

## List of topics for the preliminary exam in topology

- Continuity
- Connectedness
- Compactness
- Separation axioms
- Metric spaces
- Product spaces
- Complete metric spaces
- Baire Category Theorem
- Urysohn's Lemma
- Tietze Extension Theorem
- Metrization theorems
- Imbedding theorems
- Tychonoff's Theorem
- Fixed point theorems
- Function spaces
- Topological groups
- Identification spaces
- Quotient spaces
- Fundamentals of homotopy theory

- Fundamental group and covering spaces
- Fundamental group
- Covering spaces
- Covering homotopy theorem
- Browder fixed point theorem
- Second homotopy group
- Group actions on spaces
- Lifting criteria for covering spaces
- Criteria for universal covering spaces
- Isometries and the geometry of group actions
- van Kampen's theorem
- Euler characteristic
- Classifying Platonic solids
- Borsuk-Ulam theorem
- Fundamental theorem of algebra
- Group presentations via van Kampen
- Ends of groups
- Hyperbolic groups
- Homology (simplicial, cellular, and singular)