

LIST OF POSSIBLE TOPICS FOR MTH 220 EXAM 4

Approximately 50% of the exam will be “example” type problems (not proofs). These may include:

- Be able to represent a given relation as a set of ordered pairs or by an arrow diagram.
- Find the inverse of a given relation.
- Determine if a given relation is reflexive, symmetric, and/or transitive, and be able to explain why or why not for each.
- Determine if a given relation is an equivalence relation. If yes, find the distinct equivalence classes of the relation, and explain why they form a partition of the set.
- Determine whether or not two integers are congruent mod d for a given positive integer d .
- Determine the sample space for a random experiment, and find the probability of a given event.
- Use the Multiplication Rule, the Addition Rule, the Difference Rule, and the Principle of Inclusion/Exclusion to solve counting problems.
- Use Factorial notation, Permutations, and Combinations to solve counting problems.

Approximately 50% of the exam will be proofs and counter-examples. You will be graded not only on the content of your solutions, but also on how your proofs are written. These may include:

- Prove that a given relation is reflexive, or give a counter-example to show it is not.
- Prove that a given relation is symmetric, or give a counter-example to show it is not.
- Prove that a given relation is transitive, or give a counter-example to show it is not.
- Prove that a given relation is an equivalence relation. In particular, be able to prove that congruence mod d is an equivalence relation on the integers for a given positive integer d .
- Prove that one function is Big-O of another function.