

Why does it work?

Alex and Morgan were asked to solve the linear system $\begin{cases} x + 3y = 2 \\ 5x + y = -4 \end{cases}$

Alex's "solve for x" way

Morgan's "solve for y" way

I solved the first equation for x.

I substituted this expression for x into the second equation.

I then simplified to solve for y.

I then substituted this value of y into the equation I previously solved for x. I solved this equation to find x.

This gives me the solution to this linear system.

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

$$x = 2 - 3y$$

$$5(2 - 3y) + y = -4$$

$$10 - 15y + y = -4$$

$$10 - 14y = -4$$

$$-14y = -14$$

$$y = 1$$

$$x = 2 - 3y$$

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

$$x = 2 - 3$$

$$x = -1$$

The solution is $(-1, 1)$



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

$$y = -4 - 5x$$

$$x + 3(-4 - 5x) = 2$$

$$x - 12 - 15x = 2$$

$$-14x - 12 = 2$$

$$-14x = 14$$

$$x = -1$$

$$y = -4 - 5x$$

$$y = -4 - 5(-1)$$

$$y = -4 + 5$$

$$y = 1$$

The solution is $(-1, 1)$



I solved the second equation for y.

I substituted this expression for y into the first equation.

I then simplified to solve for x.

I then substituted this value of x into the equation I previously solved for y. I solved this equation to find y.

This gives me the solution to this linear system.

- * How did Alex solve the problem?
- * How did Morgan solve the problem?
- * What are some similarities and differences between Alex's and Morgan's ways?
- * Alex and Morgan used different ways, yet they got the same answer. Why?