Study guide for second CS160 midterm exam

This is a study guide for the second midterm, more detailed information can be found in the slide sets and homework assignments. Before the midterm we will present a slide set that reviews propositional and predicate logic.

1) Sets
    a. Set Membership
    b. Set Notation
    c. Subset and Proper Subset
    d. Empty Set
    e. Union Operation
    f. Intersection Operation
    g. Difference Operation
    h. Set Complement
    i. Set Cardinality
    j. Set Identities
    k. Cartesian Product
    l. Power Sets
    m. Set Builder Notation
    n. Venn Diagram
    o. Common Sets (N, Z, Z+, R, R+)
2) Functions:
    a. Domain, Codomain, Range
    b. 1:1 Functions
    c. (Strictly) Increasing Functions
3) Propositional Logic
    a. What is and is not a proposition
    b. Truth Tables
    c. Logical Negation
    d. Logical Conjunction (and)
    e. Logical Disjunction (or, xor)
    f. Unidirectional Implication
    g. Bidirectional Implication
    h. Compound Propositions
    i. Tautology, Contradiction, Contingency
    j. Logical Equivalences
    k. Inference Rules (Understand not Memorize!)
    l. Proofs using Truth Tables
    m. Proofs using Inference Rules
4) Predicate Logic
    a. Notation
    b. Universal Quantifier (for all)
    c. Existential Quantifier (there exists)
    d. English to Logic and vice versa
    e. Figure out if true or false
    f. Provide example or counterexample
5) Math Proofs
    a. Notation
    b. Direct Proofs
    c. Contrapositive Proofs
    d. Proof by Contradiction
    e. Proof by Cases
6) Program Correctness
    a. Pre-Conditions
    b. Post-Conditions
    c. Loop Invariants