Math 221-05 Quiz 8

Name:_____ Score:_____

Instructions: You must show supporting work to receive full and partial credits. No text book, notes, formula sheets allowed.

1(3pts) Two solutions to a homogeneous system are given as $\vec{x}_1(t) = \begin{pmatrix} 2 \\ 1 \end{pmatrix} e^{-t}$, $\vec{x}_2(t) = \begin{pmatrix} 1 \\ -1 \end{pmatrix} e^{2t}$. Find the solution $\vec{x}(t)$ satisfying the initial condition $\vec{x}(0) = \begin{pmatrix} 2 \\ 4 \end{pmatrix}$.

2(7pts) For the system of linear differential equation $\vec{x}' = \begin{bmatrix} 5 & -4 \\ 8 & -7 \end{bmatrix} \vec{x}$.

(a) Find the eigenvalues of the system.

(b) Pick **one** eigenvalue and find an eigenvector for the chosen eigenvalue.

(c) Find the corresponding eigensolution $\vec{x}_1(t)$ to the eigenvalue you have chosen.

END