MATH 333:Probability & Statistics. Exam 2 (Fall 2003)

November 5, 2003 (A) NJIT

Name:	SSN:	Section #

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➔ **Must show all work to receive full credit.**

I pledge my honor that I have abided by the Honor System. _____
(Signature)

Scores

#1	
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Total	

1. An airport limousine can accommodate up to three passengers on any trip. The company will accept a maximum of four reservations for a trip, and a passenger must have a reservation. From previous records, 15% of all those making reservations do not appear for the trip.

   (a) If four reservations are made, what is the probability that an individual with a reservation cannot be accommodated on the trip? (8 pts)

   (b) If four reservations are made, what is the expected number of available places when the limousine departs? Hint: If one person shows up there will be 2 available places, but if 3 or 4 show up there will be no available places. (12 pts)

2. Let X be a random variable with mean 'a' and standard deviation 'b'. Compute: (5 pts each)

   (a) The expected value of X – a

   (b) The variance of X / b.

   (c) The expected value of X^2 [i.e. $E(X^2)$]

3. A shipment of circuit boards arrives in a factory. The factory draws a random sample of 20 circuit boards and accepts the shipment if the number of defective circuit boards in the sample is no more than one. (10 pts each)

   (a)What is the probability of accepting the shipment, if the shipment of circuit boards contains 11% defectives?

   (b)What is the probability of rejecting the shipment, if the shipment of circuit boards contains 20% defectives?

4. Let X be the number of automobile accidents on the whole length of Interstate 95 in one day. Suppose X follows a Poisson distribution with the mean of 4 accidents per day. (7 pts each)

   (a) What is the probability of more than one accident in a day?

   (b) What is the probability distribution of the time interval T between two successive accidents? [i.e. What is the density function f(t)]

   (c) What is the probability that the time interval between two successive accidents is more than one day?

5. The diameter of a component follows a normal distribution with mean of 1 inch and standard deviation of 0.1 inches. A component is considered good if its diameter is between 0.75 and 1.15 inches, otherwise it is defective. (6 pts each)

   (a) What percentage of the components will be good?

   If a component is defective because its diameter is too large, it can be reworked, but if it's too small it must be scrapped.

   (b) What percent of the components can be reworked?

   (c) What percent of the components will be scrap?

   (d) If the acceptable range of the diameter is [1 – b, 1 + b], for what value of b would 95% of all components have an acceptable diameter?