

## Exam 1 (Take-Home Portion)

**Your Name:**

**Names of Any Collaborators:**

### Instructions

This portion of Exam 1 is worth a total of 16 points and is worth 30% of your overall score on Exam 1. This take-home exam is due by 5PM on **Friday, February 28**. Your overall score on Exam 1 is worth 20% of your overall grade. Good luck and have fun!

I expect your solutions to be *well-written, neat, and organized*. Do not turn in rough drafts. What you turn in should be the “polished” version of potentially several drafts.

Feel free to type up your final version. The  $\text{\LaTeX}$  source file of this exam is also available if you are interested in typing up your solutions using  $\text{\LaTeX}$ . I'll gladly help you do this if you'd like.

The simple rules for the exam are:

1. You may freely use any theorems/problems that we have discussed in class, but you should make it clear where you are using a previous result and which result you are using. For example, if a sentence in your proof follows from Problem 2.32, then you should say so.
2. Unless you prove them, you cannot use any results from the course notes that we have not yet covered.
3. You are **NOT** allowed to consult external sources when working on the exam. This includes people outside of the class, other textbooks, and online resources.
4. You are **NOT** allowed to copy someone else's work.
5. You are **NOT** allowed to let someone else copy your work.
6. You are allowed to discuss the problems with each other and critique each other's work.

**I will vigorously pursue anyone suspected of breaking these rules.**

You should **turn in this cover page** and all of the work that you have decided to submit. **Please write your solutions and proofs on your own paper.**

To convince me that you have read and understand the instructions, sign in the box below.

**Signature:**

Good luck and have fun!

Each of the following problems can be found in Chapters 4 and 5 of the course notes. You may freely use any result that appears in either chapter as long as the result appears *before* the problem in question. For example, you may use the result of Problem 4.9 in the proof of Problem 4.10 (although I not trying to suggest that you should do this, but you can if you need to). However, you may not use Problem 5.13 to do Problem 5.9.

1. Complete one of Problems 4.10, 4.13, 4.14.
2. Complete one of Problems 5.4, 5.9.
3. Complete two of Problems 5.5, 5.11, 5.13.