

HOMEWORK 8 - MATH 111

DUE DATE: Monday, April 4

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 matrix equation $AX = B$ for X , if

$$A = \begin{bmatrix} 7 & -3 \\ -2 & 1 \end{bmatrix}, B = \begin{bmatrix} 0 & 8 \\ 4 & 1 \end{bmatrix}.$$

2. Use the inverse of the coefficient matrix to solve the system of equations

$$\begin{cases} x + y - 3z = 4 \\ 2x + 4y - 4z = 8 \\ -x + y + 4z = -3 \end{cases}$$

3. Write True or False for each of the following five statements:

$$(a) 2 \in \{1, 2, 3, 4, 5\} \quad (b) \{1, 2\} \in \{1, 2, 3, 4, 5\} \quad (c) \{1, 2\} \subseteq \{\{1, 2, 3\}, 4, 5\}$$

$$(d) \emptyset \in \{1, 2, 3, 4, 5\} \quad (e) \emptyset \subseteq \{\{\emptyset\}\}$$

4. Suppose that $U = \{1, 2, \dots, 9\}$, $X = \{2, 3, 4, 5\}$, $Y = \{3, 5, 7, 9\}$ and $Z = \{2, 4, 5, 7, 9\}$. Find the following sets: $X \cap Y$, $X' \cup Z$, $Y \cup (Z' \cap X)$.
5. Use a Venn diagram for three sets to depict the set $(A \cap B') \cup C$.
6. In 2000, there were 3842 (in thousands) children under the age of 18 living with their grandparents. Of these children, 531 had both parents also living with them, 1732 had only their mother living with them and 220 had only their father living with them. How many children lived with their grandparents only?
7. A survey of a group of military personnel revealed the following information: 20 officers, 27 minorities, 19 women, 5 women officers, 8 minority women, 10 minority officers, 3 women minority officers, 6 Caucasian male enlisted personnel. How many were interviewed? How many were enlisted minority women? How many were male minority officers?
8. Draw a Venn diagram and use the given information to fill in the number of elements for each region: $n(A) = 28$, $n(B) = 34$, $n(C) = 25$, $n(A \cap B) = 14$, $n(B \cap C) = 15$, $n(A \cap C) = 11$, $n(A \cap B \cap C) = 9$, $n(U) = 59$.