MATH 110 Final Exam Study Guide

The final exam will be 2 hours long and will consist of 8-12 problems/questions (some with multiple parts).

The exam is cumulative, so review all the concepts, properties, and examples covered in this course. Use the following list as a guide. It is also a good idea to review all homework and exam problems.

1. Truthtellers and liars puzzle.
2. Statements, truth values of statements.
3. Open statements.
4. Logical connectives (operations).
5. Truth tables.
6. Compound statements, order of operations.
7. Logical equivalence.
8. Expressing operations in terms of others.
9. Fundamental logical equivalences.
10. Proving other logical equivalences from the fundamental ones.
11. Tautology, contradiction.
12. More puzzles (knigths, knaves, tourists, their language, guessing numbers, and various puzzles about true and false statements).
13. Set, subset.
14. Cardinality of a set.
15. Power set.
16. Set operations.
17. Venn diagram.
18. Indexed collection of sets, operations with it.
19. Fundamental identities in set theory.
20. Proving a set identity.
21. Similarities between logical and set operations and identities.
22. Interpretation of formulas in sets.
23. Formulas valid in sets.
24. Quantifiers.
25. Negations of quantified statements.

26. Nested quantifiers.
27. Properties of quantified statements.
28. Proving quantified statements.
29. Non-constructive proofs.
30. Paradoxes in logic and set theory.
31. Axioms, Modus Ponens.
32. Sound and complete axiom systems.
33. Deriving tautologies from axioms.
34. Modal operators box and diamond, their interpretations.
35. Axioms, Necessitation Rule.
36. Proving formulas from axioms.
37. Modal logics, sublogic relationships.