Name:_____

Ch. 9 **Show all work for full credit.**

11/20/14 ***Take Home Exam Ch. 9 – Math 245*** **Box your final answers.**

1.) Solve the systems by the Gauss-Jordan Method. If the system has infinitely many solutions, write the in parametric form.

$$\begin{cases} -3x - 5y + 36 = 10 \\ -x + 7z = 5 \\ x + y - 10z = -4 \end{cases}$$

2.) Solve by elimination or substitution. $\begin{cases} 3x + 2y = 26 \\ 5x + 7y = 3 \end{cases}$

3.) Find the partial fraction decomposition of

a. $\dfrac{2x^2 - x + 4}{x^3 + 4x}$

b. $\dfrac{9 - 9x}{2x^2 + 7x - 4}$

4.) Find the inverse of $\begin{bmatrix} 4 & -1 \\ 1 & 2 \end{bmatrix}$

5.) Find the Determine of matrix A. If the det(A) $\neq 0$ find the inverse.

$$A = \begin{bmatrix} 2 & 1 & 1 \\ 0 & -1 & 0 \\ 1 & 0 & 1 \end{bmatrix}$$

6.) Given the following matrices, $A = \begin{bmatrix} 2 & 7 \\ 6 & -3 \end{bmatrix}$, $B = \begin{bmatrix} 6 \\ -5 \end{bmatrix}$, $C = \begin{bmatrix} -2 & 1 \end{bmatrix}$,

a. find 2A – BC if it exists.

b. find C + $\frac{3}{5}$ **AB if it exists.**

7.) Determine if $A = \begin{bmatrix} 1 & -1 & 0 \\ 1 & 0 & -1 \\ 6 & -2 & -3 \end{bmatrix}$ **and** $B = \begin{bmatrix} -2 & -3 & 1 \\ -3 & -3 & 1 \\ -2 & -4 & 1 \end{bmatrix}$ **are inverses of each other.**

8.) Let $A = \begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix}$ **be a 2x2 matrix with real entries such that det(*A*) ≠ 0. Show that** $\det(A^{-1}) = \dfrac{1}{\det(A)}$

9.) Solve by elimination or substitution.

$$\begin{cases} x - 2y + 5z = 3 \\ -2x + 6y - 11z = 1 \\ 3x - 16y + 20z = -26 \end{cases}$$

10.) Solve the system of equations by converting to a matrix equation and using the matrix inverse.

$$\begin{cases} 3x + 4y = 10 \\ 7x + 9y = 20 \end{cases}$$

10.) Solve the system of equations by converting to a matrix equation and using the matrix inverse.

$$\begin{cases} x+2y-z=2 \\ 2x+2y+2z=12 \\ x-y+2z=5 \end{cases}$$

11.) Solve by the Gauss-Jordan Method $\begin{cases} 3x+4y=-2 \\ 5x+3y=4 \end{cases}$