

Exercise 29 (13/12/76 ex.1)

3 persons leave a bar and line up at the curb each of them waiting to hire a cab to bring them home.

On the average 2 cabs will pass every minute. It can be assumed that the waiting time from a random point t on the time axis until the first passage is independent of t and independent of how many and when possible previous passages occurred.

Some of the passing cabs will be occupied. It can be assumed that the probability that a cab is vacant is $\frac{1}{3}$ independently of how many and when possible previous passages occurred.

Finally it can be assumed that no vacant cab will pass a waiting customer without stopping.

Question 1

Describe the distribution, mean value, and variance of the random variable defined by

$T \leq t \stackrel{d}{\Leftrightarrow}$ The person of the three to leave first has waited no more than t minutes.

Question 2

What is the probability that the person to leave last has to wait more than 5 minutes.

Question 3

Give the distribution, mean value, and variance of the random variable N defined by

$N = n \stackrel{d}{\Leftrightarrow}$ The person, who is last to leave experiences n occupied taxis passing by before he(she) leaves.