Stat 351 Fall 2008
Assignment #6

This assignment is due at the beginning of class on Monday, October 27, 2008. You must submit all problems that are marked with an asterix (*).

As indicated on the course outline, solutions will be graded for both content and clarity of exposition. The solutions that you submit must be neat and orderly. Do not crowd your work or write in multiple columns. Your assignment must be stapled and problem numbers clearly labelled.

1. * Problem #1, page 115. Since the random vector $(X, Y, Z)'$ is continuous and the density $f(x, y, z)$ is symmetric in x, y, and z, we can immediately conclude that $P(X < Y < Z) = 1/6$. (Compare this to Problem 6 on Assignment #2.) However, I would like to you write down an iterated integral to represent

$$P(X < Y < Z) = \iiint_{\{x<y<z\}} f(x, y, z)\, dx\, dy\, dz.$$

(There are $3! = 6$ different integrals that you can choose depending on your order of dx, dy, and dz.) Then compute this integral and verify that you do, in fact, get $1/6$.

2. * Problems #3, #6, #9, #10, #12, #17 pages 115–117, are required.

3. Problems #7, #8, #13, #14, #15, pages 115–117, are optional.

4. * Problems #20, pages 118. The distribution of $V = \max\{X_1, \ldots, X_N\}$ is interpreted to be a conditional distribution in the following sense. Suppose that $N = n$ is fixed. Determine the distribution of $\max\{X_1, \ldots, X_n\}$ which is really the conditional distribution $V|N = n$. You can now find the distribution of V using the law of total probability. (Don't forget to handle the case $N = 0$ separately.) Also, you will find it easier to calculate $E(V)$ by first calculating $E(V|N = n)$.