

Name: _____
(Please Print)

Alpha No: _____

TEST I – Take-Home Portion
MATH 2201 A
Due: Wednesday, September 14, 2011

Instructions:

1. There are four (4) questions with point values indicated in parentheses. There is a total of 50 points on the take-home portion. The in-class portion has a total of 50 points.
2. Do your own work. Do **NOT** collaborate with others.
3. You may consult your textbook, your notes, and me. **You may NOT seek help from other people, regardless of whether they are in the class or not.** (I can tell when a student gets assistance with a problem!!!)
4. You must show **all work** to receive full credit.
5. Explain your answers with sufficient detail to enable your reasoning to be clearly followed.
6. Unless otherwise indicated, you may **only use** your calculator to **CHECK** your work.
7. Place each problem on a separate sheet of paper. Put them in order by problem number.
8. Remember to write your mathematics correctly. **If you do not write it correctly, you will not receive full credit.**
9. The take-home portion is due at the beginning of class on Wednesday, September 14, 2011.
10. GOOD LUCK!! ☺

I pledge that I have not used any unauthorized references while taking this test.

Signature: _____

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1. Use row reduction to solve (by hand) the following systems of equations.
(10 points each)

$$\begin{array}{rcl} x_1 - x_2 + 3x_3 + x_4 & = & -1 \\ \text{(a)} \quad -2x_1 + 2x_2 + x_3 & = & 4 \\ -x_1 + x_2 - 2x_3 + 3x_4 & = & 0 \\ 2x_1 - 2x_2 & + & 4x_4 = -5 \end{array}$$

$$\begin{array}{rcl} 3x_1 + x_2 + 2x_3 - x_4 + x_5 - 2x_6 & = & 2 \\ \text{(b)} \quad x_1 - x_2 + 2x_3 + 3x_4 + x_5 + 4x_6 & = & 5 \\ 5x_1 - x_2 + 6x_3 + 5x_4 + 3x_5 + 6x_6 & = & 10 \end{array}$$

2. Find (by hand) the determinant of the following matrix. Look for the most efficient way before you begin calculations. (10 points)

$$\begin{bmatrix} 3 & 0 & 0 & 0 & 1 \\ -2 & 2 & -3 & 1 & -1 \\ 0 & -3 & -3 & -3 & -1 \\ -2 & 1 & 2 & 3 & -1 \\ 5 & -1 & -4 & 1 & -1 \end{bmatrix}$$

3. True or False: If A is invertible, then $A - I$ is invertible. If the statement is true, prove it. If it is false, give a specific matrix A that is invertible but for which $A - I$ is not invertible. (10 points)
4. **Prove:** If A^2 is not invertible, then A is not invertible. Make your arguments clear and logical.
HINT: Use determinants.