7. Resolver.

a)
$$\left.\begin{aligned} 2x - y - z &= 0 \\ x + 3y + z &= 5 \\ 3x - y + 2z &= 4 \end{aligned}\right|$$

Calculamos Δ

$$\begin{pmatrix} 2 & -1 & -1 \\ 1 & 3 & 1 \\ 3 & -1 & 2 \end{pmatrix}$$ el determinante es: $$\left|\begin{array}{ccc|cc} 2 & -1 & -1 & 2 & -1 \\ 1 & 3 & 2 & 1 & 3 \\ 3 & -1 & 2 & 3 & -1 \end{array}\right| = 2\cdot3\cdot2 + -1\cdot2\cdot3 + -1\cdot1\cdot-1$$

$$-3\cdot3\cdot-1 - -1\cdot2\cdot2 - 2\cdot1\cdot-1$$

$$= 12 - 6 + 1 + 9 + 4 + 2$$

$$\Delta = 23$$

$$\Delta x = \left|\begin{array}{ccc|cc} 0 & -1 & -1 & 0 & -1 \\ 5 & 3 & 1 & 5 & 3 \\ 4 & -1 & 2 & 4 & -1 \end{array}\right| = 0\cdot3\cdot2 + -1\cdot1\cdot4 + -1\cdot5\cdot-1 - 4\cdot3\cdot-1 - -1\cdot1\cdot0 - 2\cdot5\cdot-1$$

$$\Delta x = 0 - 4 + 5 + 12 + 0 + 10$$

$$\Delta x = 23$$

$$\Delta y = \left|\begin{array}{ccc|cc} 2 & 0 & -1 & 2 & 0 \\ 1 & 5 & 1 & 1 & 5 \\ 3 & 4 & 2 & 3 & 4 \end{array}\right| = 2\cdot5\cdot2 + 0\cdot1\cdot3 + -1\cdot1\cdot4 - 3\cdot5\cdot-1 - 4\cdot1\cdot2 - 2\cdot1\cdot0$$

$$= 20 + 0 - 4 + 15 - 8 + 0$$

$$\Delta y = 23$$

$$\Delta z = \left|\begin{array}{ccc|cc} 2 & -1 & 0 & 2 & -1 \\ 1 & 3 & 5 & 1 & 3 \\ 3 & -1 & 4 & 3 & -1 \end{array}\right| = 2\cdot3\cdot4 + -1\cdot5\cdot3 + 0\cdot1\cdot-1 - 3\cdot3\cdot0 - -1\cdot5\cdot2 - 4\cdot1\cdot-1$$

$$= 24 - 15 + 0 - 0 + 10 + 4$$

$$\Delta z = 23$$

Entonces $x = \dfrac{\Delta x}{\Delta} = \dfrac{23}{23} = 1$

$y = \dfrac{\Delta y}{\Delta} = \dfrac{23}{23} = 1$

$z = \dfrac{\Delta z}{\Delta} = \dfrac{23}{23} = 1$

$\therefore$ $x = 1$
$y = 1$
$z = 1$

b) $\left.\begin{array}{l} x+3y-z=-3 \\ 2x-y+4z=14 \\ x-5y+z=15 \end{array}\right|$

$$\Delta = \left|\begin{array}{ccc|cc} 1 & 3 & -1 & 1 & 3 \\ 2 & -1 & 4 & 2 & -1 \\ 1 & -5 & 1 & 1 & -5 \end{array}\right| = 1\cdot{}^-1\cdot 1 + 3\cdot 4\cdot 1 + {}^-1\cdot 2\cdot{}^-5 - 1\cdot{}^-1\cdot{}^-1 - {}^-5\cdot 4\cdot 1 - 1\cdot 2\cdot 3$$

$$= -1 + 12 + 10 - 1 + 20 - 6$$

$$\Delta = 34$$

$$\Delta x = \left|\begin{array}{ccc|cc} -3 & 3 & -1 & -3 & 3 \\ 14 & -1 & 4 & 14 & -1 \\ 15 & -5 & 1 & 15 & -5 \end{array}\right| = {}^-3\cdot -1\cdot 1 + 3\cdot 4\cdot 15 + {}^-1\cdot 14\cdot{}^-5 - 15\cdot -1\cdot -1 - {}^-5\cdot 4\cdot{}^-3 - 1\cdot 14\cdot 3$$

$$= 3 + 180 + 70 - 15 - 60 - 42$$

$$\Delta x = 136$$

$$\Delta y = \left|\begin{array}{ccc|cc} 1 & -3 & -1 & 1 & -3 \\ 2 & 14 & 4 & 2 & 14 \\ 1 & 15 & 1 & 1 & 15 \end{array}\right| = 1\cdot 14\cdot 1 + -3\cdot 4\cdot 1 + -1\cdot 2\cdot 15 - 1\cdot 14\cdot -1 - 15\cdot 4\cdot 1 - 1\cdot 2\cdot -3$$

$$= 14 - 12 - 30 + 14 - 60 + 6$$

$$\Delta y = -68$$

$$\Delta z = \left|\begin{array}{ccc|cc} 1 & 3 & -3 & 1 & 3 \\ 2 & -1 & 14 & 2 & -1 \\ 1 & -5 & 15 & 1 & -5 \end{array}\right| = 1\cdot{}^-1\cdot 15 + 3\cdot 14\cdot 1 + {}^-3\cdot 2\cdot{}^-5 - 1\cdot{}^-1\cdot{}^-3 - {}^-5\cdot 14\cdot 1 - 15\cdot 2\cdot 3$$

$$= -15 + 42 + 30 - 3 + 70 - 90$$

$$\Delta z = 34$$

Entonces:

$$x = \frac{\Delta x}{\Delta} = \frac{136}{34} = 4$$

$$y = \frac{\Delta y}{\Delta} = \frac{-68}{34} = {}^-2$$

$$z = \frac{\Delta z}{\Delta} = \frac{34}{34} = 1$$

Solución:

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