1. Consider a Poisson process with the rate functions given by $\lambda(t) = 1 + \frac{t}{2}$. Calculate the probability of more than three arrivals during the $0.5 < t < 1.2$ interval.

2. Customers are arriving at Gas station A at the rate of 4.2 per hour, and at Gas station B at the rate of 6.5 per hour. Calculate the probability of Gas station A getting its 4^{th} customer earlier than Gas station B.

3. Consider a M/G/∞ queue, where the average arrival rate is 9.2 per hour and the distribution of a service time is uniform between 5 and 10 minutes. Find the probability that, 15 minutes after opening (with no customers waiting - we are starting in State 0), two people are being serviced and one has already left.

4. Consider the Cluster Poisson Process, with the arrival rate equal to 34 'clusters' per hour, and the following distribution for the number of people in each cluster:

#	1	2	3	4	5
Pr	0.38	0.27	0.19	0.12	0.04

   Compute:
   a. The expected value and standard deviation of the number of people (not clusters) arriving during the next 10 minutes.

   b. The probability that more then 15 people will arrive during the next 10 minutes.

5. A Poisson process with an arrival rate of 12.4 per hour is observed for a random time T, whose distribution is gamma(5, 12 minutes). Compute:
   a. The expected value and standard deviation of the total number of arrivals recorded.

   b. The probability that this number will be between 10 and 20 (inclusive).