

Mathematical Reasoning

Math 231-A

Fall, 2000

INSTRUCTOR: Jeff Clark

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OFFICE HOURS:

Monday, Wednesday, and Friday 10:00–11:00 AM

Tuesday, Thursday 10:30–11:30 AM

TEXTS:

- *A Primer of Abstract Mathematics* by Robert B. Ash
- *An Introduction to Point Set Topology via Linearly Ordered Spaces* by J. R. Boyd and G. R. Gordh, Jr.

COURSE DESCRIPTION: This study of proof techniques and reasoning skills introduces the student to another side of mathematics, namely proof. The student's preceding courses, e.g., precalculus and calculus, usually focus on calculations. Topics include mathematical logic, sets, mathematical induction, combinatorics, relations, and countability arguments. Prerequisite: Math 121. Offered fall and spring.

COURSE OBJECTIVES:

1. To learn how to plan the strategy for a proof.
2. To learn how to break up long trains of reasoning into manageable steps.
3. To learn how to find counter-examples for false mathematical statements.
4. To learn how to discern between false and true mathematical statements.
5. To communicate clearly mathematical reasoning, both orally and in writing.

COURSE OUTLINE:

1. Review of mathematical logic
2. Combinatorics
3. Elementary number theory
4. Set theory
5. Real number topology

ASSIGNMENTS AND GRADING:

1. Class participation will count for 20% of your final grade. Class participation will be recorded as yes or no for each class, and this portion of your grade will be expressed as a fraction.
You need to be in class to participate, and you need to be prepared. If you miss class, there is no way to make up for that day's class participation.
2. Homework will count for 20% of your final grade.
3. Class presentations on problems (approximately once every two weeks) will count for 20% of your final grade.
4. Midterm and Final exams will be cumulative and each will count for 20% of your final grade.
5. If you give me a password, you will be able to check your grades from my web page.
6. I will grade on a ten-point scale: 93–100 is an A, 90–92 is an A-, 87–89 is a B+, 83–86 is a B, 80–82 is a B-, etc.

SCHEDULE

Week:	Sections of Text	Exam
August 29, 31	Ash Chapter 1	
September 5, 7	Ash Chapter 2	
September 12, 14	Ash Chapter 3	
September 19, 21	Ash Chapter 4	
September 26, 28	Boyd Chapter 1	
October 3, 5	Boyd Chapter 2	Midterm, October 12
October 10, 12	Boyd Chapter 3	
October 17, 19	Boyd Chapter 3	
October 26	Boyd Chapter 4	
October 31, November 2	Boyd Chapter 5	
November 7, 9	Boyd Chapter 6	
November 14, 16	Boyd Chapter 7	
November 21	Boyd Chapter 8	
November 28, 30	Boyd Chapter 8	
December 5, 7	Boyd Chapter 9	
December 11, 11:30–2:30		Final Exam