**MA 222A EXAM #2 Mar. 10, 2016**

Name (***PRINT***):\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

I pledge my honor that I have abided by the Stevens Honor System.

signature: ­­­­­­­­­­­­­­­­­­­­­­­­­­­­­­­­­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Closed book, closed notes. Answer all questions.

1. If f(x) = x/2 for 0 ≤ x ≤ 2, what is the probability that a random observation of X will be greater than the average (mean) value of the random variable X?

2. Accidents on a particular machine in a factory are Poisson distributed with an average of 4 accidents per 100 hours of operation.

a) What is the probability of at least one accident in the next 50 hours of production?

b) What is the probability that the time it takes to the first accident is less than 20 hours?

3. Assume that restaurant patrons who make a reservation for dinner have a 0.1 probability of not showing up to honor the reservation, and that this probability is independent of other patron’s decisions. If a restaurant accepts 20 reservations for 18 seats, what is the probability that the restaurant will be overbooked? *(overbooked means that more patrons show up than there are seats)*

4. An insurance policy on an electrical device pays a benefit of $4000 if the device fails during the first year. The amount of the benefit decreases by $1,000 each successive year until it reaches zero. If the device has not failed by the beginning of any given year, the probability of failure during that year is 0.4 . What is the expected payout by the insurance company on this policy?

5. Students in a class are sequentially tested for high blood pressure. Let X represent the number of tests completed until the first student with high blood pressure is found. We are given that the average value of X is 12.5 . Calculate the probability that the sixth student tested is the first one with high blood pressure.