1. The Trojan club has N members, where N is a random variable with pmf $p_N(n) = (1-p)^{n-1}p$ for $n = 1, 2, 3, \ldots$. Every month, the club holds a meeting. Each Trojan member attends the meeting with probability p, independently of all the other members. If a Trojan attends the meeting, then they bring an amount of money, M, which is an exponential random variable with parameter λ. N, M, and whether each Trojan member attends are all independent. Determine (15 pts):
   (a) The expectation and variance of the number of Trojans showing up to the meeting.
   (b) The expectation and variance for the total amount of money brought to the meeting.
2. A signal of amplitude $A = 2$ is transmitted from a satellite but is corrupted by noise, and the received signal is $S = A + n$, where n is noise. When the weather is good, n is normal with zero mean and variance 1. When the weather is bad, n is normal with zero mean and variance 4. Good and bad weather are equally likely. In the absence of any weather information (15 pts):
   (a) Calculate the pdf of S.
   (b) Calculate the probability that S is between 1 and 3. Hint: Use the total probability theorem and normal cdf tables[1]
3. Gubner Chapter 4, Problem 1. (15 pts)
4. Gubner Chapter 4, Problem 20. (15 pts)
5. Gubner Chapter 5, Problem 17. (15 pts)
6. Gubner Chapter 7, Problem 6. (15 pts)
7. Gubner Chapter 7, Problem 9. (15 pts)
8. Dobrow, 7.44. (15 pts)
9. (Extra Practice) Bertsekas and Tsitsiklis: 3.1,3.2,3.3, 3.7, 3.9. Grimmet and Stirzaker: 3.7.7, 3.7.8, 3.7.9, 3.11.38, 4.1.4, 4.2.3, 4.2.4, 4.4.1, 4.4.3, 4.4.5, 4.4.6, 4.4.9

[1] `https://homes.cs.washington.edu/~jrl/normal_cdf.pdf`