

Math 339SP, Spring 2022 — Homework 1

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Due February 4 at 5:00 pm

Instructions. This problem set covers material from Week 1 of class, with a focus on Chapters 1 and 2 of the textbook.

Problem 1. Try the following exercises from Chapter 1. These are just a little more review of conditional probability. Remember that

$$P(A | B) = \frac{P(A \cap B)}{P(B)}$$

when $P(B) > 0$ (this is the definition of conditional probability) and

$$P(B | A) = \frac{P(A | B)P(B)}{P(A)}$$

when $P(A) > 0$ (this is called Bayes' formula).

1. Exercise 1.2
2. Exercise 1.3
3. Exercise 1.4

Problem 2. Try the following exercises from Chapter 2. These are practice with constructing the transition matrix for concrete examples, as well as practice using the idea that P^n gives you n -step transition probabilities.

1. Exercise 2.2 (always feel free to use R to do matrix multiplication for you)
2. Exercise 2.5 (again, you can use R to do matrix multiplication)
3. Exercise 2.8 (make sure to read the definition of random walk on a weighted graph in Example 2.11)
4. Exercise 2.12 (use $k = 5$ for concreteness, start by determining the state space, and then fill in the matrix one row at a time)
5. Exercise 2.14 (use $k = 5$ for concreteness, start by determining the state space, and then fill in the matrix one row at a time).