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) \( y = -2x^2 + 8 \)
   \( 3x - y = -3 \)

   ![Graph of a parabola and a line](image1)

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

   ![Graph of a parabola and a line](image2)

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

   ![Graph of a parabola and a line](image3)

   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) \( y = x^2 + 5 \)
   \( y = -x^2 + 7 \)

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

   No points of intersection

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

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

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

   b) The line has slope \(-3\) and \( y \)-intercept 2: \( y = -3x + 2 \)  
   The parabola has vertex \((2, 1)\) and is congruent to \( y = -0.5x^2 \)  
   Equations ③ and ④ 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.