General advice for writing math papers
K. Melnick, Maryland Writing Workshop,
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1. goals of writing

2. parts of a paper

3. organization of main text

4. style, notation, grammar
1. Goals of writing

to present and record your work

• to whom?
  – your advisor and other professors
  – people in the field, readers of the journal
  – the referee
  – yourself
  – your collaborators

• choose your audience in advance, discuss with coauthors

• communicate to your audience what you have understood, make it understandable to them
Goals

- filter: do not write all that you know about the topic, choose an appropriate level of generality

- organize information: present it not as you discovered it, but how you think it should be seen (what can you do that a google-trained monkey cannot?)

- highlight what is important, indicate what is not important
2. Parts of a paper

1. title

2. abstract

3. introduction

4. body

5. (conclusions)

6. references
Parts of a paper

- title is most read: should be informative and appropriate length

- “A minus sign that used to annoy me but now I know why it is there” (by P. Tingley, arXiv 1002.0555)

- abstract: convey what problem you solved, something about how

- references: bibtex is helpful to organize, be careful not to overlook your colleagues, use appropriate references for general facts
Parts of a paper: introduction

- interested people will read this, then decide whether to read further

- length guideline: 1 - 4 pages

- many recommend writing the intro last

- be sure to state your main theorems

- serves as conclusion in pure math, can include conjectures, open questions
introduction M. Audin (Conseils aux auteurs de textes mathématiques):

- explain what question you will answer
- recall important points of existing knowledge
- don’t require the reader to refer to other papers
- give proof ideas if possible
- excite
3. Organization of main text

- provide necessary background and definitions

- try to think of an example to start with; follow 1-3 examples throughout?

- preliminary propositions: different sections or subsections for different tools for proof

- Halmos: repeat, and don’t repeat—draw parallels, emphasize important ideas; look for arguments that are used in multiple proofs and record separately

- proof of main theorem(s)

- consequences, other interesting examples
Theorems and proofs

- keep theorem statements short, don’t deduce in theorem statement

- Audin: use more words and less symbols in theorem statements

- use displayed theorem environment for precise statements only

- hone statements for minimal hypotheses, simplest conclusion

- Halmos: “honesty is the best policy” don’t gloss over difficulties, do necessary computations
4. Style, notation, grammar

- write good English: bad language can distract or annoy; find a native speaker to read

- be careful of “frozen notation”: $\epsilon, n, i, \pi, \ldots$

- proofread, check, let ripen, reread