

Assignment 1

You have to list the following questions with paper and pen (**Use A4 or any good quality page**). Then, finally, convert it into PDF and submit it within the stipulated time.

Hardcopy submission is necessary; however, you do not have to submit it occasionally. Instead, reserve your copies, and I will post the date in the classroom before Mid exam for hardcopy submission.

Best of Luck

N.B. Word files are not acceptable.

Questions

1. Solve the following system of linear equations by Cramer's Rule. (**Show all the step-by-step calculation**)

$$\begin{aligned}-2x_1 + 3x_3 &= 13 \\ x_2 - 3x_4 &= 0 \\ 2x_1 + 3x_2 - 2x_3 &= 0 \\ -3x_3 + 2x_4 &= -15\end{aligned}$$

2. Solve the following system of linear equations by Gauss Elimination Method:

$$\begin{aligned}5x - 2y + z &= 4 \\ 7x + y - 5z &= 8 \\ 3x + 7y + 4z &= 10\end{aligned}$$

$$\text{Answer: } x = \frac{122}{109}, y = \frac{284}{327}, z = \frac{46}{327}$$

3. Solve the following system of linear equations by Gauss Elimination Method:

$$x + \frac{1}{2}y + \frac{1}{3}z = 1$$

$$\frac{1}{2}x + \frac{1}{3}y + \frac{1}{4}z = 0$$

$$\frac{1}{3}x + \frac{1}{4}y + \frac{1}{5}z = 0$$

Answer: $x = 9, y = -36, z = 30$

4. Solve the following system of linear equations by the Gauss-Jordan Method:

$$2x + y + z = 10$$

$$3x + 2y + 3z = 18$$

$$x + 4y + 9z = 16$$

Answer: $x = 7, y = -9, z = 5$.

5. Solve the following system of linear equations by the Gauss-Jordan Method:

$$x + y + 2z = 4$$

$$3x + y - 3z = -4$$

$$2x - 3y - 5z = -5$$

Answer: $x = 1, y = -1, z = 2$.

6. Solve the following system of linear equations by the Gauss-Jordan Method:

$$x + 2y - 3z = 0$$

$$2x + 5y + 2z = 0$$

$$3x - y - 4z = 0$$

Answer: $x = 0, y = 0, z = 0$.

7. Solve the following system of linear equations by the Gauss-Jordan Elimination Method:

$$\begin{aligned}x + 2y + 3z - 2s &= 6 \\2x - y - 2z - 3s &= 8 \\3x + 2y - z + 2s &= 4 \\2x - 3y + 2z + s &= -8\end{aligned}$$

Answer: $x=1, y = 2, z = -1, s = -2$.

8. Solve the following system of linear equations by using the **Gauss elimination with partial pivoting technique**:

$$\begin{aligned}2x_1 + 3x_2 + 4x_3 &= -8 \\3x_1 + 4x_2 + 5x_3 &= 6 \\4x_1 + 5x_2 - 6x_3 &= 7\end{aligned}$$

Answer: $x_1 = \frac{613}{12} \quad x_2 = \frac{-229}{6} \quad x_3 = \frac{13}{12}$

9. Solve the following system of linear equations by using the **Gauss elimination with partial pivoting technique**:

$$\begin{aligned}2x_1 + 2x_2 + x_3 &= 6 \\4x_1 + 2x_2 + 3x_3 &= 4 \\x_1 - x_2 + x_3 &= 0\end{aligned}$$

Answer: $x_1 = 9 \quad x_2 = -1 \quad x_3 = -10$