Examples – Method of Substitution and Elimination to solve a System of Linear Equations ~ Page 390

Method of Elimination

(8) $\begin{cases} 4x+3y=19 \\ 3x-4y=8 \end{cases}$ $\xrightarrow{(4)}$ $16x+12y=76$

$\xrightarrow{(3)}$ $9x-12y=24$

$+$

$25x = 100$

$\frac{25x}{25} = \frac{100}{25}$

$x = 4$

Substitute into either equation to find y, I chose the top one

$x=4$

$4(4)+3y=19$

$16+3y=19$

$-16 \quad -16$

$3y=3$

$\frac{3}{3}y=\frac{3}{3}$ $\therefore$ $y=1$

$(x,y)=\{(4,1)\}$

No variable "by itself, use elimination, if you multiply the top equation by (+4) and the bottom by (-3) you will get equal and opposite coefficients for the "y" terms.

The "solution" is the coordinates of the point where the lines cross.

Method of Substitution

(10) $\begin{cases} y=4x+11 \\ 3x-2y=-7 \end{cases}$

Since the top equation is already solved for y, use substitution.

$y = 4x+11$ ⇒ Top equation

Substitute for "y"

$3x-2(4x+11)=-7$ ⇒ Bottom equation

$3x-8x-22=-7$

$-5x-22=-7$

$+22 \quad +22$

$-5x=15$

$\frac{-5x}{-5} = \frac{15}{-5}$

$x=-3$

Substitute into either equation

$x=3$

$y=4(-3)+11$

$y=-12+11$

$y=-1$

$(x,y)=\{(-3,-1)\}$