ACTIVITY 3.2

Developing Concepts

Group Activity for use with Lesson 3.2

Combining Equations in a Linear System

GROUP ACTIVITY
Work with a partner.

MATERIALS
- graph paper
- ruler

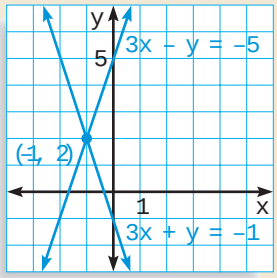
QUESTION

For a system of two linear equations with exactly one solution, how is the graph of the *sum* of the equations related to the graph of the system?

EXPLORING THE CONCEPT

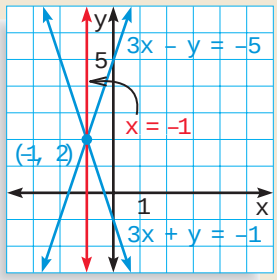
1 Graph the system and label the point of intersection.

$$3x - y = -5$$
$$3x + y = -1$$



2 Add the two equations in the system. Graph the resulting equation in the same coordinate plane you used to graph the system.

$$\begin{array}{r} 3x - y = -5 \\ 3x + y = -1 \\ \hline 6x = -6 \\ x = -1 \end{array}$$



3 Note how the graph of the sum of the equations is related to the graph of the system.

DRAWING CONCLUSIONS

1. Repeat the steps above for each system.

a. $10x + 4y = 24$
$-6x - 4y = 8$

b. $x - 2y = 2$
$-x + 4y = -20$

c. $6x - 3y = 27$
$2x + y = -9$

d. $x - y = -3$
$-2x + 5y = 6$

e. $7x + 20y = 0$
$-3x + 6y = 4$

f. $2x - y = -3$
$x + 2y = 6$

2. What seems to be true about the graph of the sum of two equations in a system if the system has exactly one solution?

3. Consider the following general system that has a single solution (p, q).

$$Ax + By = C$$
$$Dx + Ey = F$$

Use this system to justify your conclusion from Exercise 2 algebraically.