Solving Linear Systems in Three Variables

Use elimination to solve each system of equations.

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

a. Eliminate the variable z by adding the last 2 equations

$2x - y + z = 3$

$-4x + 2y - z = -1$

b. Then add the first and third equations.

$x + y + z = 4$

$-4x + 2y - z = -1$

c. Solve this system of 2 equations for x and y using elimination.

d. Substitute x and y into one of the original equations and solve for z.

e. Write the solution as an ordered triple.

2. $\begin{cases} x + y + 2z = 3 \\ x - y - z = 0 \\ 3x - 2y - z = 1 \end{cases}$

3. $\begin{cases} 4x + y + 3z = 0 \\ 2x - 2y - z = 10 \\ 3x - 2y + 2z = 11 \end{cases}$

4. $\begin{cases} 3x + 4y - z = 1 \\ 3x - y - 4z = -3 \\ x + 3y - 3z = 9 \end{cases}$