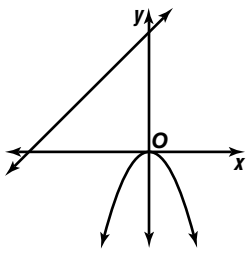
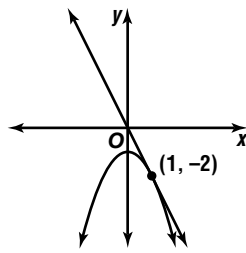
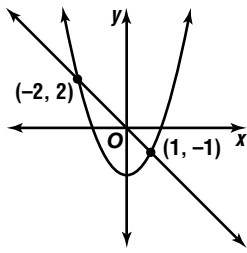


# Solving Quadratic-Linear Systems of Equations (Pages 580–585)

A **quadratic-linear** system of equations can have 0, 1, or 2 solutions. You can use graphing and substitution to solve quadratic-linear systems.

|   |   |   |
|---|---|---|
|  |  |  |
| <b>no solution</b>  | <b>one solution</b>   | <b>two solutions</b>  |

### EXAMPLE

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

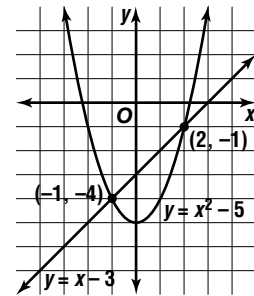
Substitute  $x - 3$  for  $y$  in the first equation.

$$\begin{aligned}
 x - 3 &= x^2 - 5 \\
 x &= x^2 - 2 && \text{Add 3 to each side.} \\
 0 &= x^2 - x - 2 && \text{Subtract } x \text{ from each side.} \\
 0 &= (x + 1)(x - 2) && \text{Factor.} \\
 0 &= x + 1 &\text{ or }& 0 = x - 2 \\
 -1 &= x && 2 = x
 \end{aligned}$$

Substitute the values of  $x$  into one of the original equations to find values of  $y$ . Choose the easier equation to solve.

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

The solutions are  $(-1, -4)$  and  $(2, -1)$ . The graph shows the solutions are correct.



### PRACTICE

Solve each system of equations by graphing.

- |                              |                                 |                               |   |
|------------------------------|---------------------------------|-------------------------------|---|
| 1. $y = x^2 + 3$<br>$y = -x$ | 2. $y = x^2 - 4$<br>$y = x + 2$ | 3. $y = -5$<br>$y = 2x^2 - 5$ | 4. $y = \frac{1}{2}x^2 + 1$<br>$y = -x + 1$ |
|------------------------------|---------------------------------|-------------------------------|---|

Use substitution to solve each system of equations.

- |                              |                                  |                                      |                                 |
|------------------------------|----------------------------------|--------------------------------------|---------------------------------|
| 5. $x = -2$<br>$y = x^2 - 1$ | 6. $y = -x^2 - 5$<br>$y = x + 1$ | 7. $y = 2x + 4$<br>$y = x^2 + x - 2$ | 8. $y = x + 4$<br>$y = x^2 - 8$ |
|------------------------------|----------------------------------|--------------------------------------|---------------------------------|



9. **Standardized Test Practice** What is the solution of the system  $y = 3x + 3$  and  $y = x^2 - 1$ ?

- A**  $(-1, 0), (4, 15)$       **B**  $(0, -1), (15, 4)$       **C** no solution      **D**  $(-1, 0)$

**Answers: 1–4.** See Answer Key for graphs. **1.** no solution **2.**  $(-2, 0), (3, 5)$  **3.**  $(0, -5)$  **4.**  $(-2, 3), (0, 1)$  **5.**  $(-2, 3)$  **6.** no solution **7.**  $(-2, 0), (3, 10)$  **8.**  $(-3, 1), (4, 8)$  **9.** A