Dr. Z.'s Intro to Probability Homework assignment 13

1. Let X be an exponential distribution with parameter 3. Find

(a) $P(1 < X < 3)$; (b) $P(X > 4)$; ; (c) E[X] ; (d) Var(X) .

2. Suppose that the number of miles that a car can run before its battery dies is exponentially distributed with an average value of 5000 miles. If Jane desires to take a a 2000-mile trip, what is the probability that she will be able to complete the trip without replacing the battery?

3. The number of years a TV functions is exponentially distributed with mean 5 years. If Smith buys a used TV, what is the probability that it will be working an additional 10 years?

4. The lifetime of a printer costing 200 is exponentially distributed with mean 2 years. The manufacturer agrees to pay a full refund to a buyer if the printer fails during the first year following the purchase, and a one-half refund if it fails the second year.

If the manufacturer sells 100 printers, how much should it expect to pay in refunds?

5. An auto-insurance policy has a deductible of 1 and a maximum claim payment of 5. Auto loss amounts follow an exponential distribution with mean 2.

Calculate the expected claim payment made of an auto loss.

Note: we make the assumption that the **maximal claim** is 5, so the maximal claim-payment is 4. In other words, we interpret it as '(maximum claim) payment' rather than 'maximum (claim payment)'. In other words, we assume that one must always pay the deductible, and the maximum one can claim is 5.

6. A piece of equipment is being insured against early failure. The time from the purchase until failure of the equipment is exponentially distributed with mean 10 years. The insurance will pay an amount of A if the equipment fails during the first year, and it pays $0.5A$ if failure occurs during the second or third year. If failure occurs after the first three years, no payment will be made.

At what level must A be set if the expected payment made under this insurance is to be 1000?