Exponential Distribution - Problems for Practice

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1. The mileage which car owners get certain kind of radial tire is a r. v having on exponential distribution with mean 4000 km. Find the probabilities that one of these tires will last (i). at least 2000 km (ii). At most 3000 km

   Ans: $P(X > 2000) = 0.6065$ (ii). $P(X \leq 3000 = 0.5270$

2. The length of time a person speaks over phone follows exponential distribution with mean 6. What is the probability that the person will take for (1) more than 8 minutes (2) between 4 and 8 minutes?

   Ans: Mean $= 6 \Rightarrow \frac{1}{\lambda} = 6$ (or) $\lambda = \frac{1}{6}$,

   1) $P(X > 8) = 0.2636$, (2) $P(4 \leq X \leq 8) = 0.2498$

3. If X is exponentially distributed with parameter λ, find the value of K such that $\frac{P(X>K)}{P(X\leq K)} = a$.

   Ans: $K = \frac{1}{\lambda}\log\left(1 + \frac{1}{a}\right)$

4. The length of the shower on a tropical island during any rainy season has an exponential distribution with parameter 2, time being measured in minutes. What is the probability that a shower will last more than 3 minutes? If a shower has already lasted for 2 min, what is the probability that it will last for at least one more minute?

   Ans: $\lambda = 2, P(X > 3) = 0.0025, P(X \geq 2 + 1/X \geq 2) = P(X \geq 1) = 0.1353$