

## Homework 12

Upload the following problems to Gradescope before 8 am on April 24th. When you upload your assignment, mark the page on which your solution to each problem starts, or upload each problem individually.

Homework should be written neatly and clearly explained. If it requires more than one sheet, the sheets must be stapled. Include your name and id number in the top right corner of your homework.

**Problem 1.** The number of the customers,  $N$ , at a store in a given hour is a Poisson random variable with mean 10. The amount of money,  $X_i$ , that the  $i^{\text{th}}$  customer spends is a uniformly distributed random variable between 50 and 100, independently. Use the law of iterated expectations to compute the expectation and variance of the total amount of money spent,  $\sum_{i=1}^N X_i$ .

**Problem 2.**  $n$  people go to a party and in order to be more social they leave their phones by the entrance. Unfortunately, they all have the same phone model and just randomly grab one as they leave. Compute the expectation and variance of the number of people who get their own phone.

Hint. let  $X_i = 1$  if the  $i^{\text{th}}$  person gets their own phone and 0 otherwise. The sum of the  $X_i$ 's is the number of people who get their own phone. Each of the  $X_i$ 's has the same distribution (pmf), but they are not independent.