MA 331 **Name (Print):** _____
Fall 2017
Homework 7: Systems of DEs
Due: 10/26/17

1.) Find the general solution to the system of equations

a)

$$x_1'(t) = 3x_1 - 2x_2$$
$$x_2'(t) = 2x_1 - 2x_2$$

b)

$$x_1'(t) = 3x_1 - 2x_2$$
$$x_2'(t) = 4x_1 - 1x_2$$

c)

$$x_1'(t) = 3x_1 - 4x_2$$
$$x_2'(t) = x_1 - 1x_2$$

d)

$$x_1'(t) = x_1 + 2x_2$$
$$x_2'(t) = -5x_1 - 1x_2$$

2.) Solve the initial value problems

a) $\vec{x}' = \begin{pmatrix} -2 & 1 \\ -5 & 4 \end{pmatrix} \vec{x}, \qquad \vec{x_0} = \begin{pmatrix} 1 \\ -3 \end{pmatrix}$

b) $\vec{x}' = \begin{pmatrix} 1 & -5 \\ 1 & -3 \end{pmatrix} \vec{x}, \qquad \vec{x_0} = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$

c) $\vec{x}' = \begin{pmatrix} 2 & \frac{3}{2} \\ -\frac{3}{2} & -1 \end{pmatrix} \vec{x}, \qquad \vec{x_0} = \begin{pmatrix} 3 \\ -2 \end{pmatrix}$

d) $\vec{x}' = \begin{pmatrix} 3 & 9 \\ -1 & -3 \end{pmatrix} \vec{x}, \qquad \vec{x_0} = \begin{pmatrix} 2 \\ 4 \end{pmatrix}$