Investigating
Special Types of Linear Systems

GROUP ACTIVITY
Work in a small group.

MATERIALS
• graph paper

▶ **QUESTION** How can you identify the number of solutions of a linear system by graphing?

▶ **EXPLORING THE CONCEPT**

1 Each member of your group should choose a different one of the linear systems below and graph it.

a. $x + y = 0$
$3x - 2y = 10$

b. $2x - 4y = 6$
$x - 2y = 3$

c. $x - y = 1$
$-3x + 3y = 3$

2 Share your graphs. How are the three graphs different?

3 For the system you graphed, write both equations in the form $y = mx + b$.

4 Share your results from **Step 3** with the others in your group. How are the equations within each system alike or different?

STUDENT HELP

▶ **Look Back**
For help with graphing linear systems, see p. 399.

▶ **DRAWING CONCLUSIONS**

1. Repeat **Steps 1** through **4** above using the following systems.

a. $x - 3y = 9$
$-2x + 6y = -18$

b. $x - \frac{1}{4}y = 5$
$5x + \frac{1}{4}y = 7$

c. $x + 2y = 3$
$x + 2y = 6$

Write a linear system for the graphical model. If only one line is shown, write two different equations for the line.

2.

3.

4.
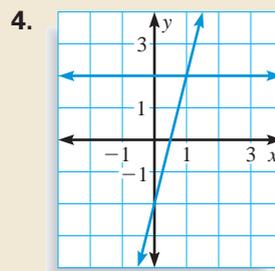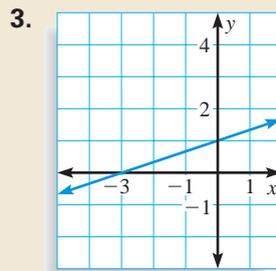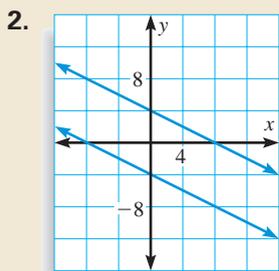
CRITICAL THINKING In Exercises 5–7, the graph of a linear system is described. Decide whether the system has *no solution*, *exactly one solution*, or *many solutions*. Explain your reasoning.

5. The slope and the *y*-intercept of the lines are the same.

6. The lines have different slopes and *y*-intercepts.

7. The lines have the same slope but different *y*-intercepts.

Have each member of your group give an example of a linear system that has the given number of solutions. Compare your results.

8. No solution

9. Exactly one solution

10. Many solutions