**MA 222 EXAM #2 Mar. 11, 2015**

Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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

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Closed book, closed notes, no electronic access. Answer any 5 questions.

1. A beginner at archery takes ten shots at the target. If the archer has a 60% chance of getting a bulls eye on any one try, what is the probability that it takes him at least four shots to get his first bulls eye?

2. If 40% of marriages end in divorce and we assume that divorces are independent of each other, find the probability that of 8 couples,

a) of the 8 couples, only the Smiths and the Jones will stay married

b) of the 8 couples, two will stay married and six will get divorced

3. A continuous random variable X is uniformly distributed over (0,10). Compute the probability that an observed value of X will be within on standard deviation of its mean.

4. 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?

5. Ten light bulbs are put into operation on Day 1, and if at least nine of them are still operating after 100 days, the plant foreman gets paid $1,000. If fewer than nine are still operating after the 100 days, the foreman gets paid $300. What is the expected value of the foreman’s pay if the lifetime of each bulb is exponentially distributed with average lifetime of 500 days?

6. A die is tossed until a “six” comes up for the third time. What is probability that a “six” comes up for the third time on (exactly) the 13th toss of the die?