

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

1. Use Cramer's Rule to solve the system $\begin{cases} x + y + z = 0 \\ 2x - y + z = -1 \\ -x + 3y - z = -8 \end{cases}$. Be sure to write out all the matrices and their determinants used in the process.

$$A = \begin{bmatrix} 1 & 1 & 1 \\ 2 & -1 & 1 \\ -1 & 3 & -1 \end{bmatrix} \quad \det A = 4$$

$$A_1 = \begin{bmatrix} 0 & 1 & 1 \\ -1 & -1 & 1 \\ -8 & 3 & -1 \end{bmatrix} \quad \det A_1 = -20$$

$$A_2 = \begin{bmatrix} 1 & 0 & 1 \\ 2 & -1 & 1 \\ -1 & -8 & -1 \end{bmatrix} \quad \det A_2 = -8$$

$$A_3 = \begin{bmatrix} 1 & 1 & 0 \\ 2 & -1 & -1 \\ -1 & 3 & -8 \end{bmatrix} \quad \det A_3 = 28$$

$$x = \frac{-20}{4} = -5$$

$$y = \frac{-8}{4} = -2$$

$$z = \frac{28}{4} = 7$$

$$(-5, -2, 7)$$