**Q.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 inches 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**

**Ans:** Average rate of rainfall is given. So, I will be choosing a Poisson distribution.

Here, t\*lambda = t\*20\*5 = 100t

So, 100 raindrops for a given measure 5square inches.

N.B. 20 has been chosen as it is being mentioned the region has no rain drops in a given 3second time interval. 20 in 1 minute or 60 seconds calculation.

P(X=0) = ((100/20)^0/0!)\*e^-100/20 = e^-5

**Q.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)**

**Ans:**

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

Follow same distribution as X and Y are having similar data distribution or you can say same probabilities

Here, P(X<Y) = 1/7+1/7+1/7+1/7+1/7+1/7 = 6/7