

Q1. Linear System.

Express the system of equations below in matrix form using $\mathbf{x} = \begin{bmatrix} x_0 & x_1 & x_2 \end{bmatrix}$:

$$2x_0 + 3x_1 - x_2 = 5$$

$$4x_0 - x_1 + 2x_2 = 6$$

$$-x_0 + 5x_1 + 3x_2 = 4$$

Then, explain how you would solve this system.

Q2. Solvability.

Describe the solvability of the following system of equations and the reason why they can or cannot be solved. Express each system in matrix form.

(a)

$$\begin{aligned}x_0 + 2x_1 - x_2 &= 3 \\ 2x_0 + 4x_1 - 3x_2 &= 9\end{aligned}$$

(b)

$$\begin{aligned}x_0 + 2x_1 &= 4 \\ 2x_0 + 4x_1 &= 8 \\ 3x_0 + 6x_1 &= 12\end{aligned}$$

(c)

$$\begin{aligned}x_0 + 2x_1 &= 4 \\ -x_0 + x_1 &= 2 \\ 5x_0 - x_1 &= 6\end{aligned}$$