**MA 222B 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. The number of arrivals at a facility has a Poisson probability distribution with average time between arrivals of 20 seconds. What is the probability that there are no arrivals in the next minute?

2. A study is being conducted in which the health of two independent groups of 10 people is being monitored over a one-year period of time. Individual participants in the study drop out with probability 0.2 (independently of the other participants).

What is the probability that at least 9 participants complete the study in one of the two groups , but not in both groups?

3. If X is a random variable with pdf fX(x) = 2x for 0 ≤ x ≤ 1 , what is the probability that a random observation of X will be within **half** of the standard deviation of its mean? (that is, the difference between the observation and the mean will be less than **half** the size of the standard deviation)

4. An experiment consists of repeatedly tossing 3 dice until the faces of all 3 dice are different (no repeated faces). What is the expected value of the number of times you will need to toss the 3 dice to achieve this?

5. 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 its purchase, a one-half refund if it fails during the second year, and no refund for failure after the second year.

Calculate the expected amount of refund to a single buyer.

6. An actuary has discovered that policyholders are three times as likely to file two claims in a year as to file four claims in a year. If the number of claims per year has a Poisson probability distribution, what is the average number of claims filed by a policyholder in one year?