

Math 335, Section 1, Real Analysis
Fall 1996
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Text: Protter & Morrey, A First Course in Real Analysis, 2nd Ed.

I consider the book appropriate for a year long course in real analysis which spends about a semester on analysis in 1 variable and about a semester on analysis in several variables. It has an excellent choice of topics, is well-written, and includes lots of examples. The problems range from easy to medium in level of difficulty. I would use it again.

The students find the book hard to read; they would find any analysis book hard to read. Among analysis books, I would rank this as fairly easy. **Contents**

CHAPTER 1 The Real Number System

- 1.1 Axioms for a Field
 - 1.2 Natural Numbers and Sequences
 - 1.3 Inequalities
 - 1.4 Mathematical Induction
- CHAPTER 2 Continuity and Limits

- 2.1 Continuity
 - 2.2 Limits
 - 2.3 One-Sided Limits
 - 2.4 Limits at Infinity; Infinite Limits
 - 2.5 Limits of Sequences
- CHAPTER 3 Basic Properties of Functions on \mathbf{R}^1

- 3.1 The Intermediate-Value Theorem
 - 3.2 Least Upper Bound; Greatest Lower Bound
 - 3.3 The Bolzano-Weierstrass Theorem
 - 3.4 The Boundedness and Extreme-Value Theorems
 - 3.5 Uniform Continuity
 - 3.6 The Cauchy Criterion
 - 3.7 The Heine-Borel and Lebesgue Theorems (Lebesgue Theorem skipped)
- CHAPTER 4 Elementary Theory of Differentiation

- 4.1 The Derivative in \mathbf{R}^1
 - 4.2 Inverse Functions in \mathbf{R}^1
- CHAPTER 5 Elementary Theory of Integration

- 5.1 The Darboux Integral for Functions on \mathbf{R}^1
 - 5.2 The Riemann Integral
 - 5.3 The Logarithm and Exponential Functions
- CHAPTER 9 Infinite Se-

quences and Infinite Series

- 9.1 Tests for Convergence and Divergence
- 9.2 Series of Positive and Negative Terms; Power Series
- 9.3 Uniform Convergence of Sequences

Math 335, Section 1, Syllabus

August 28,30 Chapter 1
September 2,4,6 Sections 2.1, 2.2
September 9 Section 2.3
September 11 Section 2.4
September 13,16 Section 2.5
September 18,20 Section 3.1
September 23 Section 3.2
September 25 review for exam
September 27 Exam I
September 30 Section 3.3
October 2 Section 3.4
October 4,7 Section 3.5
October 9,11,13 Sections 3.6, 3.7
October 16,18,28 Section 4.1
October 30 Section 4.2
November 1,4 Section 5.1
November 6 review for exam
November 8 Exam II
November 11,13 Section 5.2
November 15,18 Section 5.3
November 20,22 Section 9.1
November 25,27 Section 9.2
December 2,4 Section 9.3
December 6,9 Section 9.4
December 11 review for final