

Topics for Real Analysis Qualifying Exam

Advanced Calculus

Elementary set theory, and the topology of Euclidean space. Limits of functions and sequences, continuity. Pointwise and uniform convergence, and uniform continuity. Differentiation, the mean value theorem, Riemann integration of functions of several variables.

Suggested books:

- Buck, *Advanced Calculus*
- W. Rudin, *Principles of Mathematical Analysis*, Chapters 1-7, 9
- Strichartz, *The Way of Analysis*, Chapters 1-7, 10,13

For supplementary reading: P. Halmos, *Naive Set Theory*

Real Analysis

Lebesgue measure and integration on Euclidean space; abstract metric and topological spaces; integration theory on general measure spaces: Fubini's theorem, the Radon-Nikodym theorem, and the various convergence theorems; functional analysis: L^p spaces and other Banach spaces, Hilbert spaces, orthogonality, bounded operators, Holder and Minkowski inequalities; elements of Fourier analysis: Plancherel theorem, uniform convergence of Fourier series, Young inequalities.

Suggested books:

- Folland, *Real Analysis*, Chapters 1-6, 8
- M. E. Munroe, *Measure and Integration*
- H. L. Royden, *Real Analysis*
- W. Rudin, *Real and Complex Analysis*
- Stein and Shakarchi, *Princeton Lectures in Analysis*, Vol I (Fourier Analysis) and Vol III (Real Analysis)

For supplementary reading: J. L. Kelley, *General Topology* and M. Reed and B. Simon, *Functional Analysis*