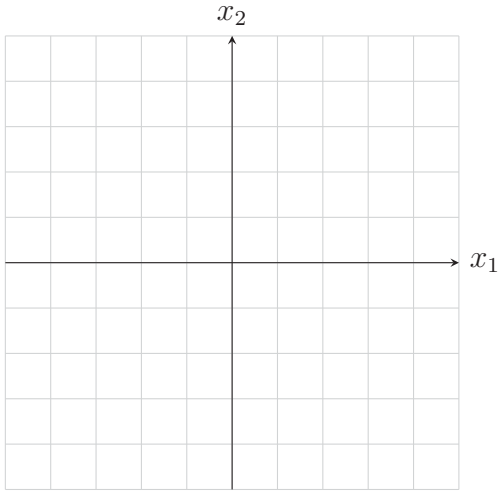
Math 256 GWS 11 - 5.2 Eigenvalues for Homogeneous Systems

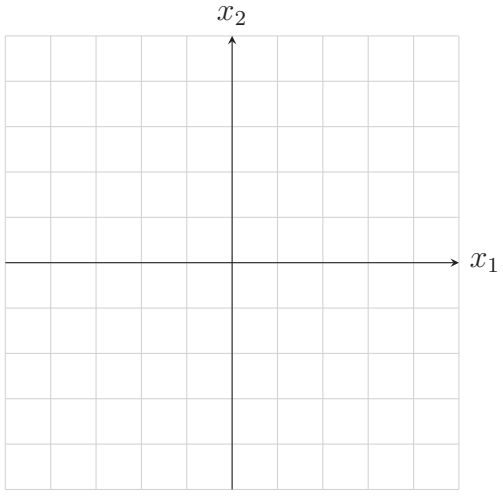
Name:_____

1. Apply the eigenvalue method to find a general solution of the given systems. If initial condions are given, find the cooresponding solution. Draw a direction field and typical solution curves for each.

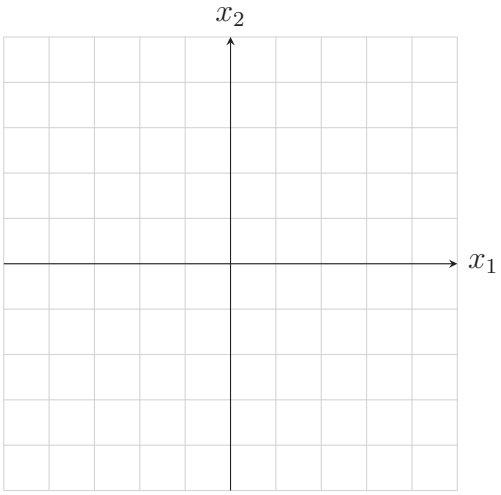
   a. $x_1' = x_1 + 2x_2$, $x_2' = 2x_1 + x_2$



b. $x_1' = x_1 - 5x_2$, $x_2' = x_1 - x_2$



c. $x_1' = x_1 - 2x_2$, $x_2' = 2x_1 + x_2$, $x_1(0) = 0$, $x_2(0) = 4$



2. The eigenvalues of the coefficient matrix can be found by inspection and factoring for the following system. Apply the eigenvalue method to find a general solution to the system $x_1' = x_1 + 2x_2 + 2x_3$, $x_2' = 2x_1 + 7x_2 + x_3$, $x_3' = 2x_1 + x_2 + 7x_3$.