

Homework assignment #1

Problem 1. Interpret each equation of the following system as a line in the plane. Graph the lines and determine geometrically the number of solutions.

$$\begin{cases} x_1 + x_2 = 4 \\ x_1 - x_2 = 2 \end{cases}$$

Problem 2. Interpret each equation of the following system as a line in the plane. Graph the lines and determine geometrically the number of solutions.

$$\begin{cases} x_1 + x_2 = 1 \\ x_1 - x_2 = 1 \\ -x_1 + 3x_2 = 3 \end{cases}$$

Problem 3. Solve a system of linear equations

$$\begin{cases} x_1 + 2x_2 - x_3 = 1 \\ 2x_1 - x_2 + x_3 = 3 \\ -x_1 + 2x_2 + 3x_3 = 7 \end{cases}$$

Problem 4. Solve a system of linear equations

$$\begin{cases} 3x_1 + 2x_2 + x_3 = 0 \\ -2x_1 + x_2 - x_3 = 2 \\ 2x_1 - x_2 + 2x_3 = -1 \end{cases}$$

Problem 5. The following matrix is the augmented matrix of a system of linear equations in variables x_1, x_2, x_3, x_4 . Find the solution set to the system.

$$\left(\begin{array}{cccc|c} 1 & 2 & 0 & 1 & 5 \\ 0 & 0 & 1 & 3 & 4 \end{array} \right)$$

Problem 6. Use Gauss-Jordan reduction to solve the following system:

$$\begin{cases} x_1 + 3x_2 + x_3 + x_4 = 3 \\ 2x_1 - 2x_2 + x_3 + 2x_4 = 8 \\ 3x_1 + x_2 + 2x_3 - x_4 = -1 \end{cases}$$

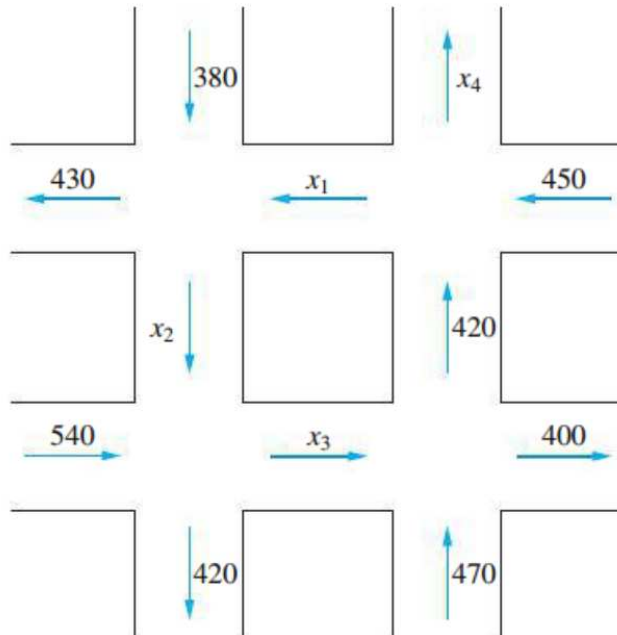
Problem 7. Use Gauss-Jordan reduction to solve the following system:

$$\begin{cases} x_1 + x_2 + x_3 = 0 \\ x_1 - x_2 - x_3 = 0 \end{cases}$$

Problem 8. The following matrix is the augmented matrix of a system of linear equations. For what values of the parameter a will the system have a unique solution?

$$\left(\begin{array}{ccc|c} 1 & 2 & 1 & 1 \\ -1 & 4 & 3 & 2 \\ 2 & -2 & a & 3 \end{array} \right)$$

Problem 9. Determine the values of x_1, x_2, x_3, x_4 for the following traffic flow diagram:



Problem 10. Determine the amount of each current for the following network:

