Chapter 1. Overview

Section 1. Writing in Mathematics?

A. Why You Need It

Does anyone really spend much time writing in mathematics? Sure. Listen to one contemporary mathematician:

At high school career fairs, students want to know what a mathematician does all day. My first answer is, “I write.” . . . At the Center for Communications Research, the only tangible products of my work are the technical reports that I write to disseminate my ideas. I have also published research papers in pure mathematics, expository articles, conference proceedings, reviews of papers and books, editor’s notes for collections of articles, and essays like this one. My professional writing that is not meant for publication includes referee’s reports, committee reports, grant proposals, memoranda, letters of recommendation, and other correspondence.

I write now. I wrote as a faculty member. I wrote as an administrator. In fact, the only time in my adult life when I did not write was during graduate school, when I was preparing for a career in which I would be writing.

Ann K. Stehney

Mathematicians Write; Mathematics Students Should Too

There are still other types of writing mathematicians do. For instance, some mathematicians write textbooks and a few even write about how to write mathematics.

Statements like Stehney’s could be written by any frequent user of mathematics, for instance, most natural scientists, engineers, social scientists, computer scientists, computer programmers, statisticians, financial analysts, and people who do operations research or management science.

Consequently, if you are a student thinking of a career in any of these areas, you need to know how to write mathematics.

Here are six more reasons, relevant no matter why you are taking math.

1. Math courses have always had written work, namely, homework problems and tests. Half the battle to do well on homework and tests is to communicate your ideas. (The other half is to develop the ideas themselves.) Communicating better is writing better.

2. In recent years the mathematics community has taken increased interest in writing assignments that are more like those in other subjects. In many courses students are asked to write essays, lab reports and diaries in addition to homework and tests. The writing skills needed for these extended writing assignments are even greater than for homework and tests.
3. **Writing helps you think.** The level of concentration needed to write, and the level of detail writing entails, force you into careful thought as you write. Thus, even if you sit down to write only when you think you’ve got everything clear in your head, as you write you may find that things aren’t so clear after all. Sometimes it’s even worthwhile to sit down and write before you are sure how to explain the mathematics in your head, because the best way to identify the sticking points is to try to put your reasons on paper. So writing is not only about communicating ideas, but about developing them as well.

4. **Writing helps you read.** Good mathematical writing consists of many distinct types of elements that need to be read differently. Perhaps the best way to understand how to take passages apart while reading them is to have learned how to put them together when writing them.

5. **Writing helps you write.** In fact, the approaches and skills you develop in learning how to write mathematics will transfer to other sorts of writing. For instance, the fact that mathematics writing is tightly reasoned will help you be thoughtful in whatever endeavors await you in life. The fact that definitions are a special aspect of writing mathematics will make you aware that words can have, and sometimes need to have, special meanings, and that when they do have special meanings you need to make this clear.

Also, the more types of writing you do, the more aspects of writing you learn to appreciate and control. When I was a high school junior, my English teacher made us write stories in the style of great American authors – Hemingway, Faulkner, Twain, and others. I was terrified at first, despite all the help my teacher gave us. But I did my best and I became very conscious of styles of writing. I found I became better able to fit each piece of my own writing to the need at hand, even when it had nothing to do with writing fiction. So will you, by writing mathematics.

6. **Your writing allows your professor – and you – to make a broader, hence fairer, assessment of your understanding and achievements.** Traditionally, grades in math courses have been determined solely by how well you could answer short computational problems. This gave an advantage to students who solve these problems easily. Some students solve them easily because they understand what is going on, but others simply memorize formulas and “turn the crank”. In any event, students who are quick and don’t make many errors the first time are at an advantage. Longer writing highlights other accomplishments: understanding the concepts, putting the solution in context. If, for instance, you can explain well in an essay the various rules for taking derivatives, and the essay includes specific nontrivial examples done correctly, then you and the professor can be confident that you have learned a lot about the rules even if you frequently mess them up on timed tests.

B. **Why There Is Something to Learn**

OK, so you put pencil to paper in math class, but should this really be called writing? Don’t