Box #____ (Name on Back)
Math 65 Section ___
Homework 5
11/13/18

F1: Compute (a) the characteristic polynomial of A, (b) the eigenvalues of A, (c) a basis for each eigenspace of A, and (d) the algebraic and geometric multiplicity of each eigenvalue.

$$A = \begin{bmatrix} 4 & 0 & 1 \\ -2 & 1 & 0 \\ -2 & 0 & 1 \end{bmatrix}$$

F2: Compute (a) the characteristic polynomial of A, (b) the eigenvalues of A, (c) a basis for each eigenspace of A, and (d) the algebraic and geometric multiplicity of each eigenvalue.

$$A = \begin{bmatrix} 1 & -9 \\ 1 & -5 \end{bmatrix}$$

Box #____

F3: Compute (a) the characteristic polynomial of A, (b) the eigenvalues of A, (c) a basis for each eigenspace of A, and (d) the algebraic and geometric multiplicity of each eigenvalue.

$$A = \begin{bmatrix} 1 & 1 & -1 \\ 0 & 2 & 0 \\ -1 & 1 & 1 \end{bmatrix}$$

F4: Consider the linear system of differential equations for $\vec{x}(t) \in \mathbb{R}^2$,

$$\vec{x}\,' = \begin{bmatrix} 2 & 1 \\ -3 & 6 \end{bmatrix} \vec{x}.$$

(a) Find the general solution for the linear system. Express your answer in the form $\vec{x}(t) = \Psi(t)\vec{c}$ where $\Psi(t)$ is a fundamental matrix and $\vec{c}$ is a vector of constants.

(b) Solve the initial value problem for this system when $\vec{x}(0) = \begin{bmatrix} 0 \\ 2 \end{bmatrix}$.

Box #____

F5: Consider the linear system of differential equations for $\vec{x}(t) \in \mathbb{R}^3$,

$$\vec{x}\,' = \begin{bmatrix} 2 & 2 & 1 \\ 1 & 3 & 1 \\ 1 & 2 & 2 \end{bmatrix} \vec{x}.$$

(a) Find the general solution for the linear system. Express your answer in the form $\vec{x}(t) = \Psi(t)\vec{c}$ where $\Psi(t)$ is a fundamental matrix and $\vec{c}$ is a vector of constants.

(b) Solve the initial value problem for this system when $\vec{x}(0) = \begin{bmatrix} 1 \\ 2 \\ -1 \end{bmatrix}$.