EXAM 4 - MATH 111

DATE: Friday, April 8

INSTRUCTOR: George Voutsadakis

Read each problem very carefully before starting to solve it. Each question is worth 3 points. It is necessary to show your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

1. A chemist has some 40% acid solution and some 60% solution. How many liters of each should be used to get 40 liters of a 45% solution? Write down an appropriate linear system and solve by any method.

2. Use the Gauss-Jordan method to solve the linear system

$$\left\{\begin{array}{rcrcrcr} x & + & y & + & z & = & 9 \\ 3x & - & y & + & z & = & -1 \\ -2x & + & 3y & - & z & = & 2 \end{array}\right\}$$

3. Solve the matrix equation $5X - 2B = 7A$, where

$$A = \begin{bmatrix} 2 & -1 \\ -3 & 2 \\ 5 & 7 \end{bmatrix} \quad \text{and} \quad B = \begin{bmatrix} 2 & -3 \\ 7 & -5 \\ -2 & 1 \end{bmatrix}.$$

4. Use matrix algebra to solve the following matrix equation for X. Then use the given matrices to find X. $A = BX + X$, where $A = \begin{bmatrix} 4 & 6 \\ -2 & 2 \end{bmatrix}, B = \begin{bmatrix} -2 & -2 \\ 3 & 3 \end{bmatrix}$.

5. You are given \$144 in one, five and ten dollar bills. There are 35 bills. There are two more ten dollar bills than five dollar bills. How many bills of each type are there?

6. Darw a Venn diagram and use the given information to fill in the number of elements for each region: $n(A) = 54, n(A \cap B) = 22, n(A \cup B) = 85, n(A \cap B \cap C) = 4, n(A \cap C) = 15, n(B \cap C) = 16, n(C) = 44, n(B') = 63$.