

## Homework 3

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**Last name:** \_\_\_\_\_

**First name:** \_\_\_\_\_

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*Due in class on Friday April 21st.*

1. Find the general solution to the system

$$X' = \begin{pmatrix} 4 & -3 \\ 3 & 4 \end{pmatrix} X.$$

2. Find the solution to the initial value problem

$$X' = \begin{pmatrix} -2 & 1 \\ -1 & -4 \end{pmatrix} X, \quad X(0) = \begin{pmatrix} 1 \\ 2 \end{pmatrix}.$$

3. Find the general solution to

$$X' = \begin{pmatrix} 9 & 4 & 0 \\ -6 & -1 & 0 \\ 6 & 4 & 3 \end{pmatrix} X.$$

4. Find the solution to the initial value problem

$$X' = \begin{pmatrix} 1 & 0 & 0 \\ 2 & 1 & 0 \\ 1 & 1 & 2 \end{pmatrix} X, \quad X(0) = \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix}.$$

5. Find a particular solution to the system

$$X' = \begin{pmatrix} 3 & 2 \\ 7 & 5 \end{pmatrix} X + \begin{pmatrix} 3 \\ 2t \end{pmatrix}.$$

6. Find the general solution to

$$X' = \begin{pmatrix} 4 & 2 \\ -1 & 2 \end{pmatrix} X + \begin{pmatrix} 5 \\ e^{3t} \end{pmatrix}$$