MATH 101 - SETS, GROUPS, AND TOPOLOGY
INFORMATION ON THE PRE-MIDTERM

When? The pre-midterm will take place on Friday, October 5, 2018, from 6pm to 8pm in room SC-B10. If you cannot take the exam at that time (for example because of a religious holiday or a university event), please let me know as soon as possible (`sebv@math.harvard.edu`).

What is covered? The pre-midterm will cover everything discussed in class until the end of Friday, September 28, as well as the material introduced in assignments 1-7 (your answers may use the material seen later, but it will not be tested in the exam). This includes:

- Sets: Chapter 1 of Hammack (sections 1.9 and 1.10 were not discussed).
- Proof techniques: Chapter 4,5,6,7,8,9 in Hammack (sections 5.2 and 8.4 were not discussed). While many of the specific examples of these chapters were not discussed in class, you should be able to understand them.
- Basic logic: this was discussed in class as we were talking about proof techniques. A detailed overview is in Chapter 2 of Hammack. You will *not* be specifically tested on logic, but you must know it in order to carry out proofs successfully.
- Mathematical induction: Chapter 10 in Hammack (section 10.2 was not discussed).
- Relations, including equivalence relations: Chapter 11 of Hammack (section 11.3 was not discussed).
- Functions: section 12.1 in Hammack.

What can I use during the exam? You may only use your brain, an eraser, and a pen. Scratch paper will be provided if needed. You may *not* use any other documents: textbooks or personal notes are *not* allowed. You also may *not* use a calculator (you will not need one anyway).

What will the exam look like? The exam will have five problems and one extra credit question. The first problem will ask you to state (without proofs) results or definitions seen in class. The second problem will ask you whether several statements are true or false (you will also have to give a brief justification). The third problem will ask you to give the proof of a result seen in class. Finally, the fourth,

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fifth, and extra credit problems will ask you for proofs (or disproofs) of statements that you have (probably) not seen before. These could for example be statements about sets, functions, relations, or the natural numbers (asking for example for a proof by induction). I will try to make the problems easier than in your homework, but your answer will be expected to have the same level of details as in the homework.

What can I do to prepare for the exam? Make sure you understand all of the homework and the course material. A sample exam is available on the course website. Try to solve it! You can also try to do the problems at the end of each section in Hammack. You can find the solutions to odd-numbered problems at the end of the book.