Writing Guidelines

The projects you turn in this term represent opportunities to explore some mathematical topics with a considerable amount of creative freedom. They are also opportunities to work on mathematical writing. In general, your projects are graded for both content and style, and should be written up with considerable care. The purpose of this handout is to give you some guidance on how to do these write-ups.

Good mathematical writing is a lot like good prose writing: it conveys a sense of flow, it adheres to basic elements of grammar, it says things that are both true and interesting. There are some key differences between a mathematical exposition and one on French troubadours, however. To wit, mathematical writing usually involves equations. While different authors handle equations in different ways, here are some guidelines that are fairly widely accepted:

• Equations can either be imbedded in the text (like this: $x^2 + 2$), or set apart in their own paragraph space. For example, the equation

$$f(x) = \int_0^5 (x^2 + 2)dx$$

would look cramped if stuck inside of a line of text, so it makes more sense to set it apart. In general, smaller snippets of equations fit well “in-line”, larger snippets should be set apart. In both cases, the equations should be viewed as a lexical unit within a sentence: an equation that finishes a sentence requires a period, for example, while an equation that induces a pause requires a comma. Get in the habit of reading your work aloud to see where these punctuation marks should go.

• In general, equations that are set off from the text should not be preceded by a colon. Rather, the text should flow naturally into the equation, as in the example above. There will be exceptions to this rule, but they should really be exceptions, not the rule.

• Part of good mathematical writing is knowing what to omit. Not every detail of a derivation needs to make it onto the page. In general, you should write with a consciousness of who your reader is going to be, and include just enough detail that said reader can fill in the gaps easily.

• When writing a derivation, don’t repeat the left hand side. For example,

$$\frac{d}{dx} e^{x^2} = e^{x^2} \frac{d}{dx} x^2$$

$$= 2xe^{x^2}.$$  

Derivations should not be extraordinarily long, either; if necessary, break up a derivation into multiple parts by adding some text.

• Figures can make great additions to certain kinds of technical or mathematical writing. Make sure that all axes are labeled, that the details are large enough to read, and that the figure has a caption.

• In general, try not to begin a sentence with a mathematical symbol of any sort.

Writing elegant-looking mathematics generally takes some advanced software. Microsoft Word comes with an equation editor which many people like. I personally find it cumbersome, and recommend using Latex instead. Latex is an open source typesetting language that produces beautiful looking mathematics (unfortunately, beautiful looking mathematics is not always beautiful mathematics.) We’ll spend a little bit of time in class learning how to use Latex so you can leverage it for your project reports.