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

Answer : [probability distribution](https://www.investopedia.com/terms/p/probabilitydistribution.asp) that is used to show how many times an event is likely to occur over a specified period.*it is a count distribution*

*here independent events that occur at a constant rate within a given interval of time*

20 drops per 5 inches /min = 100 drops

Rate at event occur λ=np= 1

length of time = t= 1/60\*3 =.05 min

no of event =x =1

P(X=1) = e-𝛌𝛌x/x! = e111/1! = e=2.71

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)

Anser: 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