

7.5

Solve Special Types of Linear Systems

- Goal** • Identify the number of solutions of a linear system.

Your Notes

VOCABULARY

Inconsistent system

Consistent dependent system

Example 1 *A linear system with no solutions*

Show that the linear system has no solution.

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

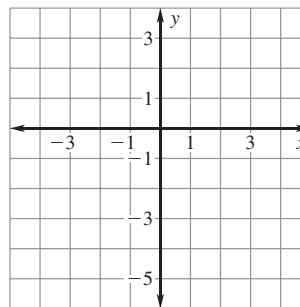
$$-2x + y = -3 \quad \text{Equation 2}$$

Solution

Method 1 Graphing

Graph the linear system.

The lines are _____ because they have the same slope but different y-intercepts. Parallel lines do _____, so the system has _____.



Method 2 Elimination

Subtract the equations.

$$-2x + y = 1$$

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

$$\underline{\quad} = \underline{\quad}$$

The variables are _____ and you are left with a _____ regardless of the values of x and y . This tells you that the system has _____.

To ease graphing, write each equation in slope intercept form.

Example 2 A linear system with infinitely many solutions

Show that the linear system has infinitely many solutions.

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

$$3x + 9y = -9 \quad \text{Equation 2}$$

Solution

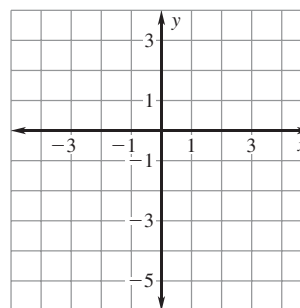
Method 1 Graphing

Graph the linear system.

The equations represent the _____, so any point

on the line is a solution.

So, the linear system has _____.



Method 2 Substitution

$$x = \underline{\hspace{2cm}}$$

Solve Equation 1 for x.

$$3x + 9y = -9$$

Write Equation 2.

$$3(\underline{\hspace{2cm}}) + 9y = -9$$

Substitute _____ for x.

$$\underline{\hspace{2cm}} + 9y = -9$$

Distributive property

$$\underline{\hspace{2cm}} = -9$$

Simplify.

The variables are _____ and you are left with a statement that is _____ regardless of the values of x and y. This tells you that the system has _____.

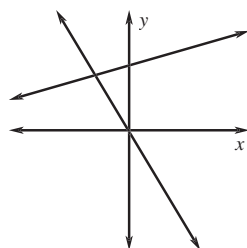
Your Notes

✔ **Checkpoint** Tell whether the linear system has no solution or infinitely many solutions.

<p>1. $y = 2x - 7$ $4x - 2y = 14$</p>	<p>2. $2y = 8x + 4$ $-4x + y = 4$</p>
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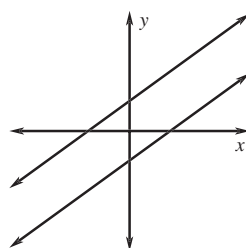
NUMBER OF SOLUTIONS OF A LINEAR SYSTEM

One solution



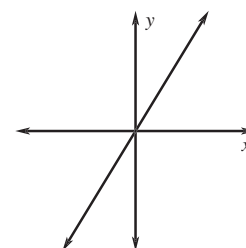
The lines _____.
The lines have _____ slopes.

No solution



The lines are _____.
The lines have the same slope and _____ y-intercepts.

Infinitely many solutions



The lines _____.
The lines have the same slope and the _____.

Homework