Name: MAT 281E
Number: **Homework 1** October 9, 2019

- **Prepare a report for this homework in PDF format using Word or Latex. The handwritten parts of the solutions must be present on white paper legibly and put in the appropriate places in the report after scanned clearly.**
- **Only one page should be used for each answer.**
- **Write your name and number at the top of the each page.**
- **No late submissions will be accepted.**
- **In Case of Cheating and Plagiarism Strong disciplinary action will be taken.**
- **For any questions about the homework, contact Rusen Halepmollasi directly (office no: 1207) or via mail (halepmollasi@itu.edu.tr).**

Submissions: Please submit your report through Ninova e-Learning System. Another way of submission will not be accepted.

1. (40 pts.)For each of the following express the linear system in matrix form.

   i)
   $x + y + 3z = 8$
   $-x + 2y + 3z = 1$
   $3x - 7y + 4z = 10$

   ii)
   $2x + 2y + 2z = 0$
   $-2x + 5y + 2z = 1$
   $8x + y + 4z = -1$

   a) Solve the linear system (if any) by Gaussian Elimination
   b) Solve the linear system (if any) by Gauss-Jordan Elimination

2. (30 pts.) If

$$M = \begin{bmatrix} 2 & -1 \\ 3 & 6 \\ -2 & 5 \end{bmatrix} \qquad \text{and} \qquad N = \begin{bmatrix} 1 & 7 \\ 3 & -6 \end{bmatrix}$$

verify that

a) $3(MN) = (3M)N = M(3N)$

b) $(MN)^T = N^T M^T$

3. (30 pts.) Let $A^3 - 5A^2 + 7A = 0$

   Write down a formula for A^{-1} in terms of A and I.