

These problems are related to material covered in Lectures 3–4.

Instructions: Solve problems 1 and 2 below, then complete the survey problem 3. Your answer should be in the form of a PDF submitted to [Gradescope](#) no later than midnight on the date due (do not ask for an extension, the answer is no). Be sure to include your name somewhere on the PDF. Each problem is worth 1 point and the grading is binary; unless otherwise specified, any credible attempt will be awarded 1 point.

I recommend using latex to create the PDF, but scanned handwritten solutions are fine provided your handwriting is legible. For the first two problems collaboration (including with LLMs) is permitted, but I strongly encourage you to first attempt the problems on your own. Problem 3 should be answered entirely on your own.

Important: Be sure to use the [2013 version of Altman–Kleiman](#); newer versions do not necessarily use the same numbering.

Problem 1. Self-graded problems from Altman–Kleiman (1 point)

Read chapters 3, 4, and 11 of [AK13](#); we covered most (but not all) of chapters 3 and 11 in lecture, but Jeffries assumes you already know everything in Chapter 4, so make sure that you do. Then solve the following 8 exercises in [AK13](#) and check your answers against the solution (clicking the exercise number in [AK13](#) will take you directly to the solution, be careful not to click prematurely).

3.3, 3.13, 3.16, 3.17, 3.25, 11.11, 13.9, 13.16

Do not include your answers in your Gradescope submission. Your answer to this problem should instead be a list of 8 positive integers, each counting the number of lines in the solution to the 8 problems above that is printed in [AK13](#).

Problem 2. Subrings of $\mathbb{Q}$ (1 point)

Show that every ring $R \subseteq \mathbb{Q}$ arises as $S^{-1}\mathbb{Z}$ for some multiplicative set $S \subseteq \mathbb{Z}$ and give an explicit description of the sets S (you can find solutions to this problem in many places, including Altman–Kleiman, but I strongly encourage you to solve it yourself).

Problem 3. Survey (1 point)

Answer the following:

1. How long did it take you to complete this problem set (include everything)?
2. Do you think the pace of the lectures this week was too slow, too fast, or just right?
3. Name one thing you liked and one thing you did not about this pset.
4. Name one thing you liked and one thing you did not about the lectures this week.