# 347 MIDTERM 3 STUDYGUIDE, FALL 2005

This is a possibly incomplete list of things that are worth studying for the upcoming third midterm, which will be an in class exam this time.

- Know the list of possible proof starts.
- Know how to negate statements (practice all the statements on the list with the proof starts and the examples we did in class and homework)
- Know the definitions of injective, surjective and bijective. You might be asked to do a mini proof with one of these, so I recommend to review all the homeworks about these.
- Be able to handle (*e.g.* compose, invert etc.) permutations in two line form, in cycle form, with little diagrams etc. Do you remember how to compute the order of a permutation?
- Be able to do modular arithmetic computations *e.g.* to compute inverses using the Euclidean algorithm.
- You should be prepared to give a small induction proof. Practice to write it up in the correct format.
- Know the statements of the theorems we proved in class (*e.g.* existence and uniqueness of prime factorization, properties of fields, $\mathbb{Z}/m\mathbb{Z}$ is a field if and only if $m$ is a prime number, Fermat's little theorem, and so on ...
- Know the definition of an equivalence relation and memorize the properties you have proved about them in the first midterm.
- Familiarize yourself with the notation used for sets. What I mean by this is the following: I could give an abstract definition of some set, and ask you to tell me what it is in a concrete example. Or I might offer you various possibilities to denote a set, and you would have to tell me which ones are o.k. and which ones are bogus.
- Remember that the order of the quantifiers in a logical statement is extremely important, and therefore also the order of the parts of a proof. There will be some sort of question testing you on this.

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*Date*: November 8, 2005.

- Depending on how far we get this coming week, there will be some questions about graph theory. Know Euler's polyhedra formula.