MTH 211 Practice Test #5
Summer 2009

Introduction to Ordinary Differential Equations

Name _____

1. a) Show that $\begin{cases} y_1(t) = 3t - 2 \\ y_2(t) = -2t + 3 \end{cases}$ is a particular solution of the nonhomogeneous system

$$\begin{cases} y_1'(t) = y_1 + 2y_2 + (t-1) \\ y_2'(t) = 3y_1 + 2y_2 - (5t + 2) \end{cases}$$

b) What is the general solution to this system?

2. Solve the IVP $\begin{cases} y_1'(t) = -3y_1 + 4y_2 \\ y_2'(t) = -2y_1 + 3y_2 \end{cases}$; $\vec{y}(\vec{0}) = \begin{pmatrix} 0 \\ 1 \end{pmatrix}$

3. Solve the system of linear differential equations $\begin{cases} y_1'(t) = y_1 + y_2 \\ y_2'(t) = -y_1 + y_2 \end{cases}$

4. Solve the IVP $\begin{cases} y_1'(t) = y_2 \\ y_2'(t) = y_1 \end{cases}$; $y_1(0) = 1,\ y_2(1) = 0$

5. Given $X(t) = \begin{pmatrix} e^{-2t} & 2e^{5t} \\ -3e^{-2t} & e^{5t} \end{pmatrix}$, find $X^{-1}(t)$.