HW 3

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1. Flight

   (a) In order for a flight with $s = 50$ seats to accomadate k passengers who show up, $k \leq s$. Let X represent the random variable of the number of passengers who show up, then $P(X \leq s)$ is probability all k passengers will have a seat. This can be calculated as follows, $P(X \leq 50) = \rho(45) + \rho(46) + \rho(47) + \rho(48) + \rho(49) + \rho(50) = .05 + .1 + .12 + .14 + .25 + .17 = .83$. There is an **83%** chance all ticketed passengers who show up will have a seat.

   (b) The probability at least one of k passengers who show up will not be seated happens when $k > s$. Which can be shown as $P(X < 50)$ which is the complement to answer 'a'. so $P(X < 50) = 1 - P(X \leq 50) = 1 - .83 = .17$. The probability that not all of the k will recieve a seat is **17%**.

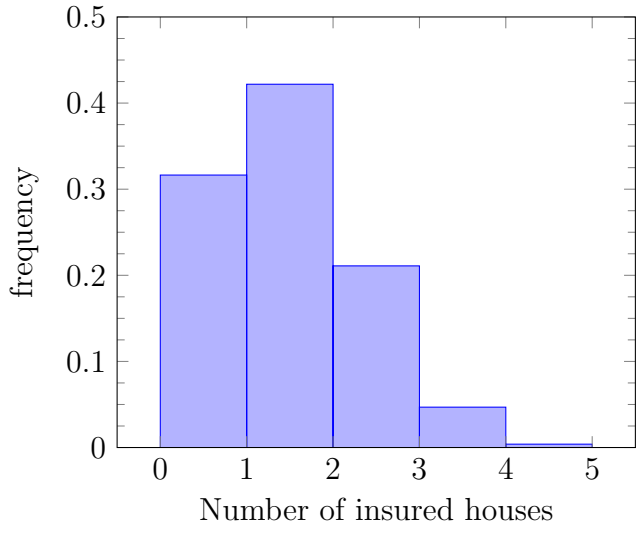
   (c) If you are the first person on standby, then if there must be one free seat on the plane for you to have a seat. This happens when $X \leq 49$. So answer derived from a $P(X < 50) = P(X \leq 50) - P(X = 50) = .83 - .17 = .66$. If you are the first person on standby there is a **66%** you will still be able to fly. Now, if you are the 3rd person on standby $X \leq 47$ must be true. $P(X \leq 47) = P(45) + P(46) + P(47) = .05 + .10 + .12 = .27$. If you are the third person on standby there is a **27%** chance you will still be able to fly.

2. Earthquake

   (a) The probability distrabution of X is

$$\rho(k) = \begin{cases} \binom{4}{k}.25^k.75^{N-k} & 0 \leq k \leq 4 \\ 0 & otherwise \end{cases}$$

   (b)



(c) Initialy I thought of calculating the expected value, $E(X) = \rho n = 1.0$, but then I interpreted the question as the mode, which value individually is most likely to be choosen, which also is **1**.

(d) The probability at least two of the four selected houses have eathquake insurance can be represented as follows, $P(X \geq 2) = 1 - P(X < 2) = 1 - P(X = 0) - P(X = 1) = 1 - .316406 - .421875 = 0.261719$. The probability that at least two of the selected houses have earthquake insurance is **26.1719%**.

3. Allergies

(a) one