**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 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.

**Solution:**

A reasonable choice of distribution is Poisson with parameter ( t)

**Let random variable X denote** raindrops hitting a particular region

So the average number of raindrops per minute hitting the region is t

=20\*5 that is 100

P(no raindrops in 3/20 of a minute) = 

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**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).

Solution: -

 Let X be a random variable denote day of the week

So x can take value between 1 to 7 where 1 is coded as Monday and 7 is coded as Sunday.

Let Y be the next day after X (again represented as an integer between 1 and 7).

So here x and y both have same distribution

Whenever we have x=7, we can write y=x mod7 so

P(y)=p(x+1) =1/7 