

DISCRETE MATHEMATICS

Math 245

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Review for Second Exam, Sets and Predicate Logic (Epp 4th Ed., Sections 1.1-2, 3.1-4, 6.1-3, 9.2, 3)

I. Predicates:

- Know the variety of ways to express a conditional.
- Know the variety of ways to express universal and existential statements.
- Know how to negate a statement involving a quantified predicate.
- Know how to translate from English to formal logic and vice-versa.
- Be able to identify valid and invalid arguments.
- Given several statements, derive a conclusion using valid arguments.
- * Solve a logic puzzle (1) Identify the simple predicates, (2) translate to formal logic, (3) Derive a conclusion.

II. Sets: Definitions and computations.

- Know the definitions: Subset. Intersection, union, set difference, complement.
- Be able to compute expressions for sets involving intersection, union, set difference, and complement.
- Be able to draw Venn diagrams for intersection, union, set difference, complement.
- Be able to compute the power set of a set, and the Cartesian product of two or more sets.

III. Sets: Theorems and proofs.

- Be able to use the Set Identities in Theorem 6.2.2.
- * Prove a property of sets using an element argument.
- Use established properties (logical equivalences, distributivity, De Morgan's etc.) to algebraically prove new ones.

IV. Counting:

- Be able to use the inclusion-exclusion formula for 2 and 3 sets. Illustrate using a Venn diagram.
- Know the formula for the number of elements in a Cartesian product.

(*) Level 2 problems.