Math 151, Spring 2011
Jo Hardin, HW #9

Homework due on THURSDAY, MARCH 24^{th}, START OF CLASS. Note: we won't cover 3.10 or the ideas about the Jacobian from 3.9.

1. DeGroot (3^{rd} or 4^{th} ed.), section 3.9: # 2, 4, 5, 7, 8

2. CAN YOU FORM A TRIANGLE? Let A, B, and C be independent random variables uniform on [0, 1]. What is the probability that three sticks of length A, B, and C can form a triangle?

   (a) In R, simulate the above situation. According to your simulation, how often does there exist a triangle? [As always, if you want help with R, tell me exactly what you want to do, and I'll tell you how to do it in R.] You may want to use the `pmax` function which takes the maximum value element-wise in an array.

   ```
   > vector1 <- c(1, 7, 8, 1, 2)
   > vector2 <- c(1, 4, 1, 2, 3)
   > max(vector1, vector2)
   > [1] 8
   > pmax(vector1, vector2)
   > [1] 1 7 8 2 3
   ```

   (b) Analytically: find the probability that three random U[0,1] sticks will form a triangle. [Hint: the easiest way I found to do this was to start by assuming one of the values (say C) was the biggest one. Then to generalize I realized that any of the values could have been the biggest one. It is much harder to approach this problem using the theory of order statistics.]