1. Raindrops are falling at an average rate of 20 drops per square inch per minute. What would be a reasonable distribution to use for the number of raindrops hitting a particular region measuring 5 inches2 in t minutes? Why? Using your chosen distribution, compute the probability that the region has no rain drops in a given 3 second time interval. A reasonable choice of distribution is P

   - Considering time = 1 minute
     20 drops fall in 1 inch square.
     Therefore 20 x 5 = 100 drops fall in 5-inch square.

   - For time = 3 seconds
     - x drops = 100 x (3/60) = 5 drops per 3 seconds.

     Here we will use Poisson's Distribution for computing the Probability. Since the Poisson's distribution works well when there is some interval given.
     P = Poisson's Distributed
     X = Is the event of rainfall happening

     $$P(X=0) = (e^{-\mu} * \mu^{x}) / x!$$
     $$= (e^{-5} * 1)/1$$
     $$= 0.0068$$

2. Let X be a random day of the week, coded so that Monday is 1, Tuesday is 2, etc. (so X takes values 1, 2..., 7, with equal probabilities). Let Y be the next day after X (again represented as an integer between 1 and 7). Do X and Y have the same distribution? What is P(X)

X	Y	P(X)	P(Y)
1	2	1/7	1/7
2	3	1/7	1/7
3	4	1/7	1/7
4	5	1/7	1/7
5	6	1/7	1/7
6	7	1/7	1/7
7	1	1/7	1/7

   - X and Y have same probability distribution since all values have equal probability.
   - P(X) = 1/7