

Ma 227

Exam IA

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 _____

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1 [20 pts.] Let

$$A = \begin{bmatrix} 1 & 3 \\ 5 & 7 \end{bmatrix}$$

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

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2 Let

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

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

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

$$\frac{dx_1}{dt} = 2x_1 + x_2$$

$$\frac{dx_2}{dt} = x_1 + 2x_2$$

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

$$\frac{dx_1}{dt} = 2x_1 + x_2 + e^{-t}$$

$$\frac{dx_2}{dt} = x_1 + 2x_2 - e^{-t}$$

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

$$x_1 + 2x_2 + x_3 + 3x_4 = 4$$

$$3x_1 + 6x_2 + 5x_3 + 10x_4 = 0$$

$$5x_1 + 10x_2 + 7x_3 + 17x_4 = 23$$