

LESSON
6.5**Investigating Algebra Activity:**
Special Types of Linear Systems*For use before the lesson "Solve Special Types of Linear Systems"***Materials:** graph paper**QUESTION** How can you identify the number of solutions of a linear system by graphing?**EXPLORE** Identify special types of linear systems**STEP 1** Work in a group of three

When you graph a system of equations there are three possible outcomes. Each member of your group should choose a different one of the linear systems below and graph it.

a. $x + y = 0$
 $2x + y = 2$

b. $2x - 6y = 8$
 $x - 3y = 4$

c. $x - y = 1$
 $-2x + 2y = 2$

STEP 2 Share graphs

Share your graphs with the other members of your group. How are the graphs different?

STEP 3 Write equations in slope-intercept formFor the system you graphed, write both equations in the form $y = mx + b$.**STEP 4** Share results

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

DRAW
CONCLUSIONS**Use your observations to complete these exercises.**

1. Repeat Steps 1–4 above using the following systems.

a. $x + y = 6$
 $-x + y = -2$

b. $y = 2x + 1$
 $2y = 4x + 2$

c. $y = \frac{1}{2}x - 3$
 $-x + 2y = 8$

In Exercises 2–4, the graph of a linear system is described. Decide whether the system has *no solution*, *exactly one solution*, or *many solutions*. Explain your reasoning.

- The slopes and the y -intercepts of the lines are the same.
- The lines have different slopes and y -intercepts.
- 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.

- No solution
- Exactly one solution
- Many solutions