

Instructions: Show all work. Use exact answers unless specifically asked to round. Answer all parts of each question.

1. Multiply the matrices $A = \begin{bmatrix} 1 & -2 & 1 \\ 0 & 5 & 3 \end{bmatrix}$, $B = \begin{bmatrix} -3 & 4 \\ 5 & -7 \\ 2 & -2 \end{bmatrix}$ by hand.

$$\begin{bmatrix} -3 -10 + 2 & 4 + 14 - 2 \\ 0 + 25 + 6 & 0 - 35 - 6 \end{bmatrix} = \begin{bmatrix} -11 & 16 \\ 31 & -41 \end{bmatrix}$$

2. Find the inverse of $C = \begin{bmatrix} 4 & 5 \\ 2 & 3 \end{bmatrix}$ by hand.

$$12 - 10 = 2$$

$$\frac{1}{2} \begin{bmatrix} 3 & -5 \\ -2 & 4 \end{bmatrix}$$

3. Use any method to solve the system $\begin{cases} x + y + z = 0 \\ 2x - y + z = -1 \\ -x + 3y - z = -8 \end{cases}$.

$$\left[\begin{array}{ccc|c} 1 & 1 & 1 & 0 \\ 2 & -1 & 1 & -1 \\ -1 & 3 & -1 & -8 \end{array} \right] \rightarrow \left[\begin{array}{ccc|c} 1 & 0 & 0 & -5 \\ 0 & 1 & 0 & -2 \\ 0 & 0 & 1 & 7 \end{array} \right]$$

$$x = -5, y = -2, z = 7$$