Topology I, Newberger, Spring 2005

Exam 1 Review Sheet

This exam will cover Sections 7, 12-17 and Section 18 up to but not including the subsection on constructing continuous functions. You will be asked four types of questions:

I. You will be asked to state the definitions of some of the following vocabulary. Not much partial credit will be given. Know the definitions very well.
   (a) topolological space, topology, open set
   (b) comparable, finer and coarser topologies
   (c) basis, and topology generated by a basis
   (d) countable
   (e) product topology
   (f) subspace topology
   (g) discrete topology
   (h) closed set
   (i) closure
   (j) limit points
   (k) Hausdorff
   (l) convergence of a sequence
   (m) continuous function

II. You will be asked to prove at least one theorem or lemma that is proved in the book. The purpose of asking these is to see if you can explain the main content of the course. In general, the theorems I am interested in are the ones that relate the various vocabulary that we have been studying. The one(s) on the exam will be chosen from the following list: 13.1, 16.1, 16.2, 17.2, 17.5, 17.6, 17.10, 18.1.

III. You will be asked to apply the definitions and theorems prove things about examples. You will be asked about some of the topological spaces that we have studied: $\mathbb{R}_{std}$, $\mathbb{R}_K$, $\mathbb{R}_l$, $\mathbb{R}_d$, the finite complement topology, the order topology and topologies on the set with three points (shown on page 76). I will not ask you to state the definitions of these, but you need to know what they are in order to prove things about them. You may be asked to come up with topological spaces as counterexamples to false statements, or examples of sets, or functions or spaces having certain properties. You may be asked to prove things about these topological spaces. You may be asked to prove a particular set is countable or not countable. You may be asked to prove a particular function is continuous or not continuous.

IV. You may be asked to prove new abstract statements that involve the vocabulary we have been studying. For example, an abstract statement like, "a subspace of a Hausdorff space is Hausdorff," is an abstract statement that involves the vocabulary subspace and Hausdorff.