

Suggested Material for the Comprehensive Exam

Real Analysis

- 1- Sequences and Series
- 2- Continuity
- 3- Differentiation
- 4- Taylor's Theorem
- 5- Riemann Integrals (in one and in several variables)
- 6- Sequences and Series of Functions
- 7- Line Integrals and Green's Theorem

Complex Analysis

- 1- Analytic Functions
- 2- Elementary Functions
- 3- Contour Integrals
- 4- Cauchy Integral Formula
- 5- Maximum Modulus Principle
- 6- Identity Theorem
- 7- Residue Theorem

Linear Algebra

- 1- Systems of Linear Equations
- 2- Matrices
- 3- Vector Spaces
- 4- Linear Transformations
- 5- Eigenvalues and Eigenvectors
- 6- Inner Product Spaces

Abstract Algebra

- 1- Groups
- 2- Cyclic, Symmetric and Alternating Groups
- 3- Cosets, Normal Subgroups and Quotient Groups
- 4- Rings and Fields
- 5- Prime and Maximal Ideals
- 6- Integral Domains
- 7- Quotient Rings
- 8- Homomorphisms, Fundamental Homomorphism Theorems

Suggested References

- 1- Berkley Problems in Mathematics.
- 2- Schaum's Outline: Complex Variables.
- 3- Schaum's Outline of Advanced Calculus.
- 4- Schaum's Outline of Linear Algebra.
- 5- Schaum's Outline of Abstract Algebra.