Sample Test 4

(1) Given the following matrices: (20 points)

$A=\begin{bmatrix}6 & 1\\ 3 & -2\end{bmatrix}$ $B=\begin{bmatrix}0 & -1 & \frac{1}{2}\\ 3 & -4 & 3\\ 1 & -2 & 3\end{bmatrix}$ $C=\begin{bmatrix}1 & -7\\ 2 & -5\end{bmatrix}$ $D=\begin{bmatrix}-4 & 0 & -2\\ 3 & 1 & -7\end{bmatrix}$ $E=\begin{bmatrix}-1 & -2 & 0 & 4\\ 4 & -1 & 3 & 0\\ 7 & 2 & -1 & 1\\ 2 & 1 & 0 & 0\end{bmatrix}$ Find the following, if possible. (If not possible, say so.)

(a) DA

(b) A + C

(c) A C

(d) DB

(g) B^{-1}
(answer here, work on next page)

(h) det (E)
(answer here, work on next page)

Work for #1 (g) and (h)

(2) Use Cramer's Rule to solve the following system. $\begin{cases} \frac{1}{3}x - 2y = 6 \\ \frac{2}{5}x - y = 3 \end{cases}$ (10 points)

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(3) Express the system of linear equations as a matrix equation of the form AX=B. Then solve the matrix equation by multiplying each side by the inverse of the coefficient matrix.

(14 points)

$$\begin{cases} 2x + 4y = 1 \\ x - 3y = 4 \end{cases}$$

(4) Solve: $\begin{cases} 2x^2 + 4y = 13 \\ x^2 - y^2 = \frac{7}{2} \end{cases}$ (14 points)

(5) Solve using any of the methods discussed in class. (14 points)

$$\begin{cases} 2x - y + z = 4 \\ x + 3y + 2z = -1 \\ 7x \quad + 5z = 11 \end{cases}$$

(6) Find the partial fraction decomposition of $\dfrac{x^2-12x+4}{x^2(x^2+4)}$ (14 points)

(7) Use matrix methods (Gaussian elimination or Gauss Jordan) to solve: (14 points)

$$-x - 2y - z = -3$$
$$2x + y + z = 16$$
$$x + y + 2z = 9$$

You must obtain row echelon form or reduced row echelon form. Be sure to label operations performed at each step.