**Statistics Assignment 2**

**Question1:**

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:**

We need to use Poisson Distribution in this question

Firstly, we need to find the amount of rainfall in t minutes

t\*no of drops\*inches = t \* lambda

= t \* 20\* 5

= 100t

Therefore, there are 100 drops for 5 square inches.

20 has been chosen as it is being mentioned that 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 = **6.737947 \* 10-3**

**Question2:**

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:**

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

X and Y follows **same distribution** as they 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