Fall 2018/MA 331 Exam 3 Study Guide

The exam will consist of a section of definitions, and a section covering the major theorems of the course. In that section you will be presented with four theorems and will have to give detailed proof outlines for two of them. Each one of these results is too complex for me to request a complete proof at the exam, so definitely plan on just providing an outline. Your outline should, however, include all the important steps (even as the details of some of the steps will be omitted).

Here is the list of theorems from which the four options will be selected. There will also be a bonus problem.

(1) Sperner's Lemma

(2) The Intermediate Value Theorem.

(3) The n-dimensional Brouwer Fixed Point Theorem

(4) The topologists' sine curve is connected but not path connected.

(5) The Cantor set is homeomorphic to the product of itself with itself.

(6) A subset of $\mathbb{R}^n$ is compact if and only if it is closed and bounded.

(7) The polygonal Jordan curve theorem.

(8) The Invariance of Dimension theorem.

(9) The fundamental group of the circle is isomorphic to the integers.

(10) The Cellular Approximation Theorem

(11) The topological classification of surfaces theorem (both parts)