Makes Sense Strategies ™

MENU   sample

These are the steps to …
SOLVING BY SUBSTITUTION

Step 1

Gist of step
Choose one equation and solve for one of its variables.

Example
1. $x + 3y - z = -4$
    $x = -3y + z - 4$

Step 2

Gist of step
Substitute the expression into each of the other two equations. Simplify.

Example
2.　　　　　$2x - y + 2z = 13$　　　　　　　3. $3x - 2y - z = -9$
　　$2(-3y + z - 4) - y + 2z = 13$　　　$3(-3y + z - 4) - 2y - z = -9$
　　$-6y + 2z - 8 ~ - y + 2z = 13$　　　$-9y + 3z -12 - 2y - z = -9$
　　　　　　$-7y + 4 z = 21$　　　　　　　　$-11y + 2z = 3$

Step 3

Gist of step
Write the two new equations as a system. Solve for the remaining variables.

Example
4.　　$-7y + 4z = 21$ no change　　$-7y + 4z = 21$　　$-11(1) + 2z=21$
5.　$-11y + 2z = 3$ multiply by –2　$22y - 4z = -6$　　$-11 + 2z = 21$
　　　　　　　　　　　　　　　　　　$15y ~ = 15$　　　　$2z = 32$
　　　　　　　　　　　　　　　　　　　$y = 1$　　　　　　$z = 16$

Step 4

Gist of step
Substitute these variable values into one of the original equations and solve for the remaining variable.

Example
4.　　$-7y + 4z = 21$ no change　　$-7y + 4z = 21$　　$-11(1) + 2z=21$
5.　$-11y + 2z = 3$ multiply by –2　$22y - 4z = -6$　　$-11 + 2z = 21$
　　　　　　　　　　　　　　　　　　$15y ~ = 15$　　　　$2z = 32$
　　　　　　　　　　　　　　　　　　　$y = 1$　　　　　　$z = 16$

Step 5

Gist of step
Write the solution as an ordered triple.

Example
$(9, 1, 16)$

Why are these steps important?