Math 102
Exam 1 Review Sheet

Problem Solving; Inductive and Deductive Reasoning

• Know the 7 basic problem solving strategies and the 4 step problem solving process and be able to apply them to solve a specific problem.
• Know the definitions of inductive and deductive reasoning.
• Be able to identify which of the two is being used in a given example.
• Be able to use inductive reasoning to make conjectures and deductive reasoning to do a simple proof.

Section 3.1: Statements, Connectives and Quantifiers

• Know the definition of a statement, and the difference between simple and compound statements.
• Be able to determine whether or not an English sentence is logical statement.
• Know the symbols for and meanings of the 5 basic logical operations.
• Be able to translate from English statements to logical symbols.
• Be able to translate from logical symbols into written English.
• Know the difference between universal and existential quantifiers.
• Be able to negate logical statements, including those with universal and existential quantifiers.

Sections 3.2 and 3.2: Truth Tables

• Memorize the truth tables for the 5 logical connectives.
• Know and be able to illustrate the difference between "inclusive or" and "exclusive or"
• Know the number or rows in the truth table of a logical expression with given number of variables.
• Be able to build the truth table for a logical expression.
• Know the definition of logical equivalence for two logical statements.
• Be able to use truth tables to determine whether or not two statements are logically equivalent.
• Know DeMorgan's Laws, and be able to use them to rewrite statements.
• Be able to identify the hypothesis and conclusion in a conditional statement.
• Given a conditional statement, be able to write the converse, inverse, and contrapositive of the statement, and know which of these are logically equivalent.

Section 3.4: Verifying Arguments

• Know the components of a logical argument: premises and a conclusion.
• Know how to translate an argument from English to symbolic form, and vice versa.
• Know how to use a truth table to determine whether or not an argument is valid.
• Memorize the forms of the standard valid arguments (logical laws), common invalid arguments (logical fallacies) and pairs of common equivalent logical statements (see the supplemental handout).
• Be able to determine whether a given argument is valid or in valid by translating it into symbolic form and comparing it to our list of standard logical laws and fallacies.
• Be able to provide the reasons for each step in a 2 column proof by providing line number references, and citing logical laws) and/or pairs of common equivalent logical statements.
• Be able to construct your own two column proof to verify that a given logical argument is valid.

Section 3.5: Using Euler Diagrams to Verify Syllogisms

• Know how to construct Euler diagrams for quantified logical statements.
• Know how to analyze the validity of an argument using an Euler diagram.

Practice: Chapter Three Test page 136-137 # 1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 19