

Math 322 Paper Rubric

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The paper is worth 15% of your final grade in the course. Of this, 5% is for turning in a rough draft by Monday, November 18. If I do *not* have a draft by the end of class at 11:40 AM on Monday, I will penalize your score. I strongly recommend that you discuss your topic with me by Monday, November 4. (I also strongly recommend you start writing your paper before November 17).

The rough draft will have comments and a “shadow grade ” which does not affect your course grade in any way; you will get 100% of the possible credit for the rough draft simply by turning in a draft paper (not an outline!) of acceptable length on an acceptable topic. The shadow grade is to guide you as you do revisions, and corresponds to the grade I would give the rough draft if it were submitted as a final draft.

The final draft will be graded on the following rubric, out of a total of 70 points:

35 points **Mathematical Content**

I will evaluate the mathematical content of your paper. I won't break this down into sub-topics with fixed numbers of points because different papers will have different types of content in different ratios—for instance, some topics will require many definitions and some will require only one or two. I will be looking for a few things:

- The centerpiece of your paper should be at least one substantial “result”. A result can be a theorem or a computation, but should involve doing some mathematical work.
Every claim should be stated clearly, precisely, and correctly, in formal mathematical language. When possible, claims should also be explained informally, to help readers figure out how to think about them.
- Your paper should clearly define any terms you expect your fellow math majors, and any terms that are central to your paper. Definitions should be clearly and precisely stated, and ideally come with a sentence or two explaining how your readers should think about the concept being defined.
- The bulk of your paper should be the computations and proofs that prove your main results. The proofs should be correct, clearly written, and display understanding of the details of the argument and the topic. Again, try to give a technical argument and also an explanation of how to think about it—an intuition or motivation.
- It is permissible—and often more-or-less necessary—to use some results which you do *not* prove. Any such results should be clearly stated, and you should give a citation for where the reader can look up details of the result.

35 points **Style and Framing**

4 points: Title

The paper should have a clear title, give the name of the author and the author's college affiliation, and nothing else.

6 points: Abstract

A good paper should begin with an *abstract*, a 3-4 sentence sales pitch explaining what your paper covers and why one might be interested in it. A good abstract tells the reader what the main result or conclusion of your paper is; identifies the main tool or tools used to reach that conclusion; and gives some perspective on how this conclusion relates to other topics your reader may be interested in.

10 points: Framing material

Your paper should feature an introduction (and possibly conclusion), which put your result or problem in context and explain why people were interested in it. The introduction should provide some historical topic on your problem (when was it first studied? When was the core problem solved?), as well as a discussion on how your topic relates to other topics in mathematics. If your paper has more than one main result, you should explain how these results relate and form one cohesive paper.

When possible, your results should be related to topics which are at least one of

- Practically applicable (e.g. encryption)
- Interesting to a great many people (e.g. finding prime numbers, solving diophantine equations)
- Something we have studied in this course.

10 points: Writing style

Your paper should be well-organized, with transitions that flow from one section to the next. It should be free of obvious grammatical and spelling errors, and formatted legibly. (If the act of reading your paper is painful or unpleasant, this is where I can take points off).

5 points: Appropriate use of references

Your paper should cite at least two references. They should be cited appropriately when used in the body, and also listed in a "References" section at the end of the paper. (Use of BibTeX should make this nearly automatic but is not mandatory).