * At least one item should appear in your bibliography that you have *not* cited in your document. [Use the \nocite command from page 13 of 27 of the lecture.]
- The document should not just be a bunch of chapter/section/subsection headings and a list of limits followed by citations. The limits above should be in an enumerated environment like a 'normal' lab, but add some appropriate paragraphs (even if they are short paragraphs) for the citations and to populate your chapters, sections, etc. It can be relatively random thouhts, as in the example document, but must be actual words and sentences.