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

**Ans : As we see in above question that we have to find how many no of times raindrop fall at particular region**

**so firstly i have to find in t minutes how many rainfall fall.**

**t\*no of drops\*inches = t \* lambda = t \* 20\* 5 = 100t**

**so we find that there are 100 drops for 5 square inches.**

**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**

1. 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**