Math 160

SECOND HOUR EXAM

NAME_____

General Notes:

1. Show work.
2. Look over the test first, and then begin.
3. Calculators are permitted on this exam, but only for basic arithmetic (i.e., no statistical calculations)

Friday, October 28, 2011
100 pts.

I. Some short questions (5 pts. each):

a. What is the IRB and what does it do? (simply saying what the letters mean is not enough for this question.

b. What is a simple random sample (SRS) of size n?

c. What is the difference between a statistic and a parameter?

d. What is the sampling distribution of a statistic?

e. What is the union of two sets?

f. What is a random phenomenon?

g. What is a random variable?

II. Experiments and Samples

1. (25 pts.) Two medications A and B are to be given to groups of experimental subjects. Each group will be given both medications. For medication A (MedA), the amounts of medication will be 0 (placebo), 5, or 10 mg. For medication B (MedB), the amounts of medication will be 0 (placebo) or 10 mg. After each treatment a blood sample will be drawn and the level of a given substance measured.

   a. What are the factors in this experiment?

   b. What are the levels of these factors?

   c. Into how many groups do we need to divide the experimental subjects? That is, how many treatments do we have? (please look at part (d) on the next page before answering this question).

(continued on the following page)

(problem II.1 continued)

d. What are the treatments in this experiment?

e. Draw a brief flowchart diagram (as we have used in the text) of this experiment.

2. (10 pts.) A sample of five students is to be taken from a class of 40 students, numbered 01 - 40. Using table B and starting at line 151 using the methods described in the textbook and in class to find these 5 students (by the numbering scheme).

III. Probability

1. (20 pts.) Consider the following discrete random variable (notice that one of the probabilities is missing). Please remember to show your work.

X	0	1	2	3
Probability	1/8	3/8		1/8

a. Fill in the missing probability. What rule are you using?

b. What is the probability that $X \leq 2$? Give **two** ways of computing this.

c. Calculate (to a number) μ_X for this discrete random variable.

(continued on the following page)

(problem III.1 continued)

d. Calculate (to a number) σ_X^2 (variance) for this discrete random variable.

2. (10 pts.) Suppose that we have two random variables X and Y with $\mu_X = 2, \sigma_X^2 = 1, \mu_Y = 1, \sigma_Y^2 = 0.5$. Suppose that we know further that X and Y are independent (ρ=0). Find the mean and variance of the discrete random variable $3X + Y$.