

Name: _____

This quiz covers: Chapter 7.1-7.8 (except 7.7 directly). **DUE: 10:25 in my office or MAC 126.**

Directions: Complete all questions and **show all applicable work.** Partial credit will be given. You may use a calculator and one sheet of paper with handwritten notes. Please do not discuss with other people (except the professor) or use the Internet.

For the following problems, assume:

$$A = \begin{bmatrix} 2 & 6 \\ -1 & 3 \end{bmatrix}, \quad B = \begin{bmatrix} 3 & 5 \\ 1 & -5 \\ -3 & 4 \end{bmatrix},$$

- 1.) Find the transpose of A .
- 2.) Find the transpose of B .
- 3.) Compute $A + B$ (if possible).
- 4.) Compute AB (if possible).
- 5.) Compute BA (if possible).
- 6.) Compute the determinant of A .
- 7.) Find the inverse of A .
- 8.) Write the following system of differential equations into matrix form:

$$x_1' = 3x_1 - 4x_2$$

$$x_2' = -2x_1 + 2x_2$$

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9.) Do the following two solutions form a fundamental solution set to a two-variable system of differential equations? Justify your response.

$$\mathbf{x}^{(1)} = \begin{bmatrix} 6 \\ 2 \end{bmatrix} 2e^{-2t}$$

$$\mathbf{x}^{(2)} = \begin{bmatrix} -3 \\ -1 \end{bmatrix} 2e^{-2t}$$

10.) Find the solution to the differential equation and initial condition (to save time, do not check the Wronskian):

$$\mathbf{x}' = \begin{bmatrix} -2 & 1 \\ -5 & 4 \end{bmatrix} \mathbf{x}, \quad \text{where } \mathbf{x}(0) = \begin{bmatrix} 0 \\ 4 \end{bmatrix}.$$

11.) Find the general solution to the differential equation:

$$\mathbf{x}' = \begin{bmatrix} 4 & -2 \\ 8 & -4 \end{bmatrix} \mathbf{x}$$