

## 1. KEYS TO MATHEMATICAL WRITING

- (1) **Guide the reader.** As with any piece of writing, it is important to provide the reader with context. The first line(s) of a proof should outline what will be proved and how the proof will be carried out. Longer proofs may have multiple interludes to remind the reader
  - (a) what you are trying to accomplish,
  - (b) what parts of the proof have been completed so far, and
  - (c) what part of the proof will be tackled next.
- (2) **Write in complete English sentences.** Every statement should be a sentence. Sentences should be organized into paragraphs. The rules of spelling, punctuation, and grammar apply to mathematics as well.
- (3) **Be precise.** Avoid using (read: do not use) ambiguous words and phrases. Wherever possible, be explicit about the objects to which you are referring.
- (4) **Define all of your notation.** The first time you use a symbol, state explicitly what that symbol means (even if the symbol previously appeared in the statement of a problem, theorem, or definition).
- (5) **Use appropriate symbols.** Mathematical symbols should match the context in which they are used. Mathematical phrases should integrate seamlessly into the surrounding text. It is a faux pas to begin a sentence with a mathematical symbol. *Be careful not to use the same symbol to represent multiple objects.*
- (6) **Justify your claims.** For the most part, each sentence in the body of your proof should have two parts:
  - (a) a statement of fact (usually a logical consequence of the preceding statement), and
  - (b) justification for why the logical statement is true.

Proper justification usually includes citing a definition or theorem, or providing simple algebraic steps. In some cases, more than one line of justification is needed.
- (7) **Write for your peers.** Write arguments that can be understood by your classmates. Keep your statements simple, and strive for clarity. Use words that everyone can understand.
- (8) **Write the complete statements of each definition.** Write out the precise statement of each definition you use in your proof. (You may want to do this before your proof, rather than within the proof to avoid filling the proof with interjections.) Writing out the definitions will help you learn the statements and also provide a helpful reminder to the reader.
- (9) **Proofread.** In fact, *read your proof out loud*. Do your statements read smoothly, or are there gaps? Do you find the need to insert words/phrases/pauses/interludes/etc to make sense of or to clarify your statements? Your readers should not have to guess to fill in blanks.