

Homework 1

Due April 2, 2014

Please make sure to explain your answers to each of the following questions. Remember: a correct numerical answer without explanation is worth no points! Write up your answers legibly and logically. The not-to-turn-in problems provide additional practice and are important to preparing for exams.

- (a) A fair dice is rolled twice. What is the probability the first roll is higher than the second?
 - (b) Two numbers between 1 and n are chosen uniformly at random. What is the probability the first is larger than the second?
- Section 1.2 Exercise 7
- Section 1.2 Exercise 14
- Section 1.2 Exercise 20 (in Grinstead and Snell)
- Section 1.2 Exercise 22
- At the beginning of an ultimate frisbee match, each captain flips a frisbee. The frisbees can land face up or face down. One of them calls “same” (the frisbees have the same orientation) or “different”. Assuming the captains have the same chance of flipping face up (which might not be $1/2$), what should you say?
- Section 3.1 Exercise 16
- In arranging people around a circular table, we take into account their seats relative to each other, not the actual position of any one person. How many ways can n people be arranged around a table?

Problems **not** to turn in (Items with * go beyond practice):

1. Section 1.2 Exercise 1, 4 and 5.
2. Section 1.2 Exercise 6
3. Section 1.2 Exercise 9
4. (*) Section 1.2 Exercise 25 (also, google the *conjunction fallacy* and read about it)
5. (*) One hundred people line up to board an airplane, but the first has lost his ticket and takes a random seat. Each subsequent passenger takes their assigned seat if available, otherwise a random empty seat. What is the probability that the last passenger to board finds his assigned seat occupied?
6. Section 3.1 Exercise 7
7. Section 3.1 Exercise 10
8. In n balls are placed uniformly at random into n slots, what is the probability exactly one slot is empty?
9. Klutz problems: I live with four people, and we take turns doing dishes (this is not true). A total of four times dishes have been broken, three times by the same person. Is it fair to call that person a klutz, or could it just be chance?