

Guidance on Writing in Maths

$$(AQ+IG+C^n)+3R[r,e,p] \Rightarrow A+$$

Analyse the Question

Failing to answer the question or not fulfilling the requirements of an assignment is one of the most common reasons for poor grades. It pays to take some time to clarify your understanding of the task and question at hand. What is the tutor looking for? What might a model answer look like? It can be useful to write your understanding of the what the question is asking you to address and what you are required to do in a few sentences in your own words. This should help you to make decisions about what to include and what to leave out. Looking at the marking criteria can also help you to plan where to focus your energies. What proportion is assigned to mathematical content? Are you expected to demonstrate 'evidence of reading'? Research? How much credit is there for originality? Or are you being asked to demonstrate your understanding of other people's work? How important is presentation?

Summary:

- What is the question at hand?
- How am I expected to show what I know?

Top tip: If in doubt, check. Ask for clarification.

Identify the Genre

You need to develop an awareness of the conventions of the different forms of academic writing used for assessment. These include essays, reports, case studies, literature reviews, project proposals and dissertations. For example, essays have an introduction (where you introduce the topic, set out the scope of your essay and give a brief overview), body (the main area for discussion of ideas and your argument), a conclusion which summarises the essay (and does not contain new information) and a list of references. Nearly all the writing you do will require you to provide accurate citations of other people's work and a list of references or bibliography, but you'll need to check the referencing style (usually Harvard for Maths). Other key aspects to confirm: use of headings; length; use of footnotes and appendices; academic voice (some forms of writing use 'I' and 'we', others are more formal); and use of examples.

Summary:

- Find and use good models to identify key features of the form of writing you are producing.

The power of Criticality

Critical thinking is about questioning the ideas you are examining, whether your own or those of others. Through the process of asking yourself questions, you can gather the evidence you need to support your argument or to assess the strength and weakness of other people's. Here are some to get you started:

- What assumptions are being made (by you or by others)? Can you make these explicit?
- What's the context? How does the topic in hand relate to other areas of work?

- What's missing? Where are the gaps?
- What theories are relevant? (And why?)
- What needs defining?
- What needs clarifying?
- Are there any principles in action? Are they appropriate?
- What concepts are useful or not useful? Why?
- What comes next? What are the consequences, effects or implications?
- What applications are there?

Not all of these questions will be relevant for every piece of work, but they provide a useful starting point for your thinking. Though you may not choose to explore them in your writing, they should help you to clarify what is relevant for the particular assignment you are undertaking. What questions can you add to the list?

Summary:

- Use questions to stimulate your thinking.

Read your work 3 times

When you have what you think is a good first draft of your writing, put it on one side for a day or two, then come back to it with fresh eyes. It can be useful to read it three times, looking for different things each time.

1. **Revise.** Focus on the big picture. Have you **answered the question**? Is there any waffle? Are there any major gaps? Does the structure and organisation make sense or do you need to rearrange?
2. **Edit.** Focus on **making life easy for the reader**. Do you give the reader an overview? Have you used signposting to show how your ideas link up (First..., next..., This section covers..., However..., In contrast...)? Have you provided definitions? Have you clearly distinguished between your ideas and those of others? Are areas of certainty and uncertainty highlighted? Have you made good use of appropriate examples?
3. **Proofread.** Focus on the **details**. This is the fiddly stuff which is easy to do, but often neglected. Check for grammar, punctuation, spelling mistakes. If this is a weak area for you, develop a checklist of your weak points. Have you used the correct citation and referencing styles consistently? Does every citation in the text match an entry in the references list (and vice versa)? Are your headings consistent? Do your diagrams have labels? Are they numbered correctly? Have you included page numbers, a title, your name and the module code? Is the font easy to read? Have you left enough white space in the margins for comments?

Summary:

- Allow time to reread your work.

In conclusion

Can you work out what this means now?

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Further sources of help:

- Skills@Library offers workshops; online resources; one to one advice; and rooms you can book for group working activities and to practise presentations. Further information is available from the website: <http://skills.library.leeds.ac.uk/>
- Advice on referencing: <http://library.leeds.ac.uk/referencing>, with the preferred referencing styles in mathematics being Harvard or Numeric.

Writing in Mathematics

HOUSTON, K. *How to Think Like a Mathematician*. Cambridge: Cambridge University Press, 2009.

LEE, K.P. *A Guide to Writing Mathematics*. [online]. [no date]. [Accessed 7 September 2010]. Available from: <http://ems.calumet.purdue.edu/mcss/kevinlee/mathwriting/writingman.pdf>