Problem Set 7
CSSS 505/ SOC 512
Due: February 24, 2021

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 $X \sim Bin(n = 3, p = 0.5)$.

   (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. Suppose a person is going to attempt to climb the highest peak on each continent (there are 7). Assume the probability of reaching the summit for each try is 0.6 for all 7 peaks. Let $X =$ the number of failed attempts before all 7 peaks have been reached.

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

   (b) $E[X]$

   (c) $V[X]$

(d) $P(X = 1) =$.

(e) $P(X > 1) =$.

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

   (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.