1 Assignment 2 - Solving Sets of Equations

1. Solve the following linear system by using *Gauss-Jordan Method*;

$$x_1 + 2x_2 + x_3 + 4x_4 = 13$$
$$2x_1 + 4x_3 + 3x_4 = 28$$
$$4x_1 + 2x_2 + 2x_3 + x_4 = 20$$
$$-3x_1 + x_2 + 3x_3 + 2x_4 = 6$$

   Hint: Modify the MATLAB code for *Upper Triangularization Followed by Back Substitution.*

2. Modify the MATLAB code for $PA = LU$*:Factorization with Pivoting* so that L, U and P are output, then by using solve the following linear system;

$$x_1 + 2x_2 + 4x_3 + x_4 = 21$$
$$2x_1 + 8x_2 + 6x_3 + 4x_4 = 52$$
$$3x_1 + 10x_2 + 8x_3 + 8x_4 = 79$$
$$4x_1 + 12x_2 + 10x_3 + 6x_4 = 82$$

   Hints: You can check your results by using MATLAB as;

   ```
   >>[L,U,P]=lu(A)
   >>inv(P)*L*U
   ```

3. Solve the following linear system by using *Gauss-Seidel Iteration*;

$$4x - y + z = 7$$
$$4x - 8y + z = -21$$
$$-2x + y + 5z = 15$$

   - Start by $P_0 = (1, 2, 2)$.
   - Tabulate the iteration. Compare with the *Jacobi Iteration.*

   Hint: Modify the MATLAB code for *Jacobi Iteration.*