

5.2 Solving Systems by Substitution

Another way to solve a system of linear equations is to use ***substitution***.

HOW TO SOLVE A SYSTEM ALGEBRAICALLY

1. _____
2. _____
 - a. remove _____ part
3. _____
4. _____

EXAMPLE 1: Solving a System of Linear Equations by Substitution

Solve the system by substitution.

$$y = 2x - 4$$

$$7x - 2y = 5$$

On your own:

Solve the system by substitution.

$$\begin{aligned} 1) \quad & y = 2x + 3 \\ & y = 5x \end{aligned}$$

$$\begin{aligned} 2) \quad & x = 5y + 3 \\ & 2x + 4y = -1 \end{aligned}$$

EXAMPLE 2 Real-life Application

You buy a total of 50 turkey burgers and veggie burgers for \$90. You pay \$2 per turkey burger and \$1.50 per veggie burger. Write and solve a system of linear equations to find the number, x , of turkey burgers and the number, y , of veggie burgers you buy

Use a verbal model to write a system of linear equations.

$$\begin{array}{|c|} \hline \text{Number} \\ \text{of turkey} \\ \text{burgers, } x \\ \hline \end{array} + \begin{array}{|c|} \hline \text{Number} \\ \text{of veggie} \\ \text{burgers, } y \\ \hline \end{array} = \begin{array}{|c|} \hline \text{Total} \\ \text{number} \\ \text{of burgers} \\ \hline \end{array}$$

$$\begin{array}{|c|} \hline \text{Cost per} \\ \text{turkey} \\ \text{burger} \\ \hline \end{array} \cdot \begin{array}{|c|} \hline \text{Number} \\ \text{of turkey} \\ \text{burgers, } x \\ \hline \end{array} + \begin{array}{|c|} \hline \text{Cost per} \\ \text{veggie} \\ \text{burger} \\ \hline \end{array} \cdot \begin{array}{|c|} \hline \text{Number} \\ \text{of veggie} \\ \text{burgers, } y \\ \hline \end{array} = \begin{array}{|c|} \hline \text{Total} \\ \text{cost} \\ \hline \end{array}$$

On Your Own:

3. You sell lemonade for \$2 per cup and orange juice for \$3 per cup. You sell a total of 100 cups for \$240. Write and solve a system of linear equations to find the number of cups of lemonade and the number of cups of orange juice you sold.