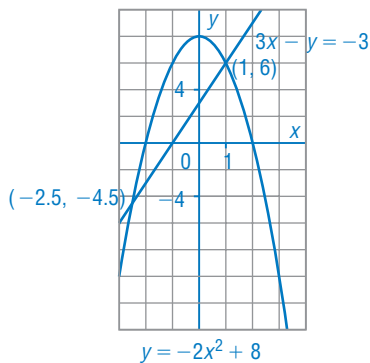# Lesson 5.4 Math Lab: Assess Your Understanding, pages 388–390

Use a graphing calculator.
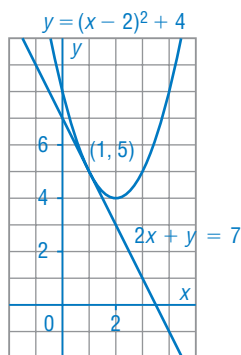
1. a) Graph each system of equations. On the grids below:
- Sketch the graphs.
- Label them with their equations.
- Write the coordinates of the points of intersection.
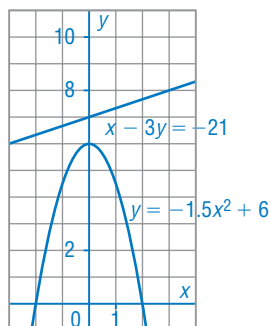
i) $y = -2x^2 + 8$
$3x - y = -3$

ii) $y = (x - 2)^2 + 4$
$2x + y = 7$

iii) $y = -1.5x^2 + 6$
$x - 3y = -21$

No points of intersection

b) Use the graphs in part a to identify the different numbers of solutions that a linear-quadratic system may have.
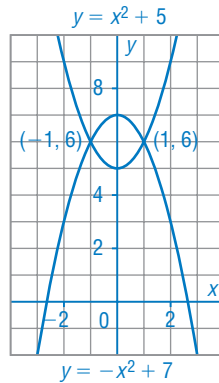
A linear-quadratic system may have 2 solutions, 1 solution, or no solution.

2. a) Graph each system of equations. On the grids below:
- Sketch the graphs.
- Label them with their equations.
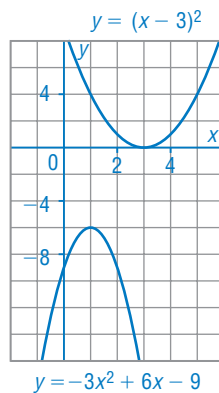- Write the coordinates of the points of intersection.
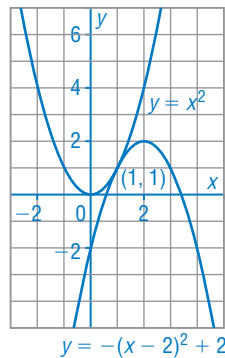
i) $y = x^2 + 5$
$y = -x^2 + 7$

$y = x^2 + 5$

$(-1, 6)$ $(1, 6)$

$y = -x^2 + 7$

ii) $y = (x - 3)^2$
$y = -3x^2 + 6x - 9$

No points of intersection

$y = (x - 3)^2$

$y = -3x^2 + 6x - 9$

iii) $y = x^2$
$y = -(x - 2)^2 + 2$

$y = x^2$

$(1, 1)$

$y = -(x - 2)^2 + 2$

iv) $y = -2(x + 3)^2 - 4$
$y = -2x^2 - 12x - 22$

Infinite points of intersection

$y = -2(x + 3)^2 - 4$
$y = -2x^2 - 12x - 22$
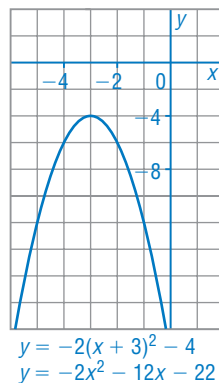
b) Use the graphs in part a to identify the different numbers of solutions that a quadratic-quadratic system may have.

> **A quadratic-quadratic system may have infinite solutions, 2 solutions, 1 solution, or no solution.**

3. Graph each system of equations, then write the coordinates of the points of intersection to the nearest tenth.
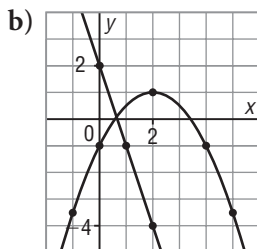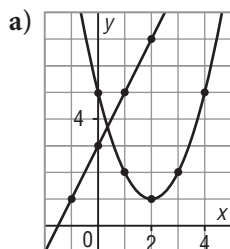
a) $y = 2x^2 + 5x - 3$
$y = -3x + 2$

b) $y = -2x^2 + 2x + 5$
$y = x^2 - 7x + 9$

> **(−4.5, 15.6) and (0.5, 0.4)**

> **(0.5, 5.5) and (2.5, −2.2)**

4. Write the system of equations represented by each graph, then solve the system. Give the solutions to the nearest tenth.

a)

b)

> **The line has slope 2 and y-intercept 3: $y = 2x + 3$ ①**
> **The parabola has vertex (2, 1) and is congruent to $y = x^2$: $y = (x - 2)^2 + 1$ ②**
> **Equations ① and ② form the system.**
> **The approximate solutions are: (0.4, 3.7), (5.6, 14.3)**

> **The line has slope −3 and y-intercept 2: $y = -3x + 2$ ①**
> **The parabola has vertex (2, 1) and is congruent to $y = -0.5x^2$: $y = -0.5(x - 2)^2 + 1$ ②**
> **Equations ① and ② form the system.**
> **The approximate solutions are: (0.6, 0.1), (9.4, −26.1)**

5. Explain the meaning of the points of intersection of a linear-quadratic system or a quadratic-quadratic system.

> **The points of intersection of a linear-quadratic system or quadratic-quadratic system are the points where the graphs of the equations in the system intersect. The coordinates of each point of intersection satisfy both equations in the system.**