Math 425: Writing Supplement

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What is the writing supplement?

The short answer is that it is a set of supplementary writing assignments offered for students of Math 425, Section 7 (DB's section) which taken together have been approved by the Sweetland Writing Center as a way to fulfill the junior/senior writing requirement for LSA students at the University of Michigan.

This means that the CRISP computer is aware of this, and you can modify your registration to add the writing supplement by telephone. Note: this does not register you for more credit hours. I will only be certifying at the end of the term that you have passed or failed the writing option part of the course. A pass means you have fulfilled the writing requirement.

Now that is all very dry, and it is good to have it out of the way. The real reason I offer the writing supplement is that I think it does two very important things for you and for me.

The first is that I think, I would even be so arrogant as to say I know, that science is an ever increasing force in our lives and the acceptance in this country of literacy in science as a luxury is probably already well out of date. Science is simply too important, so important that in order to function in our technologically advanced democracy, we will all, at one time or another, have to communicate effectively with one another about scientific matters. We do not emphasize this as much as we should in our training of young people. This is especially true of young scientists, who will bear a special responsibility for communicating the meaning, value and limitations of science and mathematics to their fellow citizens, not to mention the simpler and more obvious situation of their communications with their scientific colleagues at work.

My second reason for offering the writing supplement relates to this particular course: I think writing about probability will make you better students of probability, that is, better train you to work *mathematically* with the ideas and techniques of probability as a scientific discipline. I consider probability one of those few "paradigm subjects" you will study in your college careers. In this sense, it is very much like the calculus. The first time you saw calculus was probably a very novel and eye-opening experience. Very likely you had never before used "infinite procedures" such as taking limits, derivatives and integrals. Similarly, the idea that we can somehow understand and compute with a variety of notions of randomness, somehow give order and sense to the disordered and fluctuating, is shocking. Many of the results we will obtain this term will seem non-intuitive. Indeed, there will probably be times when you really want to argue that an answer simply cannot be correct. You may have a point! I do make mistakes. But there

will be examples which simply will require retraining your intuition. A lot of what we have to learn in this course is, therefore, "pre-mathematics". You have to recognize what is a probabilistic situation and how one begins to pull the mathematical tools you will learn into play. To do this will require new intuitions, and I feel that for most of you, those intuitions are more often than not accessible faster through ordinary language . Your sharper, more technical mathematical language will hopefully follow by the end of the term.

Your writing assignments will reflect these two reasons for the course supplement very closely. You will write brief pieces in different styles, but most importantly, *to different audiences*. The point of such exercises will be to make you aware as a scientist you will have to gauge the scientific literacy of your audience and adjust your writing accordingly. You may have to say "the same thing" to three different groups, but that may mean that the three messages will read very differently from one another.

First and foremost, your overall goals should be *clarity* and *accuracy*: does your audience follow you, and are you presenting to them as correct a picture of the scientific situation you are describing as your understanding allows? Secondly, are you being *efficient*? This is especially important for science writing because of non-specialists' limited attention span for such matters. You generate fatigue in your audience if you present scientific ideas in such a way that it requires your readers to work unnecessarily hard to understand you. Similarly, you should write correctly, in the sense of the rules of English grammar: we should all realize by now that "random English" is harder for most people other than the writer to understand. You could lose your audience for linguistic fatigue, just as for scientific fatigue! Finally, and this gets much more discretionary, you can bring to your scientific writing all the possible ways which every writer in any language can use to make writing more interesting, attractive, even beautiful. There are many examples of science writers who attain a poetic level of expression at times while still presenting accurate science. This is very important when dealing with a large public which may only experience science in a second hand fashion through your words.

Well, all that is rather heady stuff. It is also a set of goals which may require a lifetime to master, and we will have as objective this term only a modest step in this direction. Good luck!

Outline of the assignments:

Here are the assignments for the writing supplement, with approximate dates. More detailed versions of the assignments will be distributed as we go along.

1.) [Due Monday, January 20.] This assignment will be in two parts. In the first, you will write a piece about two pages long, on communication dealing with scientific areas. What are various situations or arenas where this seems to be important? Is it well or poorly done, in your experience?

The second part is to critique a piece of science writing. Please turn in a copy of the piece along with your critique. You could ask yourself questions such as: what is the piece's intended audience? Does the piece do a good job of communicating with this audience? Is it, for example, clear? The pieces can be quite short, newspaper clippings,

for example. They do not have to be about probability, statistics or any similar thing, just something scientific, although preferably some aspect of science which you understand to some degree (you don't have to be an "expert").

2.) [Due Wednesday, January 29.] Write a letter to *Parade* magazine, answering some of the critics of Marilyn Vos Savant's columns which use examples from elementary probability. (There is massive misunderstanding of even the most basic ideas among the general public, as documented in this magazine over the last decade.) Some of these examples relate to problems which we will solve in the second week of the course. [Approx. 3 pp.]

3.) Write an account for a newspaper on the basic probabilistic ideas of independence or conditional probability. [About 3 pp., due four weeks into the semester, with a *rewrite* after that.]

4.) Write mathematical letters: one to your parents, explaining the idea of independence or conditional probability; another to a fellow student, explaining the notion of sample space or random variable; a third to a professor or someone in industry or an applications area, asking for information about probabilistic aspects of their work, or a question which you might have in this area. [About 2 pp. each; one to be sent and rewritten after the recipients' comments are received. Due about six weeks into the term.]

5.) A brief journal detailing the methods of solution used and the way they were found for one of the group problem sessions. If someone else's ideas were used in the solution, these have to be explained in some detail. [About 4 pp., to be reviewed first with the group with whom the problems were solved, and then final form resubmitted.]

6.) A term paper. This is the main assignment, and will involve a topic selection from models already tried by previous students, or of your personal choice. Usually it involves making contact with someone from another area to guide you in the choice of a topic relayed to an application in, most often, your home department. [About 10-15 pp. This will be due at the end of the term, but there will be three checkpoints before that. The first is the selection of the topic and the contact of an advisor; the second is an outline and data on sources or references; finally, a draft, due about one week before the end of term, which will be revised after comments are received.]

Writing Instruction.

You will receive feedback on all assignments in the sense of grading and comments. For assignment 3.) it will be by individual conference, which will probably also touch upon the beginnings of assignment 6.). For assignment 4.), I will give comments, perhaps in a group after the regular class. I will meet with you after you receive comments from your letter recipients. I will provide a brief list of points for the recipients, to be included with your original letter, to guide them in making short comments on your writing in the letter. For assignment 5.), I will make written comments after the final turn-in. You should have attached a brief summary of your peers' remarks. Finally, assignment 6.) will involve a conference after steps one and three; step two usually is more mechanical and can be treated by brief written comments on my part.