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:**

A reasonable choice of distribution is Poisson(λt), where λ = 20 · 5 = 100 (the average number of raindrops per minute hitting the region). Assuming this distribution,

**P(no raindrops in 1/20 of a minute) =** e-100/20(100/20)0 /0! = e-5

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)

**Answer:**

Do X and Y have the same distribution?

All the values of X & Y have equal probability

P(X) = 1/7

P(X/Y) = (1/7)\*6 = 0.85