

Fall 2019 COT 3100 Exam #1 Review

Exam Format

Several Free Response Questions, 75 points total

*BRING BLANK SCRATCH PAPER
YOU WILL BE PROVIDED REFERENCE SHEETS*

Exam Outline

I. Logic and Proof

- a. Boolean variables, operators (xor not required)
- b. Implication and related statements
 - i. inverse
 - ii. converse
 - iii. contrapositive
- c. Truth Tables
- d. Bitwise Operators, Binary/Decimal Conversions
- d. Logic Laws and application
- e. Predicates and Quantifiers
- f. Nested Quantifiers
 - i. When order matters
 - ii. How to disprove a nested quantifier statement
- g. Rules of Inference
- h. Some Definitions and Preliminaries
 - i. Divisibility
 - ii. Mod
 - iii. Algebra with expressions
- i. Proof Techniques
 - i. Direct Proof
 - ii. Proof by Contradiction
 - iii. Proof of Contrapositive
 - iv. Proof by cases

II. Sets

- a. Definitions ($\in, \subseteq, \subset, \cap, \cup, \bar{A}, -, \times, \emptyset$)
- b. Set Table
- c. Laws
- d. Operations
- e. Use of Proof Techniques

III. General Math Review

- a. Log Rules, Problems with Logs, System of Equations with Logs
- b. Sum, Product of the Roots of a Quadratic Equation, Manipulation to find various quantities based on those roots.
- c. Distance = Rate x Time Problems (setting up equations, solving)
- d. Triangle Inequality, Triangle Area ($\frac{1}{2}bh$)
- e. Other Bases in General - basic definition and application