

Writing Proofs

A **mathematical proof** is an argument which convinces other people that something is true. When writing proofs, keep the following guidelines:

- Never start a proof with the desired conclusion.
- A proof should be written in complete sentences.
- Avoid excessive symbolism. A proof is meant to be read and understood by humans and not computers. Excessive symbolism can disrupt the flow of a proof and make it difficult to follow.
- State your strategy. If you are going to use a proof by contradiction, tell your reader at the beginning of the proof.
- Keep a linear and logical flow. Use conjunctions, such as therefore and because, to connect the steps logically.
- Justify any claims that you make in your argument. Does it follow from the definition, the hypothesis, or something that you proved earlier in the argument?
- Be concise. Do not make your proof unnecessarily long and complicated.
- Introduce notation thoughtfully. Introduce a variable or notation if it makes the argument easier to follow. Be sure to define the meanings of any notation that you introduce.
- Structure long proofs. Use multiple paragraphs if necessary. If it makes the argument simpler, consider proving facts that you need as preliminary lemmas, and then cite them in your proof.
- Conclude your proof. Always tell your reader when you have completed the proof. If it is not clear, explain why the original claim follows from your argument.