

MA491: Introduction to Real Analysis

Baker University — Spring 2024

Each of the following items refers to the indicated section from the course textbook *Introduction to Real Analysis* (Fourth Edition) by Robert G. Bartle and Donald R. Sherbert.

Exam 1: Essential Properties of Real Numbers

- §1.1: Sets and Functions
- §1.2: Mathematical Induction
- §1.3: Finite and Infinite Sets
- §2.1: The Algebraic and Order Properties of \mathbb{R}
- §2.2: Absolute Value and the Real Line
- §2.3: The Completeness Property of \mathbb{R}
- §2.4: Applications of the Supremum Property
- §2.5: Intervals

Exam 2: Sequences of Real Numbers

- §3.1: Sequences and Their Limits
- §3.2: Limit Theorems
- §3.3: Monotone Sequences
- §3.4: Subsequences and the Bolzano-Weierstrass Theorem
- §3.5: The Cauchy Criterion
- §3.6: Properly Divergent Sequences

Exam 3: Limits and Continuity

- §4.1: Limits of Functions
- §4.2: Limit Theorems
- §4.3: Some Extensions of the Limit Concept
- §5.1: Continuous Functions

- §5.2: Combinations of Continuous Functions
- §5.3: Continuous Functions on Intervals
- §5.4: Uniform Continuity
- §5.6: Monotone and Inverse Functions

Exam 4: Differentiability and Integrability

- §6.1: The Derivative
- §6.2: The Mean Value Theorem
- §6.3: L'Hôpital's Rule
- §7.1: Riemann Integral
- §7.2: Riemann Integrable Functions
- §7.3: The Fundamental Theorem