

Activity 4

Solving Systems of Equations: The Method of Substitution

Whenever a system of n equations with n unknowns is given, you can use any of several methods to find the solution to the system, if a solution exists. In this activity, you will use substitution to solve systems of equations.


Exploration

Using the substitution method, solve the system of equations:

$$3x - 2y + z = 6$$

$$2x + y - 3z = 5$$

$$x + 4y - 2z = 9$$

1. Open a new TI InterActive! document and title it **The Method of Substitution**.
2. Select Math Box  and define equation 1 by typing **eq1: = 3x - 2y + z = 6** and pressing Enter.

Note: Use the  key on the Math Palette to define a variable.

In the next two math boxes, define the next two equations above as eq2 and eq3.

3. On the Math Palette, select **Math►Algebra►Solve** and then type **eq1, z**). In the next Math Box, define z by typing **z:=** followed by the result of **solve(eq1,z)**.

Record this equation. _____

4. Solve eq2 for y as you did in question 3. In the next math box, define y using this result.

Record this equation. _____

5. Solve eq3 for x as you did in question 3. In the next Math Box, define x using this result.

Record this equation. _____

6. In the next Math Box, type y . Redefine y as this value.

Record this equation. _____

7. In the next Math Box, type z . Redefine z as this value.

Record this equation. _____

8. In the next Math Box, enter $3x - 2y + z$.

Record your results. _____

9. In the next Math Box, enter $2x + y - 3z$.

Record your results. _____

10. In the next Math Box, enter $x + 4y - 2z$.

Record your results. _____

11. What is the solution to this system? Do steps 8 through 10 verify your solution? Explain.

12. Save this document as **substitution.tii**. Print a copy of the document.

Additional Exercises

Solve each of the following systems of equations using the substitution method. Record your process as well as the solutions.

1. $2x + 5y - z = -8$

$3x + y - 5z = 4$

$x + 4y + 7z = -1$

Process

Solution

x: = _____ x: = _____

y: = _____ y: = _____

z: = _____ z: = _____

2. $x - 2y - 3z = -1$

$3x + y + 2z = -8$

$5x + 6y + z = 11$

Process

Solution

x: = _____ x: = _____

y: = _____ y: = _____

z: = _____ z: = _____

3. $3x + y + 5z = -2$

$5x + 2y + z = -3$

$x + 6y - 8z = 5$

Process

Solution

x: = _____ x: = _____

y: = _____ y: = _____

z: = _____ z: = _____

4. $3x + 2z = 19$

$y - 6z = -5$

$4x + 8y - 6z = 5$

Process

Solution

x: = _____ x: = _____

y: = _____ y: = _____

z: = _____ z: = _____

5. $x + 4y - 2z = 10$

$2x - 7y + z = 8$

$-x - 2y + 3z = 8$

Process

Solution

x: = _____ x: = _____

y: = _____ y: = _____

z: = _____ z: = _____

6. $x - y + z = 12$

$9x - 2y + 5z = 18$

$3x - 2y + 4z = 20$

Process

Solution

x: = _____ x: = _____

y: = _____ y: = _____

z: = _____ z: = _____