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

**Answer:** We can use Poisson Distribution and from the question we need to find how many number of times raindrop the region. So,

Need to find rain fall in t mins

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

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

= e^-5=6.728\*10^-3(apporx.)

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)

**Answer:** P(X<Y)=6/7

|  |  |  |  |
| --- | --- | --- | --- |
| 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 |