1. Write a Matlab script/function to solve a linear system of equations. You may use the main body of the script as the following:

```
n=5;                                        % size of the matrix

A=spdiags([-ones(n,1) 4*ones(n,1) -ones(n,1)], [-1 0 1],n,n); % sparse matrix
full(A)

b=1:1:n;                                    % right hand side of the system

x=A\b'                                      % solving the system
```

   Try LU decomposition `lu`, QR decomposition `qr` for the same system.

2. Write a script/function to plot a 2D surface. Repeat the example replacing mesh by surf and then by surfl.

```
clear all;
[X,Y] = meshgrid(-2:.1:2,-2:.2:2);
g = -X.*Y.*exp(-2*(X.^2+Y.^2));

figure (1)
mesh(X,Y,g), xlabel('x'), ylabel('y'), grid
figure (2), contour(X,Y,g)
xlabel('x'), ylabel('y'), grid
```

3. Plot the following two functions:
$$f(x) = \frac{x^2}{x+1}, \quad \text{in } [0,3],$$
   and
$$f(x,y) = xy(x+y), \quad \text{in } [-1,1] \times [-1,1].$$
   Plot them side-by-side in a subplot.

4. Write a MATLAB program to draw the following function:
$$f(x,y) = x^3 \sin(y^2 - \pi/6).$$

   Show the origin in your mesh drawing. You may use `plot3(`x_0, y_0, z_0`)` to draw a point (x_0, y_0, z_0) in 3D co-ordinate.