1. Consider a server with Poisson job-arrival stream at an average rate of 1440 per day (that is, the parameter $\lambda=1440 /$ 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:

$\lambda=1440 / d a y=1 / \mathrm{min}$
a. $1 / \lambda=1 / 1440$ day $=1 \min (2$ points)
b.
b.1) $P\{T>5\}=1-P\{T \leq 5\}=1-F(5)=1-\left(1-e^{-\lambda t}\right)=e^{-\lambda t}=e^{-1 * 5}=e^{-5}=0.0067$

## (2.5 points)

b.2) $P\{T \leq 8\}=F(8)=1-e^{-\lambda t}=1-e^{-1^{*} 8}=1-e^{-8}=0.9997$ (2.5 points)
b.3)

$$
\begin{aligned}
& P\{2<T \leq 6\}=F(6)-F(2)=P\{T \leq 6\}-P\{T \leq 2\} \quad \text { (3 points) } \\
& =1-e^{-\lambda^{*} 6}-\left(1-e^{-\lambda^{*} 2}\right)=e^{-2}-e^{-6}=0.1329
\end{aligned}
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