Math English Writing [GGC5041&MA320]
HW 2, September 10

Part I. Learning LaTeX

LaTeXis a free but high quality typesetting software that is very popular with mathematicians. There was a joke on Terence Tao's blog that mathematics papers not written in LaTeXmust not be serious papers and should be rejected by journal editors. This joke is perhaps not all joke as it shows how widely LaTeXhas been embraced by the mathematical community. You need to learn LaTeXon your own mostly. Here are some suggestions.

1. There are many different versions of the LaTeXsoftware package. The version that I am using to produce the present file is TeXworks which comes with a spellcheck. Dr. Zhang's version is MacTeX on her laptop and CTeX on her office computer. Search online for information about these two packages and about LaTeXin general. There may also be a newer version of TeXworks available. Dr. Zhang has presented an example in class. Some of the students in this class have already used LaTeXbefore. Please consult Dr. Zhang or your classmates who are experienced with LaTeX.

2. Dr. Zhang will share with you the source code of her presentation. Once you finish installing LaTeX, you should be able to open, edit and compile the file.

3. Keep a separate copy of the Dr. Zhang's as a backup under a new name. Then, look through the file line by line to understand the structure and the commands. Experiment with the file by making changes to the source code and observe the difference in output.

Part II. Writing an article for *Mathematics for Beginners*

I have attached the classroom discussion example below. As the second part of this assignment, write an article about finding the sum of the first n terms in a geometric progression for *Mathematics for Beginners.* You decide on the title, abstract and so on, and no need to follow the proposals talked about in the classroom discussion. Feel free to include any other material that you find relevant. For example, you can make up a reference paper about, say, a previous article in the same journal about the arithmetic progression, and talk about it in the introduction. You may also include a discussion on what happens to the sum when $0 < r < 1$ and $n \to \infty$.

Submit by email your article in a pdf file produced by LaTeXbefore 10:00 pm on Monday, September 16. Writing is an iterative process. We may go back to revise this article again and again throughout this term. We will get new ideas from the textbook as we progress, and implement these ideas in the revision process. Remember that a good math paper is a combination of good math ideas/theory and good writing. The latter is important.

(Attachment: notes from the lecture)

Classroom Discussion Problem

September 10, 2019

1. Suppose there is a journal for mathematical education called

   Mathematics for Beginners

   aimed at elementary school or junior high school students.

2. Suppose all articles/papers submitted to this journal must follow the same format as papers in a typical research journal in mathematics; that is, all issues discussed in Chapter 1 of the textbook *Mathematical Writing in English* are relevant to writing an article for this journal.

3. Suppose you wish to submit an article about finding the sum of the first n terms in a arithmetic progression to this journal.

4. I have included the derivation of the formula for the sum in the next page but I have intentionally left the title, abstract, etc., blank.

5. *Objectives of this discussion:*

   (1) Work together to come up with some proposals for the title and the abstract of this article. (2) Discuss and debate about these proposals as well as other aspects of this article using what we have learned from Chapter 1 of the textbook.

title?

abstract?

1 Introduction?

2 The formula?

Let a and d be two constants. Consider an infinite sequence of numbers

$$a_1, a_2, a_3 \ldots \tag{1}$$

where the ith term in this sequence is

$$a_i = a + (i-1)d \tag{2}$$

for $i = 1, 2, 3 \ldots$. Denote by S_n the sum of the first n terms of the sequence in (1); that is,

$$S_n = a_1 + a_2 + \cdots + a_n. \tag{3}$$

We are interested in finding the value of S_n for any given n.

A direct approach is to first compute the n terms $a_1, a_2 \ldots a_n$ through (2), and then add them up to obtain the value of S_n, but this is clearly inefficient when n is large. We show below that there is an efficient formula which expresses the S_n as a simple function of a, d and n. Since

$$S_n = a_1 + a_2 + \cdots + a_n = a + (a+d) + \cdots + (a + (n-1)d),$$

multiplying both sides of the about equation and 2 and reversing the order of the sum on the last n terms on the right hand side , we obtain

$$\begin{aligned} 2S_n &= 2\big(a + (a+d) + \cdots + (a+(n-1)d)\big) \\ &= a + (a+d) + \cdots + (a + (n-1)d) \\ &\quad +(a+(n-1)d) + (a+(n-2)d) + \cdots + a \\ &= n(2a + (n-1)d). \end{aligned} \tag{4}$$

Dividing both side of equation (4) by 2, we obtain

$$S_n = \frac{n(2a + (n-1)d)}{2}, \tag{5}$$

which holds for any integer n. (Numerical examples?)

3 Discussion/concluding remarks?

The formula is efficient for computing S_n as it does not require the computation of the first n terms of the sequence and it can be used for any arithmetic sequences ...

4 Acknowledgments?

5 References?