STAT 515 **MIDTERM EXAM** **OCTOBER 19, 2015**

In problems that require reasoning, algebraic calculation, or the use of your graphing calculator, it is not sufficient just to write the answers. You must explain how you arrived at your answers, show your algebraic calculations.

1. (a) Consider the experiment, called the **birthday problem** , where our task is to determine the probability that in a group of people of a certain size there are a least two people who have the same birthday (the same month and day of month). Suppose there is a room with 35 people in it, find the probability that at least two people have the same birthday.

(b) A fair coin is tossed 9 times. What is the probability that:
i) Exactly 3 heads appear? ____
ii) At least two heads appear? ____

2. Suppose that 2 dice thrown are thrown and the number, N, of dots showing is noted. Then suppose N coins are tossed, what is the expected value of the number of heads?

3. (a) A quiz cosists of 10 multiple-choice questions of equal weight, each with 4 possible answers. For someone who makes random guesses for all of the answers, find the probability of passing if the minimum passing grade is 70 %.

(b) A fair die is rolled 10 times. What is the expected value of the sum of the 10 rolls?

4. The mean number of patients admitted per day to the emergency room of a small hospital is 0.5. If, on any given day, there are only 7 beds available for new patients, what is the probability that the hospital will not have enough beds to accommodate its newly admitted patients?