HOMEWORK 8 - MATH 111
DUE DATE: Friday, November 21
INSTRUCTOR: George Voutsadakis

Read each problem very carefully before starting to solve it. Each question is worth 1 point. It is necessary to show your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

1. Solve the system of equations using the **Gauss-Jordan** method $\begin{cases} y &=& x-1 \\ y &=& 8+z \\ z &=& -3-x \end{cases}$

2. Let $A = \begin{bmatrix} -1 & 3 & -5 \\ 2 & 6 & -1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 \\ 3 & 2 \\ -1 & 7 \end{bmatrix}$. Compute $A \cdot B$ and $B \cdot A$.

3. Let $X = \begin{bmatrix} x & 0 \\ 0 & y \end{bmatrix}$. Solve the matrix equation $X^2 + \begin{bmatrix} -14 & 0 \\ 0 & 4 \end{bmatrix} = -5X$.

4. Compute the inverses of the matrices $A = \begin{bmatrix} 3 & -2 \\ 1 & -1 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & -1 \\ -6 & -3 \end{bmatrix}$.

5. Find the inverse of the matrix $A = \begin{bmatrix} 0 & 1 & 0 \\ 1 & 0 & -1 \\ 2 & 1 & 1 \end{bmatrix}$.

6. Let A, B be sets in a universe U. Suppose that $n(A) = 10, n(B) = 15, n(A \cap B) = 3$ and $n(U) = 35$. Find is $n((A' \cap B)')$?

7. Suppose that A, B and C are sets in a universe U. If $n(A) = 11, n(B) = 17, n(C) = 21, n(A \cap B) = 5, n(A \cap C) = 7, n(B \cap C) = 6, n(A \cap B \cap C) = 2$ and $n(U) = 35$, fill in the number of elements of each region in the appropriate Venn diagram.

8. You are a teacher of a class with 40 students. 17 of your students are doing their homework regularly. 19 of your students are getting SI help regularly and 21 of your students do well in the exams. If 8 of the students are doing homework and getting SI help, 12 of them are doing their homework and doing well in the exams and 13 are getting help and doing well in the exams, whereas only 5 of them are doing homework, getting SI help and doing well in the exams at the same time, how many of your students are not doing homework, nor are they getting SI help nor do they do well in the exams?