# MATH 354: PROBLEM SET 8

RICE UNIVERSITY, FALL 2019

**Due date:** Friday, November 1st, by 5pm in my office (you can slide it under the door). You are welcome to turn in your work during lecture on Friday.

Parts A, and B should be handed in **separately**. They will be graded by different TAs.

Please staple your homework!

**Reminder from the syllabus:** "The homework is not pledged and you can collaborate with other students in the class. In fact, you are very much *encouraged* to do so. However, you are not allowed to look up solutions in any written form; in particular, you are not allowed to look up solutions online. **Students caught violating this rule will be reported to the Honor Council.** You should write up your solutions individually."

## 1. Part A

Hand in the following exercises from Chapter 3 of Axler's book:

3F: 27, 34. 5A: 9, 12.

## 2. Part B

Hand in the following exercises from Chapter 3 of Axler's book:

5A: 15, 21, 29. 5B: 5, 7.

## 3. Comments

(1) Exercise 3E.34 is super important: it says that the double dual of finite dimensional vector space $V$ is *canonically* isomorphic to $V$, i.e., there is an isomorphism $V \to V''$ that does not require us to choose a basis of $V$, unlike the isomorphisms $V \to V'$, which required us to choose a basis for $V$ in order to construct the corresponding dual basis for $V'$.

(2) Exercise 5A.21 is worth remembering.

(3) The key to Problem 5B.5 is that $(STS^{-1})^m = ST^mS^{-1}$ (why?). This fact gets used all the time in linear algebra. Make sure you remember it.

*Date*: October 25th, 2019.