Stony Brook University
Mathematics Department
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Introduction to Advanced Mathematics
MAT 250
Fall 2025

How to prepare to Final Exam

Theoretical questions

The topics listed below are recommended for review. Some of them will be included (in a rephrased form) in the exam. It will be required to formulate the relevant definitions and theorems, and provide detailed proofs.

1. Disjunctive and conjunctive normal propositional forms of a Boolean function.

2. Constructing a useful denial of a propositional form.

3. Cantor Theorem about cardinality of the set of real numbers.

4. Two definitions of inequality between cardinal numbers (via existence of injection or surjection) and their equivalence.

5. Properties of the ordering of cardinal numbers. Totality. Proof of totality and Hausdorff maximal principle.

6. Cantor-Schröder-Bernstein theorem. Antisymmetry of the ordering of cardinal numbers.

7. Denumerability of $\mathbb{Z}$ and $\mathbb{Q}$.

8. Equivalence of surjectivity and injectivity for self-maps of a finite set.

9. Grand orbits of a self-map. Classification of grand orbits of injections.

10. Classification of self-maps of a finite set.