

Review Guide MTH 122 Discrete Mathematics Final Exam Semester 082

(Final: Wednesday April 29th 3:00 p.m.) *The final exam counts 25% of your grade.*

Additionally, if your final exam is higher than the lowest of your previous 3 tests, I will also use the grade on the final in place of that low score.

You may bring 1 page (8.5 x 11) of your own handwritten notes for the test.

1. A problem to determine whether a given mapping is a valid function, one-to-one, onto.
2. A problem using truth tables to show two compound expressions are logically equivalent.
3. A problem that given some sets A, B, and C, requires that you find members of various set combinations (e.g -- $A \cap B \cap \overline{C}$) and possibly draw Venn Diagram. May also have to calculate the number of elements in each subset using the principle of inclusion –exclusion.
4. A problem that requires that you evaluate a summation formula.
5. A problem that requires that you evaluate or give a recursive definition (recurrence relation with initial condition(s)) for a sequence or determine whether a sequence satisfies a recurrence relation.
6. A problem that requires you to write a rule of inference in tautology form or vice versa.
7. Given a simple argument, recognize what rule of inference was used. (You will have the table of rules of inference).
8. A problem that requires that you count something using formulas for combinations or permutations, the product rule, sum rule, or principle of inclusion and exclusion.
9. A problem that requires that you calculate the probability of an event, perhaps using the Principle of Inclusion-Exclusion Rule, product rule, or the complement rule.
10. A proof by mathematical induction of some formula.
11. Given a sample graph, answer certain questions about it-- is it a directed, a simple graph, pseudograph, etc. Is it bipartite? Write down its matrix representation
12. Given a graph, does it have a Hamilton circuit (path), Euler circuit (path),.
13. Given a relation R on a set A:
 - a) determine its matrix representation, representation as a directed graph.
 - b) determine whether it is symmetric, reflexive, transitive
 - * c) determine whether it is an equivalence relation – if it is gives its equivalence classes.
 - * d) If it is an equivalence relation, determine its equivalence classes.
- * 14. For a given tree -- identify root, leaf, internal vertex, parent, child, sibling, ancestor, descendant, height of tree, level of vertex
- * 15. For a binary tree -- determine whether it is full, balanced.
- * 16. Construct a binary search tree from a given set of vertices with keys.
- * 17. Construct a Huffman coding tree.

(*) indicates that it has been covered since last test – not on previous tests.