SISTEMAS DE ECUACIONES: MÉTODO DE REDUCCIÓN

1) $\begin{cases} 5x + 2y = 1 & (\times 3) \\ -3x + 3y = 5 & (\times 5) \end{cases}$

$15x + 6y = 3$
$-15x + 15y = 25$
$21y = 28$
$y = \frac{28}{21}$
$y = \frac{4}{3}$

$5x + 2\left(\frac{4}{3}\right) = 1$
$x = \frac{-5/3}{5}$
$x = -\frac{5}{15}$
$x = -\frac{1}{3}$

comp: $-3\left(-\frac{1}{3}\right) + 3\left(\frac{4}{3}\right) = 5$
$1 + 4 = 5$
$5 = 5$

2) $\begin{cases} 2x + y = 6 & \times(-2) \\ 4x + 3y = 14 \end{cases}$

$-4x - 2y = -12$
$4x + 3y = 14$
$y = 2$

$4x + 3(2) = 14$
$x = \frac{14 - 6}{4}$
$x = 2$

$2(2) + 2 = 6$
$4 + 2 = 6$
$6 = 6$

3) $\begin{cases} 5x - 2y = 2 \\ x + 2y = 2 & \times(-5) \end{cases}$

$5x - 2y = 2$
$-5x - 10y = -10$
$-12y = -8$
$y = \frac{2}{3}$

$x + 2\left(\frac{2}{3}\right) = 2$
$x = \frac{2}{3}$

$5\left(\frac{2}{3}\right) - 2\left(\frac{2}{3}\right) = 2$
$\frac{10}{3} - \frac{4}{3} = 2$
$2 = 2$

4) $\begin{cases} 5x - y = 3 & \times 2 \\ -2x + 4y = -12 & \times 5 \end{cases}$

$10x - 2y = 6$
$-10x + 20y = -60$
$18y = -54$
$y = -3$

$-2x + 4(-3) = -12$
$x = \frac{0}{-2}$
$x = 0$

$5(0) - (-3) = 3$
$3 = 3$

5) $\begin{cases} 3x + 5y = 15 & \times 2 \\ 2x - 3y = -9 & \times(-3) \end{cases}$

$6x + 10y = 30$
$-6x + 9y = 27$
$19y = 57$
$y = 3$

$2x - 3(3) = -9$
$x = 0$

$3(0) + 5(3) = 15$
$15 = 15$

6) $\begin{cases} 4x + 6y = 2 & \times 3 \\ 6x + 5y = 1 & \times(-2) \end{cases}$

$12x + 18y = 6$
$-12x - 10y = -2$
$8y = 4$
$y = \frac{1}{2}$

$6x + 5\left(\frac{1}{2}\right) = 1$
$x = \frac{-3/2}{6}$
$x = -\frac{1}{4}$

$4\left(-\frac{1}{4}\right) + 6\left(\frac{1}{2}\right) = 2$
$-1 + 3 = 2$
$2 = 2$

7) $\begin{cases} -2x + 3y = 14 & \times 3 \\ 3x - y = -14 & \times 2 \end{cases}$

$-6x + 9y = 42$
$6x - 2y = -28$
$7y = 14$
$y = 2$

$3x - 2 = -14$
$x = -4$

$-2(-4) + 3(2) = 14$
$8 + 6 = 14$
$14 = 14$

8) $\begin{cases} 2x + 3y = 2 & \times 3 \\ -6x + 12y = 1 \end{cases}$

$6x + 9y = 6$
$-6x + 12y = 1$
$21y = 7$
$y = \frac{1}{3}$

$-6x + 12\left(\frac{1}{3}\right) = 1$
$-6x = -3$
$x = \frac{1}{2}$

$2\left(\frac{1}{2}\right) + 3\left(\frac{1}{3}\right) = 2$
$1 + 1 = 2$
$2 = 2$

9) $\begin{cases} 5x + 2y = 11 & \times 2 \\ 2x - 3y = 12 & \times(-5) \end{cases}$

$10x + 4y = 22$
$-10x + 15y = -60$
$19y = -38$
$y = -2$

$2x - 3(-2) = 12$
$2x + 6 = 12$
$x = 3$

$5(3) + 2(-2) = 11$
$15 - 4 = 11$
$11 = 11$

10) $\begin{cases} -2x + 4y = 7 & \times 3 \\ 3x - 5y = 4 & \times 2 \end{cases}$

$-6x + 12y = 21$
$6x - 10y = 8$
$2y = 29$
$y = \frac{29}{2}$

$3x - 5\left(\frac{29}{2}\right) = 4$
$3x - \frac{145}{2} = 4$
$3x = \frac{153}{4}$
$x = \frac{153}{6}$
$x = \frac{51}{2}$

$-2\left(\frac{51}{2}\right) + 4\left(\frac{29}{2}\right) = 7$
$-51 + 58 = 7$
$7 = 7$

11) $\begin{cases} x + 2y = 1 & \times 3 \\ -3x + y = -10 \end{cases}$

$3x + 6y = 3$
$-3x + y = -10$
$7y = -7$
$y = -1$

$-3x + (-1) = -10$
$-3x = -9$
$x = 3$

$3 + 2(-1) = 1$
$3 - 2 = 1$

12) $\begin{cases} -x + 2y = 4 \\ 2x - 4y = 3 \end{cases}$

* A primera vista no hay forma de reducir

* IGUALACIÓN

$x = 2y - 4$
$x = \frac{3 - 4y}{2}$
$2y - 4 = \frac{3 - 4y}{2}$
$4y - 8 = 3 - 4y$
$8y = 11 \; ; \; y = \frac{11}{8}$

$x = 2\left(\frac{11}{8}\right) - 4$
$x = \frac{11}{4} - 4$
$x = -\frac{5}{4}$
$-\left(-\frac{5}{4}\right) + 2\left(\frac{11}{8}\right) = 4$
$\frac{5}{4} + \frac{11}{4} = 4 \; ; \; \frac{16}{4} = 4$
$4 = 4$

13) $\begin{cases} x + 4y = 1 \\ 2x - y = -5 \end{cases}$ $x(-2)$ $\quad -2x - 8y = -2$, $\quad 2x - y = -5$, $\quad -9y = -7$, $\quad y = \frac{7}{9}$

$2\left(-\frac{13}{9}\right) - \left(\frac{7}{9}\right) = -5$

$-\frac{45}{5} = -5 \;;\; -5 = -5$

$2x - \frac{7}{9} = -5$

$2x = -\frac{45}{9} + \frac{7}{9}$

$x = \frac{-38/4}{2}$

$x = -\frac{38}{18}$

$x = -\frac{19}{9}$

14) $\begin{cases} 3x + y = 4 \\ -6x - 2y = 1 \end{cases}$

* IGUALACIÓN:

$x = \frac{4 - y}{3}$

$x = -\frac{1 + 2y}{6}$

$\frac{4 - y}{3} = -\frac{1 + 2y}{6}$

$8 - 2y = -(1 + 2y)$

$2y - 2y \neq -9$?

* No tiene solución

5) $\begin{cases} 3x - 2y = -4 \\ 2x + y = 2 \end{cases}$ $x(-3)$ $\quad 6x - 4y = -8$, $\quad -6x - 3y = -6$, $\quad -7y = -14$, $\quad y = 2$

$2x + 2 = 2$

$x = 0$

$3(0) - 2(2) = -4$

$-4 = -4$

16) $\begin{cases} x - 4y = 5 \\ 3x - 12y = 15 \end{cases}$ $x3$

* IGUALACIÓN

$x = 5 + 4y$

$x = \frac{15 + 12y}{3}$

$5 + 4y = \frac{15 + 12y}{3}$

$15 + 12y = 15 + 12y$?

* No tiene solución

17) $\begin{cases} 2x + 3y = 1 \\ 3x + 2y = 4 \end{cases}$

* IGUALACIÓN

$x = \frac{1 - 3y}{2}$

$x = \frac{4 - 2y}{3}$

$3 - 9y = 8 - 4y$

$-5y = 5$

$y = -1$

$x = \frac{1 - 3(-1)}{2}$

$x = 2$

$3(2) + 2(-1) = 4$

$6 - 2 = 4$

$4 = 4$

18) $\begin{cases} 4x - 3y = 5 \\ -8x + 6y = 10 \end{cases}$

* IGUALACIÓN

$x = \frac{5 + 3y}{4}$

$y = -\frac{10 - 6y}{8}$

$40 + 24 = -40 + 24y$?

* No tiene solución

19) $\begin{cases} 4x - y = -9 \\ 4x + 2y = -2 \end{cases}$ $x(-2)$ $\quad 4x - y = -9$, $\quad -4x - 4y = 4$, $\quad -5y = -5$, $\quad y = 1$

$2x + 2(1) = -2$

$2x = -4$

$x = -2$

$4(-2) - 1 = -9$

$-8 - 1 = -9$

$-9 = -9$

20) $\begin{cases} 5x - 4y = 3 \\ -10x + 8y = -6 \end{cases}$

* IGUALACIÓN

$x = \frac{3 + 4y}{5}$

$-x = \frac{-6 - 8y}{10}$

$30 + 40y = -(-30 - 40y)$

* No tiene solución