MATH 210 Final (0.3 - 5.2) Review

1. Know the definition of sets, subsets, and know the operations on sets.

2. Know how to prove set equality using Venn diagrams, Truth tables, and element chasing.

3. Know the definition of function and relation.

4. Know the definition of and how to determine if a function is one-to-one (injective), onto (surjective), and bijective function.

5. Know the relations on a set A and their properties.

6. Know equivalence relations/classes.

7. Know how to determine a partial ordering and draw a Hasse diagram.

8. Know how to write the converse/contrapositive/contraconverse of a statement and be able to negate a statement.

9. Know how prove simple theorems, for example

Prove that the sum of any two odd numbers is even

10. Be able to write induction and strong induction proofs.

11. Know the definition of recurrence relation and how to find a general formula for the nth term of that relation.

12. Know how to compute the Binomial Coefficients.

13. Know how to count ordered samples with and without repetition.

14. Know how to count unordered samples with and without repetition.

15. Know the principle of inclusion/exclusion.

16. Know how to solve discrete probability problems.

17. Know the definitions of graph, weighted graph, tree, path, cycle, Euler cycle, Hamiltonian cycle, degree, outdegree, indegree, connected graph, subgraph, spanning tree, minimum spanning tree.

18. Know how to determine if a graph is Eulerian and/or Hamiltonian.

19. Know how to find the adjacency and cost matrix for a graph and weighted graph, respectively.

20. Know how to find minimum spanning tree using Prim's algorithm and how to use Dijkstra's algorithm for shortest paths.

21. Know the definition of and how to construct a binary tree.

22. Know the binary tree search (traversal) algorithms: pre-order, in-order, post-order & prefix form (Polish Notation), infix form, postfix form(Reverse Polish Notation).

23. Know the definition of a well-formed proposition (WFP) and the connectives used in constructing it.

24. Know the definition of tautology and contradiction & how to show a WFP is one or the other.

25. Know how to determine if a statement is a WFP.

26. Know the four basic boolean operations.

Example exercises: Quizzes, Exams & Homework questions; Section 1.R: PE #1-25; Section 2.R: PE; Section 3.R: PE #1-11; Section 4.R, #1-9; Section 5.R. #1, 2, 4-8, 13