

Problem Set 7: Discrete Distributions

CS&SS Math Camp 2020

1. What is the proper distribution for the following random variables? What parameters do you need for the distribution?
 - (a) Draw 4 cards from a deck, X = the number of hearts
 - (b) Observe the weather in Seattle for 7 days. Y = number of sunny days.
 - (c) Take the bus to school each day for 30 days. X = number of times the bus is late.
 - (d) Survey 100 people and ask which candidate they will vote for, among 4 candidates. X = the number of votes for each candidate.
2. Let $X \sim \text{Bin}(n = 3, p = 0.5)$.
 - (a) Write down the distribution function for X .
 - (b) Graph the distribution of X .

(c) $E[X]$

(d) $V[X]$

3. Suppose the probability that you pass your graduate school qualifying exam is 75%. Let X be the number of tries until you pass.

(a) What distribution would you use to model X ?

(b) $P(X = 1) =$

(c) $P(X = 2) =$

(d) $P(X > 2) =$

4. A Poisson distribution is used to model traffic accidents at an intersection. $X =$ the number of accidents in a month. Assume $X \sim \text{Poisson}(\lambda = 1)$.

(a) $P(X = 1) =$

(b) $P(X = 0) =$

(c) $P(X > 0) =$

(d) Write out the summation (using Σ) that would be used to calculate $E[X]$. You do not need to solve the summation.