
Algebra 2 : Exercise Series N°04

Note : The (*) part is left for students.

Exercise 01 :

Consider the following linear system :

$$\begin{cases} x + 2y + z = -6 \\ -2x + y + z = 2 \\ -x - y + 2z = 3 \end{cases}$$

1. Determine the matrix representation of the linear system in the form $AX = B$.
2. Is the matrix A invertible ? If so, calculate its inverse.
3. Deduce the solution of the linear system (using the matrix inverse method).

Exercise 02 :

Consider the following linear system S , where $m \in \mathbb{R}$:

$$S : \begin{cases} x - y + 2z & = 1 \\ mx + my - 2z & = 4 \\ x - mz + 2z & = -1 \end{cases}$$

where $m \in \mathbb{R}$.

1. Write the system S in matrix form $A_m X = b$.
2. For what values of m does the system S have a unique solution ?
3. Solve the system S using Cramer's method for $m = 2$.
4. Solve the system S using the matrix inverse method for $m = 5$. (*)

Exercise 03 : (Home-Work)

1. Consider the system S defined by :

$$\begin{cases} x - 2y + z = 0, \\ 2x + y - z = 3, \\ 3x + y + 2z = 1. \end{cases}$$

- (a) Write the matrix form of the system S .
- (b) Show that the system S has a unique solution.
- (c) Solve S using :
 - i. Cramer's method.
 - ii. The matrix inverse method.