MATH 1711, SPRING 2000

TEST 3

March 23, 2000

Print your name on this page ONLY!!!

Name: _____

T.A. or Section Number: _____

This test is closed book, closed notes. You may NOT use a graphing or programmable calculator. **READ ALL DIRECTIONS CAREFULLY!**.

There are six problems and one bonus on this test for a total of 106 possible points. Work all of problem one. Then work only four of the remaining five problems (numbers 2-6). Be sure to clearly indicate which problem you do not want graded.

SHOW ALL YOUR WORK TO RECEIVE CREDIT!!! Answers without sufficient supporting work will receive NO CREDIT!

A standard normal table is provided on the last page of this test. In addition, you may need one or more of the following formulas:

$$Z = \frac{X - \mu}{\sigma}$$

$$\mu = np, \quad \sigma = \sqrt{npq}$$

$$Pr(\mu - c \leq X \leq \mu + c) = 1 - \frac{\sigma^2}{c^2}$$

$$m = \frac{N \cdot \sum(xy) - (\sum x)(\sum y)}{N \cdot \sum x^2 - (\sum x)^2}, \quad b = \frac{\sum y - m \cdot \sum x}{N}$$

$$\begin{bmatrix} a & b \\ c & d \end{bmatrix}^{-1} = \frac{1}{ad - bc} \begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$$

WORK ALL OF PROBLEM 1.

1. (20 points) Use the method of matrix (Gaussian) elimination to solve the following system of equations. You should continue the row operations until the matrix cannot be further reduced. ANY OTHER METHOD WILL RECEIVE NO CREDIT!

$$\begin{aligned} x + y - z &= -2 \\ 3x + y + z &= 0 \\ 2x - y + 2z &= 1 \end{aligned}$$

WORK ONLY FOUR OF THE REMAINING FIVE PROBLEMS (NUMBERS 2-6). PLACE A BIG "X" THROUGH THE PROBLEM YOU DO NOT WANT GRADED. IF YOU DO NOT INDICATE WHICH PROBLEM YOU WISH TO OMIT, THEN ONLY THE FIRST FOUR PROBLEMS WILL BE GRADED.

2. (20 points) Suppose that a particular brand of light bulbs are normally distributed with a mean of 800 hours and a standard deviation of 80 hours. Find the probability that a light bulb selected at random will last at least 660 hours.

3. (20 points) Given the matrices $A = \begin{bmatrix} 3 & -2 & 1 \\ 0 & 1 & -4 \end{bmatrix}, B = \begin{bmatrix} -1 & -2 \\ 3 & -1 \\ 0 & -3 \end{bmatrix}$, find AB.

4. (20 points) Graph the feasible set for the following system of inequalities. Label all the endpoints of the feasible set, and be sure to clearly indicate which part of your graph represents the feasible set.

$$x + y \geq 5$$
$$6x + 3y \geq 18$$
$$x \geq 0$$
$$y \geq 0$$

5. (20 points) Find an equation for the best least-squares line to the data points (1,2), (2,5), and (3,11).

6. (20 points) Solve the system of equations below using the method of inverses. (In other words, given the equation $AX = B$, we solve for X by taking $X = A^{-1}B$.) ANY OTHER METHOD WILL RECEIVE NO CREDIT!

$$\begin{aligned} x + 4y &= 14 \\ 3x - 2y &= 0 \end{aligned}$$

BONUS: (6 points) A bag of chocolate bars contains an average of 20 bars, with a standard deviation of 2 bars. How many bags would you expect to contain between 17 and 23 bars?