Problems from Assignment 1

1. Suppose $X_1, X_2, X_3 \overset{iid}{\sim} \mathcal{B}er(p)$ (that is they are independent and each has a Bernoulli distribution with probability of success p).

   (a) Find $P(X_2 = 1)$.

   (b) Find $P(X_1 = 1, X_2 = 1, X_3 = 0)$.

   (c) Let $S = X_1 + X_2 + X_3$. Find $P(S = 0)$.

   (d) Find $P(S = 2)$

   (e) Find $P(S = 3)$

   (f) Find $P(S \geq 3)$

   (g) What distribution does S have? Make sure to give any corresponding parameters.

2. Suppose $X_1, X_2, X_3 \overset{iid}{\sim} \mathcal{P}(\lambda)$ (that is they are independent and each has a Poisson distribution with mean λ).

   (a) Find $P(X_2 = 1)$.

   (b) Find $P(X_1 = 1, X_2 = 1, X_3 = 0)$.

   (c) Let $S = X_1 + X_2 + X_3$. Find $P(S = 0)$.

   (d) Find $P(S = 2)$

   (e) Find $P(S = 3)$

   (f) Find $P(S \geq 3)$

   (g) What distribution does S have? Make sure to give any corresponding parameters.