

S&DS 241/541  
Problem Set 1  
due Sept. 4, 2024, 11:00 pm via Gradescope

## Guidelines

- Instead of writing your name at the beginning of your problem set, please only write it in your answer to question 6.
- We'll provide more information about using Gradescope (which is linked to Canvas) before the due date, but here's a preview: You'll need to submit a PDF, which you can create either from LaTeX or Word (if you're typing your work) or by taking a photo or scan of your (legible) handwritten work. Here are two helpful links:
  - [https://gradescope-static-assets.s3.amazonaws.com/help/submitting\\_hw\\_guide.pdf](https://gradescope-static-assets.s3.amazonaws.com/help/submitting_hw_guide.pdf)
  - [https://youtu.be/KMPoby5g\\_nE](https://youtu.be/KMPoby5g_nE)
- Please write legibly and clearly justify each step. For full credit, your answer and your reasoning need to be not only correct, but clear to the grader.
- If the answer equals a specific number [such as  $2^{10} \cdot \binom{23}{2} = 259,072$ ], it's OK to express it as a formula involving more than one number [such as  $2^{10} \cdot \binom{23}{2}$ ] instead of reducing it to a single number (such as 259,072). (Of course, you always need to explain your reasoning.)
- Late problem sets will not be accepted unless there are extenuating circumstances (e.g., an illness or family emergency). Undergraduates must obtain a Dean's excuse for any late submission. Graduate students must obtain permission before the deadline. (As mentioned in the syllabus, we'll drop your lowest homework score.)
- You're encouraged to discuss the homework with classmates (this can be a good way to learn), but you must write your solutions independently and in your own words.

## Problems

These are all from Blitzstein & Hwang, section 1.9.

1. Exercise 4. Hint: It might help to first work out an example with a small value for  $n$  and give the players names. For example, you could try  $n = 3$  and call the players Serena, Naomi, and Ashleigh. Then use the same reasoning to solve the general problem. (Don't discuss Serena, Naomi, and Ashleigh in your answer. Just explain your solution for the general problem.)
2. Exercise 10.
3. Exercise 11.

4. Exercise 23.
5. Exercise 27.
6. (Not graded) On a separate page, please write your name and acknowledge anyone who helped you or discussed the problem set with you (other than the instructor, TFs, and ULAs), as well as any written resources you consulted (other than the textbook and other resources on Canvas). If you don't have any acknowledgments to make, please write "I worked independently."