Math 110   Name_____
Test 4 Practice
Chamberlin

Show all your work. When solving systems of equations you must use the indicated method or you will not receive any credit. Remember to write your solutions to systems of equations in ordered pair or ordered triple notation. DO EACH PROBLEM BY HAND UNLESS THE DIRECTIONS SAY OTHERWISE.

$$2x + y - 3z = 5$$

1. Consider the following system of linear equations: $x - 2y + z = 0$

$$3x - y - z = 5$$

   a) Use Gaussian Elimination to transform the augmented matrix into row echelon form.

   b) Solve the system using back substitution. Write your answer as an ordered triple.

1. (alternate) Find the inverse matrix: $\begin{bmatrix} 0 & 2 & 0 \\ 3 & 3 & 2 \\ 2 & 5 & 1 \end{bmatrix}$

2. Sketch the graph of the solution set to the following system of inequalities: $\begin{array}{l} y < 2x - 1 \\ y \geq (x+1)^2 - 6 \end{array}$

3. Find the partial fraction decomposition of
   $\dfrac{3x^3 - x^2 + 34x - 10}{(x^2 + 10)^2}$.   ____

4. Consider the matrices $A = \begin{bmatrix} -3 & 4 \\ 2 & -3 \\ -1 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & 1 \\ 1 & -2 \\ 3 & -4 \end{bmatrix}$. Find $2A - 3B$.

5. Let $A = \begin{bmatrix} 2 & -1 \\ 0 & 3 \\ 1 & -2 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & -2 & 3 \\ 2 & 0 & 1 \end{bmatrix}$. Find AB.
   Show your work.

6. Consider the system

$$x + y + 2z = 4$$
$$2x + 3y + 3z = 5$$
$$3x + 3y + 7z = 14$$

Given that the inverse to the system's coefficient matrix is

$$\begin{bmatrix} 12 & -1 & -3 \\ -5 & 1 & 1 \\ -3 & 0 & 1 \end{bmatrix}$$, solve the above system using the **inverse method**. Be sure to show your steps when multiplying matrices.

7. Find the determinants of the following matrices by hand. You may expand about the row or column of your choice.

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

8. Solve the system

$$4x - 5y + z = -2$$
$$3x + y = 4$$
$$x - y + 3z = 0$$

for the z-variable only using Cramer's Rule and write your answer as a fraction. [**Hint**: use the determinants you found in the last problem. Don't repeat your work from the last problem]

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