Solving Linear Systems by Graphing

O Chapter 7 Section 1

Systems of Equations

O Given 2 equations, find the point (x, y) that is a solution to BOTH equations.

O There can be one solution, no solutions, or infinitely many solutions.

O There are three methods: graphing, substitution, and elimination

Systems of Equations

O Example:

O Is (3, 5) a solution of

$$2x - y = 1$$

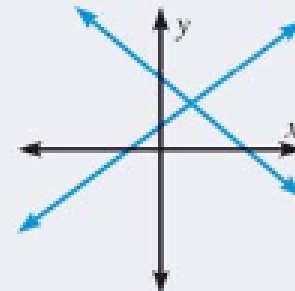$$-3x + 4y = 12$$

O What is the solution?

Number of solutions

EXACTLY ONE SOLUTION

The graph of the system is a pair of lines that intersect in one point.

The lines have different slopes.
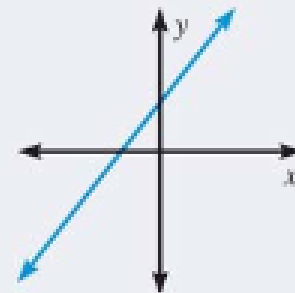
The system has exactly one solution.

INFINITELY MANY SOLUTIONS

The graph of the system is a pair of identical lines.

The lines have the same slope and the same y-intercept.
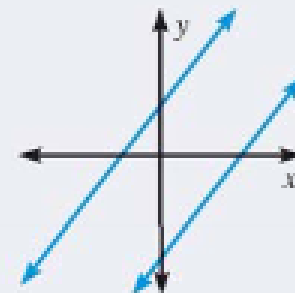
The system has infinitely many solutions.

NO SOLUTION

The graph of the system is a pair of parallel lines, which do not intersect.

The lines have the same slope and different y-intercepts.
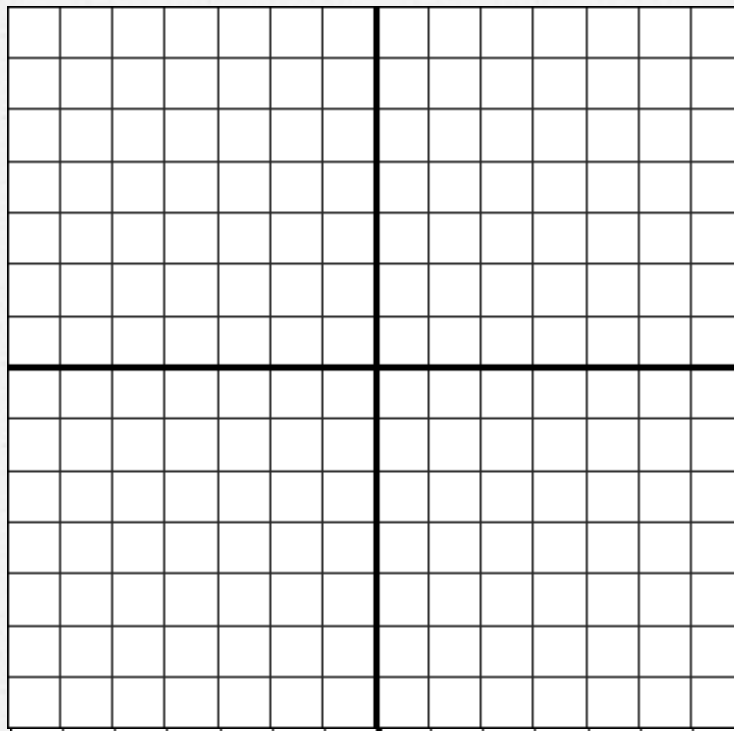
The system has no solution.

Solving Using Graphing

O Steps:

O 1. Put both equations in slope-intercept form

O Solve for y. $y = mx + b$

O 2. Graph both equations on the same coordinate plane

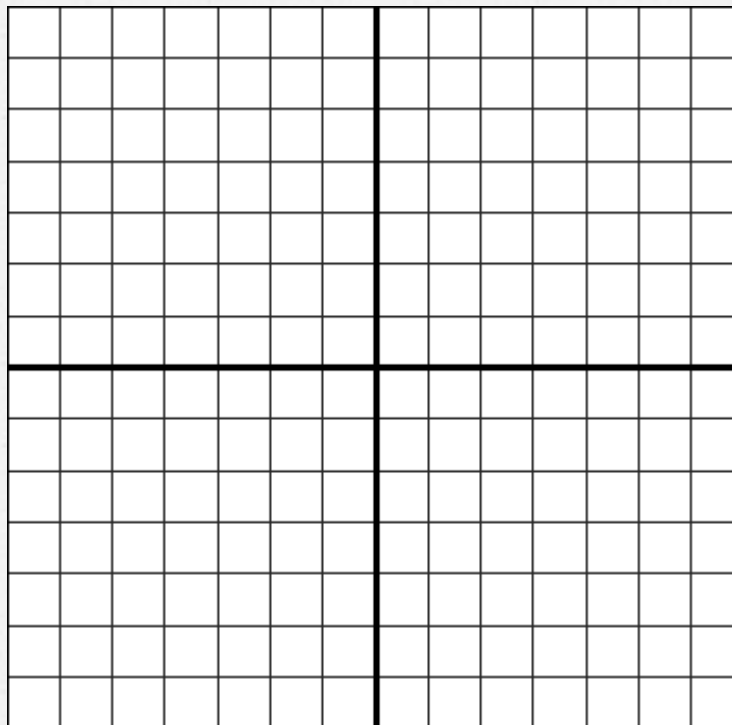O 3. Find the point where they intersect

Examples:

$$y = 3x + 3$$
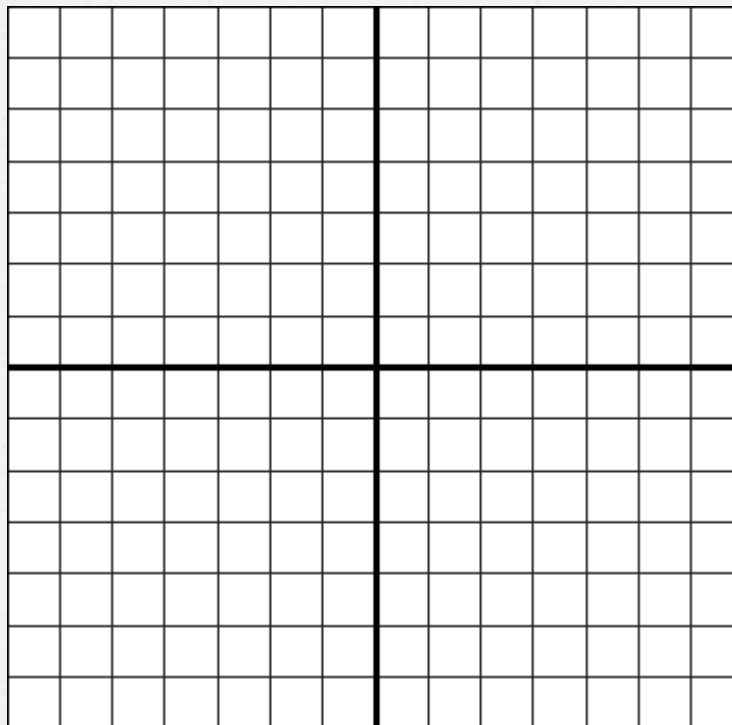
○ 1. $\quad y = -\dfrac{1}{2}x - 4$

Examples:

o 2.
$$5x - 2y = -10$$
$$2x - 4y = 12$$

Examples:

3.
$$x + 2y = 4$$
$$x + 2y = 1$$

Examples:

$$2x - y = 1$$

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