Oral Exam Syllabus

Shanshan Ding, April 15th 2010

Major: Probability

Primary text: Durrett, Probability: Theory and Examples

- Chapter 1: preliminary definitions, Borel-Cantelli lemmas, laws of large numbers, large deviations
- Chapter 2: convergence in distribution, characteristic functions, central limit theorems (including Erdös-Kac theorem), Poisson limits and Poisson processes, stable laws
- Chapter 3: random walks and stopping times
- Chapter 4: conditional expectation, martingales
- Chapter 5: Markov chains (finite, countable)

Minor: Algebraic Number Theory

Primary text: Marcus, Number Fields

- Chapter 2: quadratic and cyclotomic fields, rings of integers, embeddings, trace, norm and discriminant
- Chapter 3: Dedekind domains, behavior of primes in extensions of Q
- Chapter 4: decomposition and inertia groups, quadratic reciprocity
- Chapter 5: class number, Minkowski's bound, structure of unit groups
- Prime number theorem, density theorems of Dirichlet and Chebotarev (statements)