

## Number Talks

$$43 - 17$$

## **Essential Question**

Can a system of linear equations have no solution or infinitely many solutions?

**Work with a partner.** You invest \$450 for equipment to make skateboards. The materials for each skateboard cost \$20. You sell each skateboard for \$20.

a. Write the cost and revenue equations. Then copy and complete the table for your cost  $C$  and your revenue  $R$ .

$x$ (skateboards)	0	1	2	3	4	5	6	7	8	9	10
$C$ (dollars)											
$R$ (dollars)											

b. When will your company break even? What is wrong?

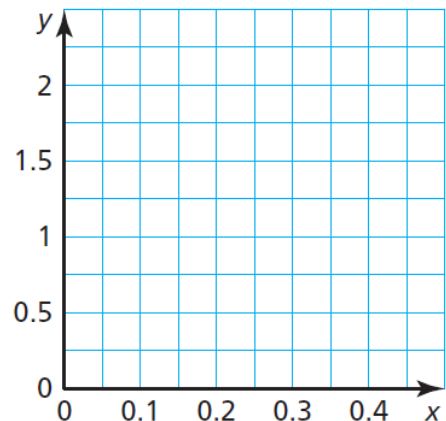
**Work with a partner.** A necklace and matching bracelet have two types of beads.

The necklace has 40 small beads and 6 large beads and weighs 10 grams. The bracelet has 20 small beads and 3 large beads and weighs 5 grams. The threads holding the beads have no significant weight.

**a.** Write a system of linear equations that represents the situation. Let  $x$  be the weight (in grams) of a small bead and let  $y$  be the weight (in grams) of a large bead.

**b.** Graph the system in the coordinate plane shown. What do you notice about the two lines?

**c.** Can you find the weight of each type of bead?



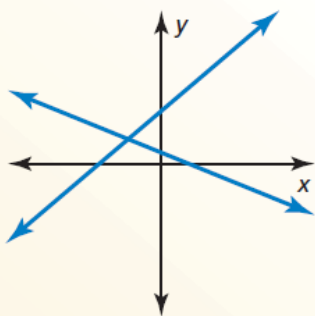
Explain your reasoning.

## Core Concept

### Solutions of Systems of Linear Equations

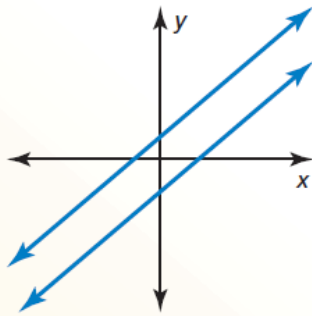
A system of linear equations can have *one solution*, *no solution*, or *infinitely many solutions*.

**One solution**



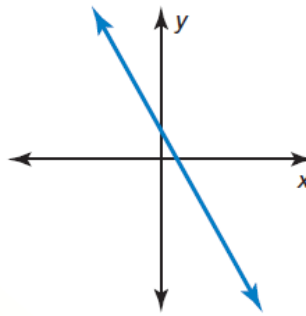
The lines intersect.

**No solution**



The lines are parallel.

**Infinitely many solutions**



The lines are the same.

Solve the system of linear equations.

$$y = 2x + 1 \text{ Equation 1}$$

$$y = 2x - 5 \text{ Equation 2}$$

Solve the system of linear equations.

$$-2x + y = 3 \quad \text{Equation 1}$$

$$-4x + 2y = 6 \quad \text{Equation 2}$$

**Solve the system of linear equations.**

**1.**  $x + y = 3$

$$2x + 2y = 6$$

**2.**  $y = -x + 3$

$$2x + 2y = 4$$

**3.**  $x + y = 3$

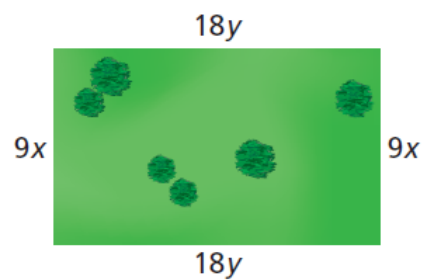
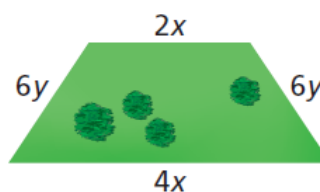
$$x + 2y = 4$$

**4.**  $y = -10x + 2$

$$10x + y = 10$$



The perimeter of the trapezoidal piece of land is 48 kilometers. The perimeter of the rectangular piece of land is 144 kilometers. Write and solve a system of linear equations to find the values of  $x$  and  $y$ .



**Exit Ticket:** Write a system of equations that has no solution.

Write a system of equations that has infinitely many solutions.