MATH 140 EXAM 7A NAME _____

There are 5 problems on this exam. Carefully read and follow all directions. In order to receive credit show all necessary work. No credit will be given for an answer I cannot find or cannot read. All answers should be exact unless specified otherwise.

1. Consider the system of equations given below.

$$4x + 5y = -8$$
$$-6x - 8y = 20$$

(a) What is the coefficient matrix associated with this system? Label your answer as A. (3 points)

(b) By hand, calculate the determinant of A. (3 points)

(c) Determine A^{-1}. Write your answer as a scalar times a matrix with integer entries. (4 points)

(d) Write this system of equations as a matrix equation. (3 points)

(e) What matrix product must be calculated to find the solution of this system? (3 points)

(f) Calculate the matrix product in part (e) and determine the solution of this system. (4 points)

2. Consider the system of equations given below.

$$-x - 4y - 6z = 7$$
$$-4x + 7y + 7z = -19$$
$$-3x + 5y - 4z = 13$$

(a) What is the coefficient matrix associated with this system? Label your answer as A. (3 points)

(b) Calculate the determinant of A. (3 points)

(c) Determine A^{-1}. Write your answer as a scalar times a matrix with integer entries. (4 points)

(d) Write this system of equations as a matrix equation. (3 points)

(e) What matrix product must be calculated to find the solution of this system? (3 points)

(f) Calculate the matrix product in part (e) and determine the solution of this system. (4 points)

3. For each of the following systems of equations, determine the augmented matrix, the reduced row echelon form of the augmented matrix, and the solution of the system. if the system has no solution write NONE for the solution. (9 points each)

(a) $4x + 3y + 2z = 15$
$7x + 8y + 4z = 33$
$6x + 5y + 5z = 18$

Augmented Matrix:

RREF:

Solution:

(b) $2x + 3y + 5z = 29$
$3x + 4y + 8z = 40$
$-10x - 16y - 24z = -151$

Augmented Matrix:

RREF:

Solution:

(c) $2x + 3y - 5z = 22$
$7x + 5y - 12z = 44$
$9x + 19y - 28z = 132$

Augmented Matrix:

RREF:

Solution:

4. Use the four matrices given below to determine the following. (5 points each)

$$A = \begin{bmatrix} 1 & -4 & 3 \\ 3 & 5 & -9 \end{bmatrix} \qquad B = \begin{bmatrix} 5 & 4 & 2 \\ 0 & 1 & 9 \end{bmatrix} \qquad C = \begin{bmatrix} 3 & -9 \\ 1 & 1 \\ 9 & -9 \end{bmatrix}$$

$$D = \begin{bmatrix} 2 & -7 \\ 8 & -5 \\ -6 & 5 \end{bmatrix} \qquad E = \begin{bmatrix} -7 & 3 \\ 0 & 0 \end{bmatrix}$$

(a) A + B

(b) 6A + 2B

(c) DA

(d) Which of the following products are not defined? Circle all that are not defined.

EB AB AE EA ED

5. Use the substitiution method to find the points of intersection for the line and parabola given below. (12 points)

$-6x + 7y = 61$
$x^2 + 7 = -2x + y$