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

Sol)

Probability using the Poisson distribution:

P(X = 0) = e^(-20t)

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)

Sol)

Probability of no raindrops in a 3-second time interval:

Let's assume t = 3 seconds.

P(X = 0) = e^(-20 \* 3)

= e^(-60)

≈ 0.00247875 (rounded to 8 decimal places)