1. Consider the following matrices.

\[ A = \begin{pmatrix} -1 \\ 3 \end{pmatrix} \quad B = \begin{pmatrix} 4 & 2 \\ -3 & 1 \end{pmatrix} \quad C = \begin{pmatrix} 5 & 10 \\ 11 & -3 \end{pmatrix} \quad D = \begin{pmatrix} -6 & 2 \\ 3 & 1 \\ -2 & -7 \end{pmatrix}, \]

compute the following expressions in Matlab (the \( T \) superscript denotes matrix transpose).

(a) \(-2C\)
(b) \(5B - 2C\)
(c) \(CA\)
(d) \(A^T D^T\)
(e) \(BC\)
(f) \(CB\)
(g) \(CB^T\)

2. For the following systems of equations, formulate each as a linear system in Matlab and solve using matrix inverse (provide both your Matlab code and your solution to the system of equations).

(a) \[5x + 7y = 10 \quad 3x + 6y = -3\]

(b) \[3x + 5y + 6z = 7 \quad x + 3y - 2z = 5 \quad -4x - 6y + 3z = 5\]

(c) \[-2x + 6z = 8 \quad 2y + 4z = 6 \quad 3x + 6y - 2z = -4\]

(d) \[0 = -x + 3z - 4 \quad 3 = y + 2z \quad 3x - 2z = -6y - 4\]
3. For the four systems of equations from question 2, visualize each system by plotting the corresponding lines (for two-dimensional systems) and planes (for three-dimensional systems) in the system. Additionally, plot the solution to confirm that the system intersects at that point.

Use the provided functions in cs11lib as follows (load the auxiliary functions with the matlab command `addpath('cs11lib/')):

- **plot2Dline**: given an equation in the form $ax + by = c$, plot the corresponding line by calling `plot2Dline(a, b, c)`.
- **plot2Dpoint**: given a point with coordinates $(x, y)$, plot the point by calling `plot2Dpoint(x, y)`.
- **plot3Dplane**: given an equation in the form $ax + by + cz = d$, plot the corresponding plane by calling `plot3Dplane(a, b, c, d)`.
- **plot3Dpoint**: given a point with coordinates $(x, y, z)$, plot the point by calling `plot3Dpoint(x, y, z)`.

By default, Matlab clears the screen each time you plot a new feature. To plot several features on the same figure (multiple lines and a point or multiple planes and a point), you should use the following code snippet: `figure; hold on;`. For example, your solution to part (a) might look something like:

```matlab
figure; hold on;
plot2Dline(...);
plot2Dline(...);
plot2Dline(...);
plot2Dpoint(...);
```