Stat 4321/5325         September 14, 2005

Exam 1

Name________________________________ UFID_____________________

On my honor, I have neither given nor receive unauthorized aid on this examination.

Signature____________________________________________________

Answer all questions in the space provided. Show enough of your work to make it clear how you arrived at your answer. Incorrect answers without any work will receive no credit. Each question has several parts; make sure that you answer all parts. Some questions may be more difficult for you than others; if you have trouble with a question, you make skip it and return to it later, if you have time. If you need the answer from a previous part of a question to answer a later part of a question, but were unable to answer that previous part, then describe what you would do if you had the answer to the previous part.

You may refer to one page (8 ½ in. by 11 in., both sides) of notes and use calculators.

There are five questions. The points for each part are designated. Please be sure to watch your time.

Do not turn the page or begin the exam until you are told that you may do so.
1. A highway patrolman is charged with monitoring speed on I-70 using radar. Whenever she observes the speed of a car, she may decide to allow the car to continue, stop the car and issue a warning ticket, or stop the car and issue a citation. An experiment is conducted in which a car is selected at random from those in the northbound lane. The action that the patrolman takes is observed.

A. Give the sample space $S$ for this experiment.

B. List all possible events for this experiment.

C. The patrolman decides to stop the car and issue a citation. Which of the event(s) in (B) has (have) occurred?

D. Are the outcomes in the sample space given in (A) equally likely? Justify your response.
2. On a large college campus, 84% of the students report drinking alcohol within the past month, 33% report using some type of tobacco product within the past month, and 86% report using at least one of these two substances during the past month. Using set notation, symbolically represent each of the following *and* determine the proportion of the student body falling into each group.

A. Students who reported both drinking alcohol and using a tobacco product during the past month.

B. Students who abstained from both alcohol and tobacco products during the past month.

C. Students who either consumed alcohol or used a tobacco product during the past month, but not both.
3. Six children, 3 boys and 3 girls, have tickets for a musical. Their seats are together in the 6th row. Their teacher believes they will be quieter if she alternates boys and girls in the seats. How many ways can she seat them so that the boys sit by girls and the girls sit by boys?

4. Six cards are drawn without replacement from a regular deck of 52 cards. Give the probability of each of the following events:

   A. exactly two aces.

   B. at least one ace.
5. According to the Census Bureau, in 2004, 23.6% of children in the United States lived in homes with a female head of household (no husband present), 5.6% lived in homes with a male head of household (no wife present), and the rest lived in married couple homes. The poverty rate for children in female head of household (no husband present) homes was 41.8%; it was 19.2% for children in male head of household (no wife present); and it was 9.0% for children in married-couple homes.

A. What is the probability that a randomly selected child in 2004 lived in poverty?

B. What is the probability that a randomly selected child who lived in poverty lived in a married-couple home?

C. Is whether a child lives in poverty or not independent of whether (s)he lives in a single-parent or married-couple home? Justify your answer.