

Ma 227

Exam IB

2/28/05

Print Name: \_\_\_\_\_

Lecture Section: \_\_\_\_\_ Recitation Section: \_\_\_\_\_

I pledge my honor that I have abided by the Stevens Honor System.

\_\_\_\_\_  
**You may not use a calculator, cell phone, or computer while taking this exam. All work must be shown to obtain full credit. Credit will not be given for work not reasonably supported. When you finish, be sure to sign the pledge.**

Score on Problem #1 \_\_\_\_\_

#2 \_\_\_\_\_

#3 \_\_\_\_\_

Total Score \_\_\_\_\_

Print Name: \_\_\_\_\_

**1 [20 pts.]** Let

$$A = \begin{bmatrix} 1 & 2 \\ 5 & 7 \end{bmatrix}$$

Find  $A^{-1}$ . Be sure to show all the steps in your calculation and indicate what you are doing in each step.

Print Name: \_\_\_\_\_

2 Let

$$A = \begin{bmatrix} 3 & 1 \\ 1 & 3 \end{bmatrix}$$

**2a [20 pts.]** Find all eigenvalues and eigenvectors of the matrix  $A$ .

Print Name: \_\_\_\_\_

**2b [20 pts.]** Find a general solution of the homogeneous system

$$\frac{dx_1}{dt} = 3x_1 + x_2$$

$$\frac{dx_2}{dt} = x_1 + 3x_2$$

**2c [20 pts.]** Find a general solution of

$$\frac{dx_1}{dt} = 3x_1 + x_2 + 8t - 1$$

$$\frac{dx_2}{dt} = x_1 + 3x_2 - 1$$

Print Name: \_\_\_\_\_

3 [20 pts.] Find all solutions, if they exist, of

$$x_1 - 3x_2 + 4x_3 + 4x_4 = 1$$

$$2x_1 - 5x_2 + 6x_3 + 6x_4 = 1$$

$$3x_1 - 7x_2 + 9x_3 + 8x_4 = 3$$