

Discrete Mathematics Review Guide for First Exam Friday Feb. 6th

Section 1.1 Logic

Term: proposition – recognize whether a statement is a proposition.

Logical operators and their symbols.

Be able to evaluate bit (logical) operations on bit strings

Given an implication as an English sentence, states its converse, inverse, and contrapositive as English sentences.

Section 1.2 Propositional Equivalences

Be able to fill in truth tables for compound propositions.

Be able to show two compound propositions are logically equivalent using truth tables

Know what a tautology, contingency, contradiction are, and be able to show a proposition is a tautology using truth tables

Section 1.3 Predicates and Quantifiers

Know what the two quantifiers \forall and \exists (universal and existential) mean.

Know how to negate quantifiers.

Be able to translate SIMPLE sentences to logical expressions and vice versa

Section 1.5 Rules of Inference

Recognize fallacy of affirming conclusion and fallacy of denying the hypothesis.

I will give you the two tables with the rules of inference (Table 1) along with the Universal Modus Ponens and Universal Modus Tollens.

Write a given a rule of inference as an equivalent tautology.

Given an argument, list the reasons (rules of inference and reasons used for each statement in the argument). Fill in missing parts (steps and reasons) of an argument.

Section 1.6 Introduction to Proof

Know what a direct proof is, an indirect proof, a proof by contradiction, an existence proof; a counterexample. Recognize examples of such proofs.

Section 2.1 Sets

What a set is, set builder notation, subset, cardinality of a set, null (empty set) power set of a set. Cartesian product of two sets.

Section 2.2 Set Operations

Know set operations and notation for them: union, intersection, complement, difference.

Given two (or more sets), perform set operations on them, writing down resulting set.

Draw a Venn diagram, shading a particular compound set.

Verify set identities using set membership tables.

Section 2.3 Functions

Terms: function, domain, codomain, range, image, one-to-one function, onto function.

When does inverse of function exist?

For a given function, is it one-to-one, onto, invertible? Find its inverse (if it exists).

Composition of two functions. Given two functions f and g , compute their composition.

Floor function, ceiling function.

Problem like examples 56 and 57 for transmitting or storing data.

Section 2.4 Sequences and Summations

What is a sequence, notation for sequences

Given a definition of a sequence, evaluate the first several terms

Geometric progression

Arithmetic progression

Summation notation

Given a sum in single or double summation notation, evaluate the sum