

Graphing Technology Lab

Systems of Linear and Quadratic Equations

Sharp EL-9900C

You can use a Sharp EL-9900C graphing calculator to solve systems involving linear and quadratic equations.

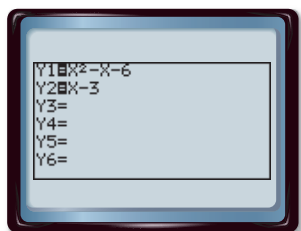
ACTIVITY 1

Use a graphing calculator to solve the system of equations.

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

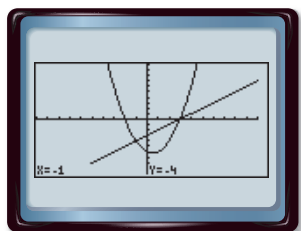
Step 1 Enter each equation in the $Y=$ list after you clear memory. Enter the quadratic equation as Y1 and the linear equation as Y2.

KEYSTROKES: 2ndF [OPTION] ALPHA [E] 2
CL ENTER $Y=$ X/θ/T/n x^2
— X/θ/T/n — 6 ENTER
X/θ/T/n — 3 ENTER



Step 3 Find the first intersection of the graphs by using the CALC menu.

KEYSTROKES: 2ndF [CALC] 2: Intsct
The intersection is at the point $(-1, -4)$.

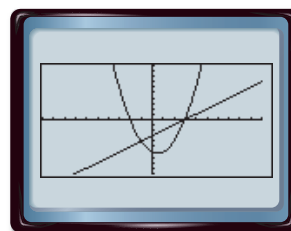


$[-10, 10]$ scl: 1 by $[-10, 10]$ scl: 1

Step 2 Graph the system.

KEYSTROKE: GRAPH

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

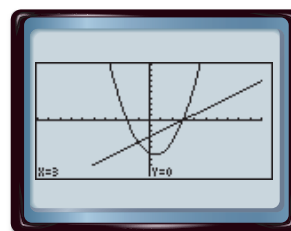


$[-10, 10]$ scl: 1 by $[-10, 10]$ scl: 1

Step 4 Find the second intersection by repeating Step 3.

The intersection is at $(3, 0)$.

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



$[-10, 10]$ scl: 1 by $[-10, 10]$ scl: 1

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 $Y=$ list.

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

KEYSTROKES: $Y=$ CL $X/\theta/T/n$ x^2 $-$ 8 $X/\theta/T/n$ $+$ 19 $ENTER$ CL 2
 $X/\theta/T/n$ $-$ 6 $ENTER$

Step 2 Graph the system. Press $GRAPH$.

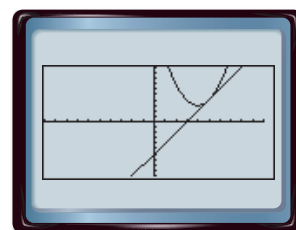
In this case, the graphs of the equations intersect at only one point. Therefore, there is only one solution of this system of equations.

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

KEYSTROKES: $2ndF$ $[CALC]$ 2: Intsct

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

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



$[-10, 10]$ scl: 1 by $[-10, 10]$ scl: 1

ACTIVITY 3

Use a graphing calculator to solve the system of equations.

$$y = -x^2 - 4x - 6$$

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

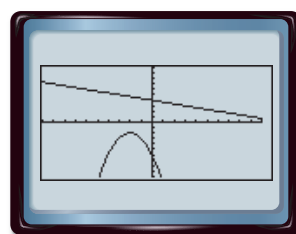
Step 1 Enter each equation in the $Y=$ list.

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

KEYSTROKES: $Y=$ CL $(-)$ $X/\theta/T/n$ x^2 $-$ 4 $X/\theta/T/n$ $-$ 6 $ENTER$ CL
 $(-)$ $($ 1 \div 3 $)$ $X/\theta/T/n$ $+$ 4 $ENTER$

Step 2 Graph the system. Press $GRAPH$.

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



$[-10, 10]$ scl: by $[-10, 10]$ scl:

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