STAT 8003, Homework 2

Group # ... (Replace this)
Members: ... (Replace this)

September 10, 2013

This homework is due Thu., 2013/09/19, 5:30p. Ten for each prolem/subproblem. The total score is 60.

Problem 1. Suppose that X is a discrete random variable with $\mathtt{P}(X = 0) = .25$, $\mathtt{P}(X = 1) = .125$, $\mathtt{P}(X = 2) = .125$, and $\mathtt{P}(X = 3) = .5$. Graph the cdf of X.

Problem 2. A light bulb manufacturer claims his light bulbs will last 500 hours on the average. The lifetime of a light bulb is assumed to follow an exponential distribution.

(a). What is the probability that the light bulb will have to replaced within 500 hours?

(b). What is the probability that the light bulb will last more than 1000 hours?

(c). Suppose a light bulb has already been working for 300 hours. What is the probability that it can work at least 300 hours more?

Problem 3. A pipe smoker carries one box of matches in his left pocket and one box in his right. Initially, each box contains n matches. If he needs a match, the smoker is equally likely to choose either pocket. What is the cdf for the number of matches in the other box when he first discovers that one box is empty?

Problem 4. Suppose there is a continuous random variable X with cdf $F(x)$. Let $Y = F(X)$. What is the distribution of Y?