Problems from Assignment 1

1. Suppose $X_1, X_2, X_3 \overset{\text{iid}}{\sim} \mathscr{B}er(p)$ (that is they are independent and each has a Bernoulli distribution with probability of success p).
   (a) Find $\mathrm{P}(X_2 = 1)$.
   (b) Find $\mathrm{P}(X_1 = 1, X_2 = 1, X_3 = 0)$.
   (c) Let $S = X_1 + X_2 + X_3$. Find $\mathrm{P}(S = 0)$.
   (d) Find $\mathrm{P}(S = 2)$
   (e) Find $\mathrm{P}(S = 3)$
   (f) Find $\mathrm{P}(S \geq 3)$
   (g) What distribution does S have? Make sure to give any corresponding parameters.

2. Suppose $X_1, X_2, X_3 \overset{\text{iid}}{\sim} \mathscr{P}(\lambda)$ (that is they are independent and each has a Poisson distribution with mean λ).
   (a) Find $\mathrm{P}(X_2 = 1)$.
   (b) Find $\mathrm{P}(X_1 = 1, X_2 = 1, X_3 = 0)$.
   (c) Let $S = X_1 + X_2 + X_3$. Find $\mathrm{P}(S = 0)$.
   (d) Find $\mathrm{P}(S = 2)$
   (e) Find $\mathrm{P}(S = 3)$
   (f) Find $\mathrm{P}(S \geq 3)$
   (g) Guess what distribution S has. (Hint: Simplify and manipulate the previous parts and see if that helps you).