Graphing Technology Lab

Systems of Linear and Quadratic Equations

Casio FX-9750G

You can use a **Casio FX-9750G** graphing calculator to solve systems involving linear and quadratic equations.

ACTIVITY 1

Use a graphing calculator to solve the system of equations.

$$y = x^2 - x - 6$$
$$y = x - 3$$

Clear the memory and reset the viewing window.

Select **MEM** from the main menu, then ▼ **Reset** [F1] [MENU] [5] [SHIFT] [F3] [F3] [EXE].

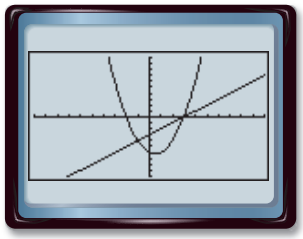
Step 1 Enter each equation in the **Graph Func** list. Enter the quadratic equation as **Y1** and the linear equation as **Y2**.

KEYSTROKES: [X,θ,T] [x^2] [−] [X,θ,T] [−] 6 [EXE] [X,θ,T] [−] 3 [EXE]

Step 2 Graph the system.

KEYSTROKE: [F6]

The solutions of the system are the intersection points. The graphs intersect at two points. So, there are two solutions.



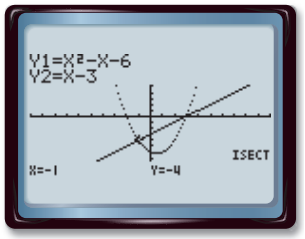
[−10, 10] scl: 1 by [−10, 10] scl: 1

Step 3 Find the first intersection of the graphs by using the **G-solv** menu.

KEYSTROKES: [SHIFT] [G-solv] [F5]

On the screen, notice the point that appears on the left most point of the linear graph. It travels along the line until it reaches the point of intersection.

The intersection is the point at $(-1, -4)$.

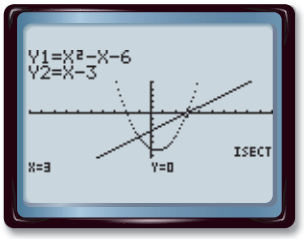


[−10, 10] scl: 1 by [−10, 10] scl: 1

Step 4 Press ▶ twice to find the second point of intersection.

The intersection is at (3, 0).

Therefore, the solutions of the system of equations are (–1, –4) and (3, 0).



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ACTIVITY 2

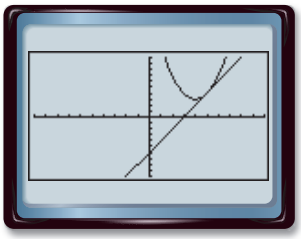
Use a graphing calculator to solve the system of equations.

$y = x^2 - 8x + 19$
$y = 2x - 6$

Step 1 Enter each equation in the Graph Func list.

Enter the quadratic equation as Y1 and the linear equation as Y2.

KEYSTROKES: SHIFT [G↔T] ▲ ▲ F2 F1 X,θ,T x^2 — 8 X,θ,T + 19 EXE F2 F1 2 X,θ,T — 6 EXE



[−10, 10] scl: 1 by [−10, 10] scl: 1

Step 2 Graph the system.

KEYSTROKE: F6

In this case, the graphs of the equations intersect at only one point. Therefore, there is only one solution of this system of equations.

Step 3 Find the intersection of the graphs of the equations.

KEYSTROKES: SHIFT [G-Solv] F5

The intersection is the point at about (5, 4).

Thus, the solution of the system of equations is about (5, 4).

ACTIVITY 3

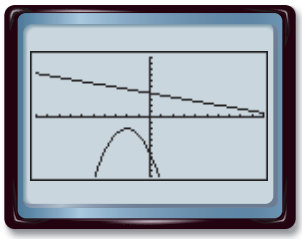
Use a graphing calculator to solve the system of equations.

$y = -x^2 - 4x - 6$
$y = -\frac{1}{3}x + 4$

Step 1 Enter each equation in the Graph Func list.

Enter the quadratic equation as Y1 and the linear equation as Y2.

KEYSTROKES: SHIFT [G↔T] ▲ ▲ F2 F1 (–) X,θ,T x^2 — 4 X,θ,T — 6 EXE F2 F1 (–) (1 ÷ 3) X,θ,T + 4 EXE



[−10, 10] scl: by [−10, 10] scl:

Step 2 Graph the system.

KEYSTROKE: F6

The graphs of the equations do not intersect. Thus, this system of equations has no solution.

Exercises

Use factoring to solve each system of equations. Then use a graphing calculator to check your solutions.

1. $y = x^2 + 7x + 12$
$y = 2x + 8$

2. $y = x^2 - x - 20$
$y = 3x + 12$

3. $y = 3x^2 - x - 2$
$y = -2x + 2$

Use a graphing calculator to solve each system of equations.

4. $y = x^2$
$y = 2x$

5. $y = -x^2 - 6x - 3$
$y = 6$

6. $y = -x^2 + 4$
$y = \frac{1}{2}x + 5$

7. $y = x^2 + 5x + 4$
$y = -x - 8$

8. $y = \frac{1}{2}x^2 - 4$
$y = 3x + 4$

9. $y = x^2$
$y = -2x - 1$