Beverly Hills High School -- Honors Math Analysis -- Spring '16 -- Test #2 -- 90 points

On this and all following exams, give neat and complete answers, those that clearly show your understanding of the problem and its solution. In other words, show all your work. All problems are five points each unless specified otherwise. PENCILS ONLY.

1) Solve this system using either elimination or substitution methods (your choice):

$3a + 2b = 5$
$5b + 7a = 4$

2) Write the augmented matrix for the system in #1.

Given matrices $A = \begin{bmatrix} -5 & 2 \\ 2 & -8 \end{bmatrix}$ $B = \begin{bmatrix} -6 & -2 \\ 4 & 6 \end{bmatrix}$ $C = \begin{bmatrix} 3 & 2 \\ -5 & -4 \end{bmatrix}$, perform the following operations

3) $-2A + 7B$

4) $A^2 + C$

5) BC^{-1}

6) $(AB)^{-1}$

7) $\begin{bmatrix} 2 & -3 \\ -3 & 1 \\ 4 & 5 \end{bmatrix} \begin{bmatrix} 7 & -3 & 5 \\ 0 & 2 & -1 \end{bmatrix} =$

8) Looking at the three matrices above, calculate the value of

$$\frac{c_{22} \bullet b_{21} \bullet a_{11}}{b_{22} + c_{12}}$$

For ten points apiece, solve each of these systems completely using Cramer's Rule (all three variables):

9)
$$\begin{aligned} 13a + 2b + c &= 5 \\ 3a + b - c &= 9 \\ 7a - 5b + 4c &= 8 \end{aligned}$$

10)
$$\begin{aligned} \frac{2}{x} - \frac{3}{y} + \frac{4}{z} &= -6 \\ \frac{-6}{x} - \frac{6}{y} + \frac{2}{z} &= 5 \\ \frac{1}{x} + \frac{3}{y} - \frac{6}{z} &= -1 \end{aligned}$$

11) For ten points, use the Gaussian elimination method to solve this system of equations:

$$\begin{aligned} 3x + y + 6z &= -7 \\ -x + 2y - 2z &= 0 \\ -4x + 3y - 6z &= -5 \end{aligned}$$

12) Given matrices $A = \begin{bmatrix} 1 & -2 & -5 \\ 3 & 2 & 1 \\ -4 & 1 & 3 \end{bmatrix}$ $B = \begin{bmatrix} -4 & 3 & -5 \\ 0 & 1 & 2 \\ -2 & 4 & 1 \end{bmatrix}$, show AB = BA.

13) Solve this system by the method of inverses:

$3a + b = 1$
$-4a - b = -3$

Decompose the following rational expressions into their proper partial fractions:

14) $\dfrac{-2x+36}{x^2-x-6}$

15) $\dfrac{6x^3-11x^2+8x-15}{x^4-5x^3}$