

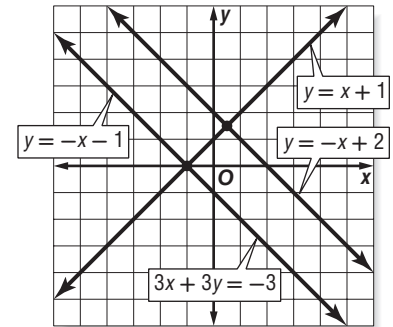
6-1 Study Guide and Intervention

Graphing Systems of Equations

Possible Number of Solutions Two or more linear equations involving the same variables form a **system of equations**. A solution of the system of equations is an ordered pair of numbers that satisfies both equations. The table below summarizes information about systems of linear equations.

Graph of a System	intersecting lines	same line	parallel lines
Number of Solutions	exactly one solution	infinitely many solutions	no solution
Terminology	consistent and independent	consistent and dependent	inconsistent

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



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

Since the graphs of $y = -x + 2$ and $y = x + 1$ intersect, there is one solution. Therefore, the system is consistent and independent.

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

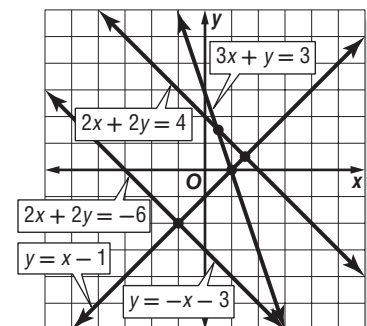
Since the graphs of $y = -x + 2$ and $3x + 3y = -3$ are parallel, there are no solutions. Therefore, the system is inconsistent.

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

Since the graphs of $3x + 3y = -3$ and $y = -x - 1$ coincide, there are infinitely many solutions. Therefore, the system is consistent and dependent.

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

6-1 Study Guide and Intervention *(continued)*

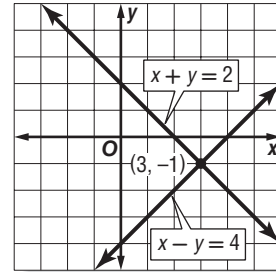
Graphing Systems of Equations

Solve by Graphing One method of solving a system of equations is to graph the equations on the same coordinate plane.

Example Graph each system and determine the number of solutions that it has. If it has one solution, name it.

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

The graphs intersect. Therefore, there is one solution. The point $(3, -1)$ seems to lie on both lines. Check this estimate by replacing x with 3 and y with -1 in each equation.



$$x + y = 2$$

$$3 + (-1) = 2 \quad 3$$

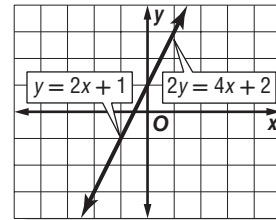
$$x - y = 4$$

$$3 - (-1) = 3 + 1 \text{ or } 4 \quad 3$$

The solution is $(3, -1)$.

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

The graphs coincide. Therefore there are infinitely many solutions.

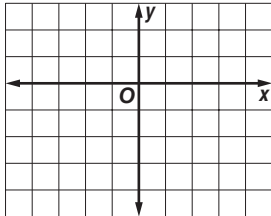


Exercises

Graph each system and determine the number of solutions it has. If it has one solution, name it.

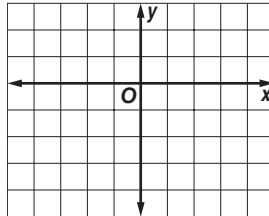
1. $y = -2$

$$3x - y = -1$$



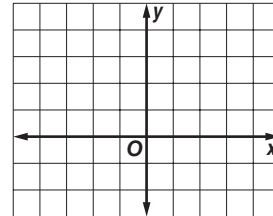
2. $x = 2$

$$2x + y = 1$$



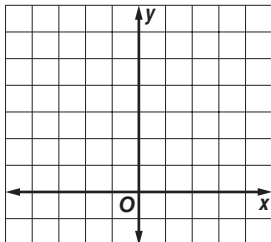
3. $y = \frac{1}{2}x$

$$x + y = 3$$



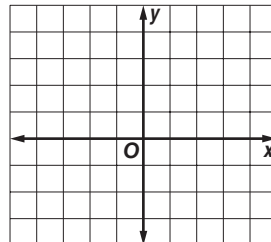
4. $2x + y = 6$

$$2x - y = -2$$



5. $3x + 2y = 6$

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



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

$$y = -2x + 2$$

