## CS 333202: Probability and Statistics HW10 Part I

1. Customers arrive at a restaurant at a Poisson rate of 12 per hour. If the restaurant makes a profit only after 30 customers have arrived, what is the expected length of time until the restaurant starts to make profit?
2. A manufacturer produces light bulbs at a Poisson rate of 200 per hour. The probability that a light bulb is defective is 0.015 . During production, the light bulbs are tested one by one, and the defective ones are put in a special can that holds up to a maximum of 25 light bulbs. On average, how long does it take until the can is filled?
3. Howard enters a bank that has n tellers. All the tellers are busy serving customers, and there is exactly one queue being served by all tellers, with one customer ahead of Howard waiting to be served. If the service time of a customer is exponential with parameter $\lambda$, find the distribution of the waiting time for Howard in the queue.
