Math 151, Spring 2011
Jo Hardin
HW #1

Homework due on FRIDAY, JANUARY 21ST AT NOON. [Note: typically the homework will be due in class at the start of class (9:35am, see syllabus for late policy).]

General notes on homework assignments (also see syllabus for policies and suggestions):

1. please be neat and organized, this will help me, the grader, and you (in the future) to follow your work.
2. be sure to include your name on all pages, and staple them together *prior* to class
3. please include at least the number of the problem, or a summary of this question (this will also be helpful to you in the future to prepare for exams).
4. I strongly recommend that you write out the questions as soon as you get the assignment. This will help you to start thinking how to solve them!
5. for R problems, you can either cut and paste physically (scissors and tape) or insert the R graphics into a Microsoft Word document and submit a printout.
6. in case of questions, or if you get stuck please don't hesitate to email me (though I'm much less sympathetic to such questions if I receive emails within 24 hours of the due date for the assignment).

Homework assignments will be graded out of 5 points, which are based on a combination of accuracy and effort. Below are rough guidelines for grading.

Score	Description
5	All problems completed with detailed solutions provided and 75% or more of the problems are fully correct.
4	All problems completed with detailed solutions and 50-75% correct; OR close to all problems completed and 75%-100% correct
3	Close to all problems completed with less than 75% correct
2	More than half but fewer than all problems completed and $> 75\%$ correct
1	More than half but fewer than all problems completed and $< 75\%$ correct; OR less than half of problems completed
0	No work submitted, OR half or less than half of the problems submitted and without any detail/work shown to explain the solutions.

1. DeGroot, section 1.5 (The Definition of Probability) # 3: Consider two events, A and B such that P(A)=1/3 and P(B)=1/2. Determine the value of $P(BA^c)$ under the following conditions: (a) A and B are disjoint, (b)$A \subset B$ (c) $P(AB) = 1/8$.

2. DeGroot, section 1.5 (The Definition of Probability) # 8: If 50 percent of the families in a certain city subscribe to the morning newspaper, 65 percent of the families subscribe to the afternoon newspaper, and 85 percent of the families subscribe to at least one of the two newspapers, what is the probability that a randomly selected person subscribes to both newspapers?

3. DeGroot, section 1.12 (Supplementary Exercises) # 10: Suppose that the events A and B are disjoint. Under what conditions are A^c and B^c disjoint? Explain.

4. In R: For each of normal[0,1] data and uniform[0,1] data (i.e., go through these steps twice):

   (a) generate 10,000 random selections from each distribution.

   (b) Find the mean, median, min, max.

   (c) Plot a histogram of the data.

   (d) Using the relative frequency approach, find the following probabilities: $P(X < 0)$, $P(X < .5)$, $P(X > .83)$, $(PX \geq .83)$.

   (e) Using the graph, numerical values, and the calculated probabilities, give a few sentences interpreting each set of data.

   Hint, here is some R code:

```
> norm.dat <- rnorm(10000,0,1) # generates normal(0,1) data
> summary(norm.dat)
> hist(norm.dat)
> sum(norm.dat < 0) # adds up the values that are less than 0
> sum(norm.dat < 0) / 10000 # relative frequency
> unif.dat <- runif(10000,0,1) # generates uniform(0,1) data
```