Swap It In

SY03-V1 · storyboard · SY03 Solve by substitution. Read each picture with its sentences.

Picture 1

$$x = 4 - 3y \quad x \text{ alone}$$

$$-2(4 - 3y) + 5y = -30 \quad \text{swap it in}$$

$$-8 + 6y + 5y = -30 \quad \text{expand}$$

$$11y = -22 \quad \text{add } 8$$

$$y = -2$$

$$\boxed{x = 4 - 3(-2) = 10} \quad \text{put it back}$$

Check: $-2(10) + 5(-2) = -30$ ✓

1. Solve the system x + 3y = 4 and −2x + 5y = −30.
2. Get x alone in the first equation: x = 4 − 3y.
3. Swap it into the second equation, in brackets.
4. Now there is only y.
5. Expand: negative two times four is negative eight, and negative two times negative three y is six y.
6. Collect the y terms and add eight to both sides: 11y = −22.
7. So y = −2.
8. Put it back: x = 4 − 3(−2), which is ten.
9. The solution is ten, negative two.
10. Check in the second equation: negative twenty minus ten is negative thirty.

Picture 2

Trap $-2x, \quad x = 4 - 3y$

$\times \quad -2 \cdot 4 - 3y$

$\checkmark \quad -2(4 - 3y)$

11. Watch for the trap: dropping the brackets.
12. Negative two multiplies the whole of 4 − 3y.