- 1. Consider a server with Poisson job-arrival stream at an average rate of 1440 per day (that is, the parameter  $\lambda = 1440/\text{day}$ .
  - **a.** What is the mean time between successive job arrivals?
  - **b.** Determine the probability that the time interval between successive job arrivals is
    - b.1) Longer than 5 minutes
    - b.2) No longer than 8 minutes
    - **b.3)** Between 2 (not included) and 6 (included) minutes

## Solution:

 $\lambda = 1440 / day = 1 / \min$ a.  $1/\lambda = 1/1440 day = 1 \min$  (2 points) b. b. b.1)  $P\{T > 5\} = 1 - P\{T \le 5\} = 1 - F(5) = 1 - (1 - e^{-\lambda t}) = e^{-\lambda t} = e^{-1*5} = e^{-5} = 0.0067$ (2.5 points) b.2)  $P\{T \le 8\} = F(8) = 1 - e^{-\lambda t} = 1 - e^{-1*8} = 1 - e^{-8} = 0.9997$  (2.5 points) b.3)  $P\{2 < T \le 6\} = F(6) - F(2) = P\{T \le 6\} - P\{T \le 2\}$  $= 1 - e^{-\lambda * 6} - (1 - e^{-\lambda * 2}) = e^{-2} - e^{-6} = 0.1329$  (3 points)