

WHAT IF SOMEONE BRINGS IN... A HIGHER MATHEMATICS PAPER?

Genre guide by Sam Chapman

Mathematics is the study of numbers, the patterns that they exhibit, and the operations that can be performed on them. Most writing for math classes will take the form of a proof, which is a series of steps in which accepted theorems are used to prove another theorem. This goal theorem might also have been proved by earlier work, or it could be an original hypothesis, chosen because the researcher discovered a relationship that seems to hold true most of the time.

Whether the proof is a simple assignment or original research, the paper will follow a similar structure: present the information so that each step follows clearly on the last until you reach your conclusion. In this way, mathematical writing is very similar to writing in the fields of biology, chemistry, or physics. The main difference is that logic and theory replace experimentation.

This guide will help you understand what the paper should include, and what a well-written math paper should look like.

WHO WILL COME IN WITH A MATH PAPER?

Whitman offers two classes in which students turn in advanced mathematical writing. The first is Calculus Lab, in which students learn to use LaTeX typesetting software, a program that allows them to easily write proofs. Almost every math paper you see will be written in this software. The second class is the senior thesis assessment for math majors.

WHO IS THE AUDIENCE FOR THESE PAPERS?

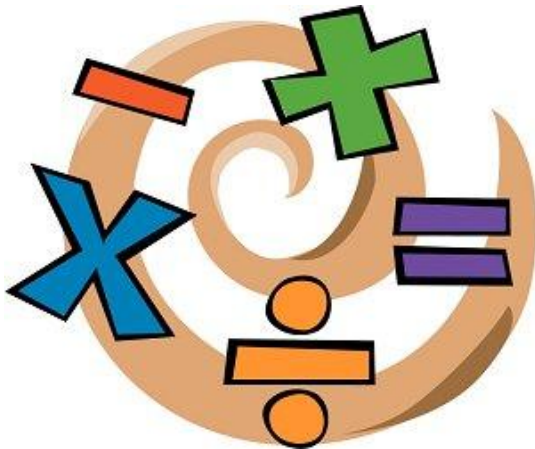
Knowing your audience is even more important when writing a math proof than it is in most other fields. Depending on the reader's familiarity with the theory you employ, the author may be able to skip certain steps. Make sure to ask the client if they have decided to skip steps, and if they feel confident about that decision; in most cases it may be helpful to refer them to their professor for confirmation that they chose right. In college, your clients will generally be writing for their professors, though they should strive to produce work that would be acceptable to other academic mathematicians.

CRITICAL KNOWLEDGE...

- Math papers use prior knowledge to show that an observed relationship holds true in all cases.
- A math paper uses logical reasoning instead of a controlled experiment.
- Each step must follow on the last.
- There should be more words than numbers.
- The most important qualities of a math paper are BREVITY and CLARITY.

WHAT SHOULD A MATH PAPER INCLUDE?

- Abstract: Like in other scientific fields, the paper should begin with a short summary of everything it will cover. The abstract should be written last, and must include enough complete information about the entire process for a reader to determine whether it is relevant to their field.
- An introduction including historical context that provides the motivation for your work. This should include previous thought that lays a groundwork for your hypothesis, explains why you have chosen it, and gives the reader a sense of how the hypothesis fits into the larger body of your field.
- A section of preliminary mathematics that provides the tools for your original proof. If the previous section provided theoretical context, this section provides numerical context to back up the theory.
- A “results” section, wherein you use the tools set up in the earlier paper to prove an original, interesting hypothesis.
- A conclusion reiterates and provides closure for all you have done. The best conclusions resolve the questions posed in the paper while leaving other questions as avenues for further work.



HOW TO WRITE A MATH PAPER...

- A math paper is not just a series of equations. There should be more words than numbers so that the reader is never confused as to definitions and is constantly aware of the paper’s motivation.
- The two most important style considerations in a math paper are clarity and brevity. Say everything needed in the smallest space possible.
- Be extremely careful that the definitions assigned to words are consistent.
- Remember, a math paper is just an extended proof. This structure—results following theorems and leading to other theorems—makes math one of the most linear disciplines in which to write.
- Math is the only discipline in which one can’t sell an argument based on charisma, persuasiveness, or writing skill. Accuracy is the only weapon.

HOW TO TUTOR A MATH PAPER...

- Don’t be nervous—clients with math papers are not very different from those writing any other kind of paper. Start by asking them what they are concerned about.
- Try not to judge the paper based on whether you can understand the argument; if you’re not a math major, you probably can’t. However, you should be able to tell if steps are left unexplained or don’t follow.
- Remember that rules of grammar and syntax still apply. Evaluate the writing as you would every other genre.
- It may have been a while since the client took a class that required them to write, so they are likely to be concerned about clarity. Sniff out unnecessary or repetitive sentences, confusing paragraphs, or muddled organization, and help the proof go swiftly from hypothesis to conclusion without sidetracks or interruptions.

