

MATH 2001 PROOF GRADESHEET

0.1. **Writing.** Grade: 0 1 2 3 4 ungraded

This is the art of writing mathematics **for an audience**. Areas that need improvement:

- (1) Complete and simple sentences, appropriately sized.
- (2) Do not include extraneous information.
- (3) Keep structure and language in line with logical steps.
- (4) State assumptions.
- (5) Introduce variables appropriately.
- (6) Guide the reader.
- (7) Choose notation to maximize clarity.
- (8) Identify the use of hypotheses.
- (9) Keep structure organized on the page and legible.
- (10) Precision over vagueness.
- (11) Honesty about logical gaps or imprecision.
- (12) Value simplicity.
- (13) Observe the established culture/etiquette.
- (14) Do multiple drafts as needed.
- (15) Provide all necessary information to reader.
- (16) Do not include examples.
- (17) Do not re-use variables, or use excess variables.
- (18) Correct language for calling on a definition (do not quote definition).
- (19) Remark to reader the necessary things to check.
- (20) Proper left-to-right flow of equations.

0.2. **Logical Reasoning.** Grade: 0 1 2 3 4 ungraded

This is the art of correct and logical reasoning from hypothesis to conclusion. Areas that need improvement:

- (1) Avoid logical errors.
- (2) Justify logical steps.
- (3) Choose appropriately sized logical steps.
- (4) Put logical steps in linear sequence.
- (5) Identify logical holes in an/your argument precisely.
- (6) Identify hidden assumptions.
- (7) Choose the fastest or clearest route (avoid meandering).
- (8) Do not include extraneous reasoning.
- (9) Avoid arithmetic errors.
- (10) Correct use of contrapositive or contradiction.
- (11) Do not forget cases.
- (12) Avoid vagueness.
- (13) Check the necessary details.
- (14) Complete the argument.
- (15) Do not assume what you should prove.

0.3. **Synthesis.** Grade: 0 1 2 ungraded

This is the art of combining, extending and adapting previous experience to novel problems. For this proof, the type of synthesis needed was:

- (1) Combine two methods in sequence.
- (2) Work with a novel definition in terms of known definitions.
- (3) Invent a new method by analogy to an old one.
- (4) Adjust a method to a new context.
- (5) Draw conclusions from the combination of known statements.
- (6) Choose appropriate concepts for a given context.
- (7) Recognize a known mathematical structure in a new context.