The following problem was discussed in the class. Please complete it!

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In the head office of a leading commercial bank, there is a single printer for a fairly large number of continually arriving print jobs. The system manager has concluded that print jobs arrive pretty much at random according to Poisson process. He also has resolved that the time spent in printing a document follows an exponential distribution.

By projecting the available data for several months, jobs are estimated to arrive at an average rate of 2 every 30 seconds. The printer takes an average of 12 seconds to print each job.

a) Would the system attain steady-state? Comment properly.

b) What is the probability of the printer to remain idle?

c) If reply of part (a) is positive, figure out the steady-state results using appropriate queuing model.

d) If the average waiting time (in the system), W, is to be reduced by 20%, by how much percent the average service rate should be improved?