5501 math Matlab assignment

Solving a system of nonlinear equations

I.   Given the following system

$$x_1{}^2 - x_2{}^2 + 2x_2 = 0$$
$$2x_1 + x_2{}^2 - 6 = 0$$

1. Graph the system using Matlab
2. Solve using newton method with accuracy 1×10^{-6}
3. Solve using quasi-Newton method with accuracy 1×10^{-6}
4. Compare accuracy of part 2, 3 after 100 iterations?
5. What happens in the methods when we start with (-10,-6) as initial approximation?
6. Solve system using steepest descent method.

II.

The nonlinear system

$$4x_1 - x_2 + x_3 = x_1 x_4,$$
$$-x_1 + 3x_2 - 2x_3 = x_2 x_4,$$
$$x_1 - 2x_2 + 3x_3 = x_3 x_4,$$
$$x_1^2 + x_2^2 + x_3^2 = 1$$

has six solutions.

1- Find solutions using Newton with accuracy 1×10^{-6}
2- Find solutions using quasi-Newton method with accuracy 1×10^{-6}