Algebra 1          6.1
Determine the number of solutions to a system of linear equations
Solve systems of linear equations by graphing

linear equation
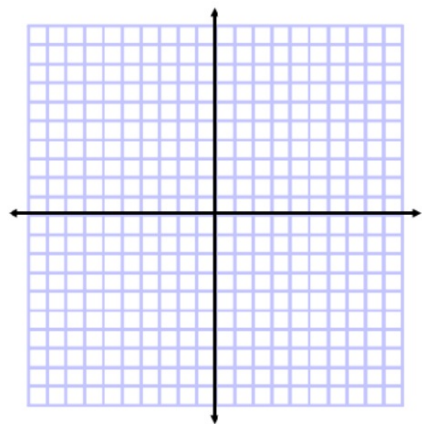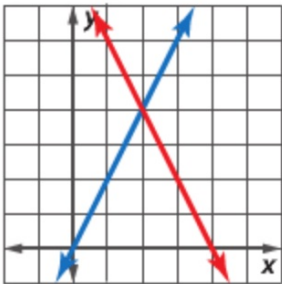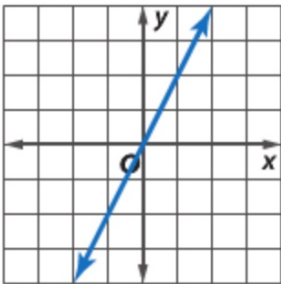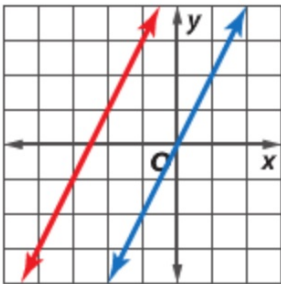system of equations
consistent
inconsistent
independent
dependent

graph matching: equation, table, graph

## ConceptSummary  Possible Solutions

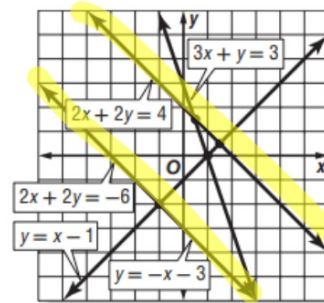| Number of Solutions | exactly one | infinite | no solution |
|---|---|---|---|
| Terminology | consistent and independent | consistent and dependent | inconsistent |
| Graph |  |  |  |

## Exercises

Use the graph at the right to determine whether each system is *consistent* or *inconsistent* and if it is *independent* or *dependent*.



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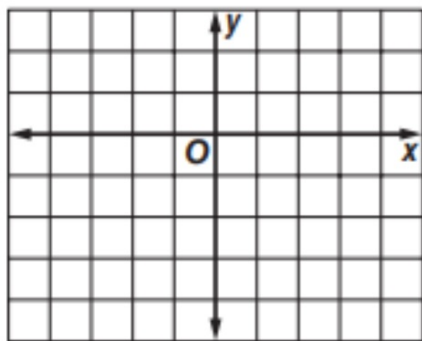   $y = x - 1$

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

3. $y = -x - 3$
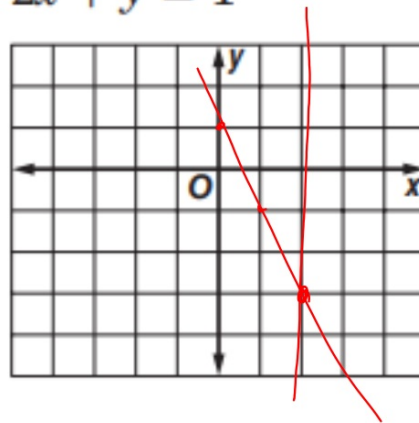   $2x + 2y = 4$

4. $2x + 2y = -6$
   $3x + y = 3$
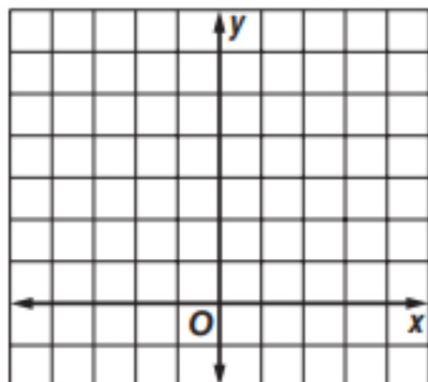
**1.** $y = -2$

$3x - y = -1$

**2.** $x = 2$

$2x + y = 1$

$(2, -3)$

$C + I$
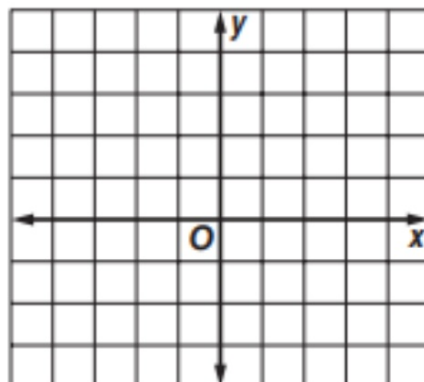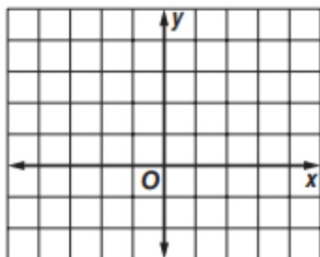
**4.** $2x + y = 6$

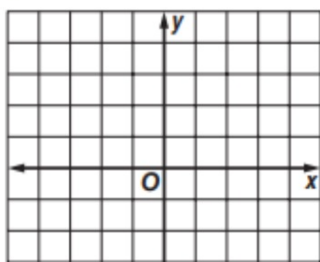$2x - y = -2$

**5.** $3x + 2y = 6$

$3x + 2y = -4$

**3.** $y = \frac{1}{2}x$

$x + y = 3$



**6.** $2y = -4x + 4$

$y = -2x + 2$

**2. ARCHITECTURE** An office building has two elevators. One elevator starts out on the 4th floor, 35 feet above the ground, and is descending at a rate of 2.2 feet per second. The other elevator starts out at ground level and is rising at a rate of 1.7 feet per second. Write a system of equations to represent the situation.

rate change   Start

$$y = mx + b$$

$$y = -2.2x + 35$$

$$y = 1.7x + 0$$

**3. FITNESS** Olivia and her brother William had a bicycle race. Olivia rode at a speed of 20 feet per second while William rode at a speed of 15 feet per second. To be fair, Olivia decided to give William a 150-foot head start. The race ended in a tie. How far away was the finish line from where Olivia started?

$$y = 20x + 0$$

$$y = 15x + 150$$

$$y = 20 \cdot 30 = 600$$

$$y = 15 \cdot 30 + 150$$

$$450 + 150 = 600$$

$$20x + 0 = 15x + 150$$
$$-15x \qquad -15x$$

$$\frac{5x}{5} = \frac{150}{5} \qquad x = 30$$