Math 160 H

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, March 26, 2010
100 pts.

I. Some definitions and short answer questions.

   a. Give brief definitions of the following: (5 pts. each)

      1.   Treatment

      2.   Factor (of a treatment)

      3.   Level (of a treatment)

      4.   Simple Random Sample

5.   Sampling distribution

6.   A biased statistic. How do we reduce bias?

7.   What is the IRB and what is its role?

8. Random phenomenon

9. Probability of a random phenomenon

10. Random variable

b Short answer questions (5 pts. each)

  1. What is the law of large numbers?

  2. What is the difference between a population and a sample?

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

II.   Probability

1.   (5 pts.) A die has been "adjusted" so that instead of the numbers 1, 2, 3, 4, 5, 6 appearing
        with equal probability, 3 and 5 both occur three times as often as a 1. The numbers 1, 2,
        4, and 6 all occur with equal probabilities. What is the probability distribution? That is,
        calculate the probabilities that a 1 appears, or that a 2 appears, etc. What property of
        probability distributions did you use in working this problem?

4.   (5 pts. each) Suppose that a discrete random variable X takes on the values given below
        (and only those values) with probabilities given below: In the following questions, please
        show your work (remembering that you may use your calculator for the basic arithmetic
        operations (+, -, *, /) but that you may not use the statistical functions of your calculator.).
        Remember to show your work.

X	1	2	3	4
Probability	0.25	0.31	0.2	

        a. Fill in the missing probability

(problem 4 continued - see the previous page)

    b. What is the probability that X is less than or equal to 2? $P(X \leq 2)$

    c. Calculate the mean of X, μ_X. Please give your answer as a number.

    d. Calculate the variance of the random variable, σ_X^2. You may give your answer as a calculator-ready expression (using your answer to part (c) above

5.　(5 pts.) A random variable T_c has mean 10 and standard deviation 5. What is the mean and standard deviation of the random variable $(\frac{9}{5})T_c + 32$?

6.　(5 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 130 using the methods described in the textbook and in class to find these 5 students (by the numbering scheme). Your answer should the numbers of the first five randomly selected students.