

Mathematics 2345 : Discrete Mathematics

Topics for Exam 1

Fall 2011

The exam will cover Chapter One and sections 2.1 — 2.3 from the textbook including all topics covered in slides, lectures, homework, handouts, and worksheets in Weeks 1 – 5. The following list of topics may help you in your preparation for the test.

- Logic — including:
 - Propositional Logic, conditionals, truth tables
 - tautology, contradiction, contingency
 - \wedge , \vee , \neg , Exclusive or (\oplus)
 - Propositional Equivalences, DeMorgan's Laws
 - logical equivalence – proof by reasoning, proof with truth tables
 - implication, inverse, converse, contrapositive, biconditional
 - predicates — binding variables, quantifiers, nested, negating
 - Rules of inference, fallacies, valid arguments
 - Proof methods: direct, indirect, contraposition, contradiction, vacuous, trivial, by cases, existence,
 - bit operations
- Sets
 - specifying sets
 - common sets: \mathbb{R} , \mathbb{N} , \mathbb{Z} , \mathbb{Z}^+ , \mathbb{Q}
 - \subseteq , \subset , \emptyset , $\mathcal{P}(A)$
 - cardinality, finite, infinite
 - cartesian product
 - set operations: equality, \cup , \cap , complement, difference, symmetric difference (\oplus)
 - Venn diagrams
 - set identities, universal instantiation, universal generalization
 - indexed collections
- Functions — definitions, injection, surjections, bijections, composition