EJERCICIOS DE SISTEMAS DE ECUACIONES: MÉTODO DE CRAMER Y SUSTITUCIÓN

1) $\begin{cases} \frac{2(x+4)}{3} - \frac{y}{2} = \frac{9}{2} \\ x + 2y - \frac{1}{3}(3x-2) = -\frac{4}{3} \end{cases}$

$\Rightarrow 4x + 16 - 3y = 27$
$4x - 3y = 11$

$\Rightarrow 3x + 6y - 3x + 2 = -4$
$6y = -6 \Rightarrow y = -1$

$4x - 3(-1) = 11$
$4x = 8$
$x = 2$

2) $\begin{cases} \frac{2x-1}{2} + \frac{y-3}{3} = \frac{11}{6} \\ -\frac{2x}{5} + \frac{y-1}{10} = -\frac{6}{5} \end{cases}$

$\Rightarrow 6x - 3 + 2y - 6 = 11$
$6x + 2y = 20$

$\Rightarrow -4x + y - 1 = -12$
$4x - y + 1 = 12$
$4x - y = 11$

$x = \frac{20 - 2y}{6}$

$x = \frac{10 - y}{3}$

$x = \frac{10 - 1}{3}$

$4\left(\frac{10-y}{3}\right) - y = 11$

$40 - 4y - 3y = 33$
$-7y = -7$
$y = 1$

$x = 3$

3) $\begin{cases} \frac{3x-2y}{3} + 4y = \frac{13}{3} \\ \frac{2(-2y+x)}{3} - \frac{3x}{2} = -\frac{13}{6} \end{cases}$

$\Rightarrow 3x - 2y + 12y = 13$
$\Rightarrow 3x + 10y = 13$

$\Rightarrow -8y + 4x - 9x = -13$
$-5x - 8y = -13$

$x = \frac{13 - 10y}{3}$

$x = \frac{13 - 10(1)}{3}$

$-5\left(\frac{13-10y}{3}\right) - 8y = -13$

$-65 + 50y - 24y = -39$
$26y = 26$
$y = 1$

$x = 1$

4) $\begin{cases} \frac{2x+2}{3} - y = -3 \\ 3x + 15 - 3y + 3x = 12 \Rightarrow 6x - 3y = -3 \leftarrow \end{cases}$

$\Rightarrow 2x + 2 - 3y = -9$
$2x - 3y = -11 \leftarrow$

$\Delta = \begin{vmatrix} 2 & -3 \\ 6 & -3 \end{vmatrix} = -6 - (-18)$

$\Delta = 12$

$\Delta x = \begin{vmatrix} -11 & -3 \\ -3 & -3 \end{vmatrix} = 33 - 9 = 24$

$x = \frac{24}{12} \Rightarrow x = 12$

$\Delta y = \begin{vmatrix} 2 & -11 \\ 6 & -3 \end{vmatrix} = -6 - (-66) = 60$

$y = \frac{60}{12} \Rightarrow y = 5$

5) $\begin{cases} \frac{7x-9y}{2} - \frac{2x+4}{2} = -15 \\ 5(x - 1 + y) = 25 \end{cases}$

$\Rightarrow 7x - 9y - 2x - 4 = -30$
$5x - 9y = -26 \leftarrow$

$\Rightarrow 5x - 5 + 5y = 25$
$5x + 5y = 30 \leftarrow$

$\Delta = \begin{vmatrix} 5 & -9 \\ 5 & 5 \end{vmatrix} = 25 - 5(-9) = 70$

$\Delta = 70$

$\Delta x = \begin{vmatrix} -26 & -9 \\ 30 & 5 \end{vmatrix} = -130 - 30(-9) = 140$

$x = \frac{140}{70} \Rightarrow x = 2$

$\Delta y = \begin{vmatrix} 5 & -26 \\ 5 & 30 \end{vmatrix} = 150 - 5(-26) = 280$

$y = \frac{280}{70} \Rightarrow y = 4$

LEY DE CRAMER

$\begin{cases} a_1 x + b_1 x = c_1 \\ a_2 x + b_2 x = c_2 \end{cases}$

$\Delta = \begin{vmatrix} a_1 & b_1 \\ a_2 & b_2 \end{vmatrix}$

$\Delta x = \begin{vmatrix} c_1 & b_1 \\ c_2 & b_2 \end{vmatrix}$

$\Delta y = \begin{vmatrix} a_1 & c_1 \\ a_2 & c_2 \end{vmatrix}$

$x = \frac{\Delta x}{\Delta} \quad y = \frac{\Delta y}{\Delta}$

$\Delta = a_1 \cdot b_2 - (a_2 \cdot b_1)$

$\Delta x = c_1 \cdot b_2 - (c_2 \cdot b_1)$

$\Delta y = a_1 \cdot c_2 - (a_2 \cdot c_1)$