

Friday, February 21, 2020



1.7 Exploring Linear Systems

When you are solving linear systems, there are three possible ways that the lines will interact with one another.

1) The Lines Cross at Exactly One Point

In most cases, two lines will meet at one point, resulting in one unique solution for the system of equations.

2) The Lines Never Cross

The lines are parallel to one another, so they will never meet.

3) The Lines Cross at Every Point

The lines have the same slope and y - intercept, resulting in an **infinite number of solutions**.

What to Look For:

Number of Solutions	Given Equations	Given a Graph
One Unique Solution		A coordinate grid with a vertical y-axis and a horizontal x-axis. Two lines intersect at a single point in the first quadrant. The lines are represented by black arrows extending across the grid.
No Solutions		A coordinate grid with a vertical y-axis and a horizontal x-axis. Two parallel lines are drawn, one above the other, representing a system with no solutions. The lines are represented by black arrows extending across the grid.
An Infinite Number of Solutions		A coordinate grid with a vertical y-axis and a horizontal x-axis. Two overlapping lines are drawn, representing a system with an infinite number of solutions. The lines are represented by black arrows extending across the grid.

When you are asked to determine the number of solutions that a system of equations has, you just need to find the slope and y - intercept for each line. This is enough information for you to be able to decide if there is one, none, or an infinite number of solutions for a linear system.

What will happen if you solve algebraically and a system has no solutions?

Solve using substitution.

$$y = 2x - 5$$

$$y = 2x + 4$$

What will happen if you solve algebraically and a system has an infinite number of solutions?

Solve using elimination.

$$-x + y = -3$$

$$x - y = 3$$

Practice Problems:

1) Determine the number of solutions for the given linear system.

$$y = -2x + 4$$

$$2x + 3y = 5$$

2) Write a linear system of equations that has no solution.

3) Use the graph provided to determine the equations for the linear system.

