**MA 222B EXAM #3 April 7, 2016**

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

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

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

**Closed book, closed notes, no electronic access. Answer all questions.**

**PROBLEM 6 IS OPTIONAL, FOR EXTRA CREDIT**

1. The ideal size for the entering first-year class at a particular college is 150 students. The college knows from past experience that on the average only 30% of the students they accept will actually decide to attend the college. Knowing this, the college Admissions Office decides to send offers of admission to 450 students. Compute the probability that more than 150 accepted students will actually decide to attend the college.

2. In a particular statistics course, the average final grade for the students in the class over the past years has been 82, with a standard deviation of 5. What is the probability that this year’s class (with 36 students in it) will have an average final grade of more than 84?

3. Consider the following joint probability distribution of the random variables X and Y:

P(X=0, Y=0) = 1/6

P(X=1, Y=0) = 1/12

P(X=1, Y=1) = 1/6

P(X=2, Y=0) = 1/12

P(X=2, Y=1) = 1/3

P(X=2, Y=2) = 1/6

Calculate the variance of X.

4. Each day Ms. X plays a series of games in which at each play of the game she wins $1 with probability 18/38 and loses $1 with probability 20/38.

Her strategy for today is: Start playing, and stop playing if she wins the first game. If she loses the first game, she will play one more game and then stop playing.

What is the expected value of her winnings with this strategy?

5. A hat contains 10 pieces of paper, each with a different person’s name on it. Person A randomly selects 3 names out of the hat, after which the 3 names are returned to the hat and then Person B randomly selects 3 names out of the hat. What is the expected number of names that are selected by both Person A and Person B? *Hint: Use auxiliary (indicator) random variables.*

OPTIONAL PROBLEM, FOR EXTRA CREDIT (20 points!) no partial credit on this problem

X is a continuous random variable that is uniformly distributed between 0 and 1, and Y is a continuous random variable that is uniformly distributed between 0 and 3. A single random sample of each random variable is obtained. What is the probability that the X-value is larger than the Y-value?