Problem 1

Convert the differential equation

$$y'' + 5y' + 6y = 0$$

into a system of first order differential equations. Solve this system and compare your solution with the one found using the characteristic polynomial (page 250 of your book).

Problem 2

Convert the following into a system of linear equations (you don't need to solve the system):

$$y''' + 3y'' + 2y' + y = e^x$$

Problem 3

Convert the following into a system of linear equations (you don't need to solve the system):

$$y_1'' + 3y_1' + y_2 = 0$$

$$y_2'' + 4y_2' + y_1' + y_2 = 0$$