Differential Equations **Homework 13** **Name:**
MWF 10-10:50 or MWF 11-11:50

Show your work! Answers without supporting work will not be given credit. Print this assignment and write your work in the spaces provided.

1. Solve $\vec{x}' = \begin{bmatrix} 5 & -1 \\ 3 & 1 \end{bmatrix} \vec{x}$

   $\vec{x}(0) = \begin{bmatrix} 2 \\ -1 \end{bmatrix}$

2. Solve $\vec{x}' = \begin{bmatrix} 3 & 2 & 4 \\ 2 & 0 & 2 \\ 4 & 2 & 3 \end{bmatrix} \vec{x}$.

3. Solve $\vec{x}' = \begin{bmatrix} -\frac{3}{2} & 1 \\ -\frac{1}{4} & -\frac{1}{2} \end{bmatrix} \vec{x}$.

4. Solve $\vec{x}' = \begin{bmatrix} 1 & 1 & 1 \\ 2 & 1 & -1 \\ 0 & -1 & 1 \end{bmatrix} \vec{x}$.

5. Solve $\vec{x}' = \begin{bmatrix} 2 & \frac{3}{2} \\ -\frac{3}{2} & -1 \end{bmatrix} \vec{x}$

$\vec{x}(0) = \begin{bmatrix} 3 \\ -2 \end{bmatrix}$.

6. Solve

$$\begin{cases} x_1' = -3x_1 + 2x_2 \\ x_2' = -x_1 - x_2 \end{cases} \qquad \vec{x}(0) = \begin{bmatrix} 1 \\ -2 \end{bmatrix}.$$

7. Solve

$$\vec{x}' = \begin{bmatrix} 2 & -5 \\ 1 & -2 \end{bmatrix} \vec{x}.$$