

# Activity 7

## Solving Systems of Equations

### TEACHER NOTES

**Topic Area:** Algebra

**NCTM Standard:** understand patterns, relations, and functions

**Objective:** The student will be able to utilize the Casio fx-9750G Plus calculator in the various activities involving systems of equations included in this unit.

**Introduction:** Although the graphing method of solving systems of equations is an excellent method for solving on the Casio fx-9750G Plus, many low-achieving students still have trouble solving systems of equations. This activity presents another method of solving systems using the Equation Menu of this calculator.

# Calculator Notes for Activity 7

## Objective

The student will be able to utilize the Casio fx-9750G Plus calculator in the various activities involving systems of equations included in this unit.

**Problem:** Solve the system:

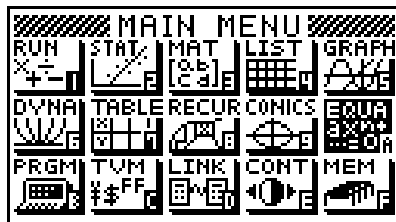
$$-2x - 3y - 6z = -26$$

$$5x + 5y + 4z = 24$$

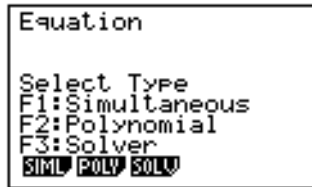
$$3x + 4y - 5z = -40$$

## Steps for Solving Systems of Equations

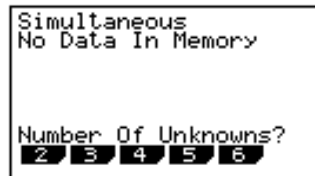
1. Systems of equations can consist of two, three, four or more variables. This problem consists of three variables (x, y and z). Before using the fx-9750G Plus calculator to solve this system, it is important that all students understand that all of the equations need to be aligned into columns. The first column is made up of the x variables of all three equations (-2x, 5x and 3x). The second column is made up of all the y variables (-3y, 5y and 4y). The third column consists of the z variables (-6z, 4z and -5z). The fourth column follows the equal signs and consists of the constants of the equation (-26, 24 and -40). If any equation is missing one of the variables, that spot should be left empty.
2. From the Main Menu of the calculator, use the arrow keys to highlight the **EQUA** Menu and then press **EXE**.



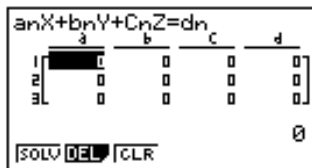
- From this screen, press **F1** (Simultaneous).



- You should see the screen, below. Notice at the bottom of the screen, there is a question that asks for the number of unknowns. Since your equation consists of three variables (x, y and z), choose **F2** (which is 3 variables).



- You should see the following screen. If your screen contains numbers other 0, you need to clear the data. To do this, press **F3** (CLR). Now, your screen will look like the following screen.



The equation at the top of the screen is reminding you that the equations need to be in the order described in Step 1. The equation is also demonstrating the fact that the coefficient (the number in front of the variable) of the x-term is represented as a. The coefficient of the y-term is b, the coefficient of the z-term is c, and the constant that follows the equal sign is represented by d.

6. To enter your data into the calculator, you need to enter only the coefficients and constants of the equation, and press **EXE** between each number. Therefore, to enter the data press -2, **EXE**, -3, **EXE**, -6, **EXE**, -26, **EXE**, 5, **EXE**, 5, **EXE**, 4, **EXE**, 24, **EXE**, 3, **EXE**, 4, **EXE**, -5, **EXE**, -40, **EXE**. Your screen should look as follows:

	a	b	c	d
1	-2	-3	-6	-26
2	5	5	4	24
3	3	4	-5	-40

SOLV DEL CLR

**If a variable does not have a coefficient, the coefficient is 1. If a variable is missing, use a 0.**

7. To solve the system, press **F1** (Solve). Your screen should look like this screen:

anX+bnY+CnZ=dn	
X	10
Y	-10
Z	6

REPT 10

Notice that the center of the screen has two columns. The first column consists of your variables. The second column consists of the solutions for those variables. This means that  $x = 10$ ,  $y = -10$ , and  $z = 6$ .

8. To do another problem, press **F1** (REPT).

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

## Activity 7: Worksheet Solving Systems of Equations

Solve the following systems of equations:

- $x + y = 1$   
 $2x - 3y = 12$
- $7x + y = -17$   
 $3x - 10y = 24$
- $x + 3y - z = 1$   
 $-4x - 2y + 5z = 16$   
 $7x + 10y + 6z = -15$
- $2x - 2y + z = 3$   
 $5y - z = -31$   
 $x + 3y + 2z = -21$
- $x - y = 3$   
 $-2x + 2y = -6$
- $0.5x + 3.1y - 0.2z = 5.9$   
 $1.2x - 2.5y + 0.7z = 2.2$   
 $0.3x + 4.8y - 4.3z = 4.8$
- $8y - 10z = -23$   
 $6y - 12z = 14$   
 $-9x + 5z = 0$
- $w + 6x + 3y - 3z = 2$   
 $2w + 7x + y + 2z = 5$   
 $w + 5x + 3y - 3z = 3$   
 $-6x - 2y + 3z = 6$

## Solutions to Activity 7 Worksheet

1.  $x = 3, y = -2$
2.  $x = -2, y = -3$
3.  $x = -5, y = 2, z = 0$
4.  $x = -5, y = -6, z = 1$  (Did you remember to enter a 0 for the coefficient of the x-term in the second equation?)
5. No Solution (If the message at the bottom of the screen reads **Ma ERROR**, it means there is no solution.)
6.  $x = 4.1402, y = 1.2737, z = 0.5944$
7.  $x = -3.858, y = -11.55, z = -6.944$
8.  $w = 20, x = -1, y = -12, z = -8$