MAT2705-04/05 22S Quiz 10 Print Name (Last, First) _____|__
Show all work, including mental steps, in a clearly organized way that speaks for itself. Use proper mathematical notation, identifying expressions by their proper symbols (introducing them if necessary), and use EQUAL SIGNS and arrows when appropriate. Always SIMPLIFY expressions. BOX final short answers. LABEL parts of problem. Keep answers EXACT (**but give decimal approximations for interpretation**). Indicate where technology is used and what type (Maple, GC). **Use Maple for the matrix products.**

1. a) For the DE system $x_1' = -3\,x_1 + 4\,x_2, x_2' = -4\,x_1 - 3\,x_2$, write it in matrix form $x' = A\,x$ and identify the coefficient matrix A.
b) Show all the steps in the diagonalization process for this matrix, ordering the complex eigenvalues with the positive imaginary part eigenvector first and scaling the eigenvectors by a positive number to get integer components ***if necessary,*** ending with evaluating the matrix product which diagonalizes the matrix, showing the 2x2 successive multiplications.

2. For the matrix $A = \begin{bmatrix} -4 & 3 & -1 \\ -2 & 1 & -1 \\ 0 & 0 & -2 \end{bmatrix}$, a) show all the steps in the diagonalization process, scaling up by positive numbers if necessary to get integer entries, ending with evaluating the matrix product which diagonalizes the matrix (use Maple for that multiplication)

▶ solution