

# Advice on writing

Adapted from a handout of O. Bernari, for an undergraduate seminar in discrete math

- Plan a bullet point outline of the paper before you start writing anything.
- Plan and write from the theorems or main results outwards. This means write down the theorems you plan to prove, then list what supporting lemmas you will need to make the proof easier, then list what definitions you need.
- Add examples or illustrations whenever you can. A paper littered with examples is often easier to read. Make sure the examples illustrate as many of the subtleties of the definition or theorem as possible. Non-examples are sometimes just as useful (e.g. an example of a space satisfying Hilbert's axioms, and another space *not* satisfying the axioms).
- The introduction should be the last part of writing your good copy. It should not contain much notation or terminology. It should explain why your topic is interesting and/or important. The end of the introduction may contain an outline of the rest of the paper, if your paper has many parts (e.g. "In section 2 we give basic definitions... The main theorem is presented in Section 3... We conclude in Section 4 with an application...")
- Be precise. Statements of definitions, propositions, lemmas and theorems should all be clear and correct. You may use looser language when motivating a definition or result, but statements and proofs must be mathematically precise.
- Have a classmate or someone else read over your draft, checking for grammatical errors, convoluted sentences, confusing explanations, etc. Ask them to point out the parts they like as well so that those don't get lost in subsequent drafts.
- The best way to learn to write a good paper is to read lots of other papers. In our case, you are modeling your paper after a textbook chapter, so it might be helpful to consult a textbook that you have used and enjoyed, read it, and make notes about what elements of the exposition there work well and or don't work so well. Try to implement the former and avoid the latter.
- Carefully check grammar and spelling. Have a friend (even a non-mathematician) proofread for clarity, grammar, spelling and good sentence construction