Unit 9: Lesson 02 — Solving two linear equations by graphing

A system of equations is two or more equations. The two equations that follow comprise a **system** of equations:

$4x - 3y = 0$
$5x + 7y = -3$

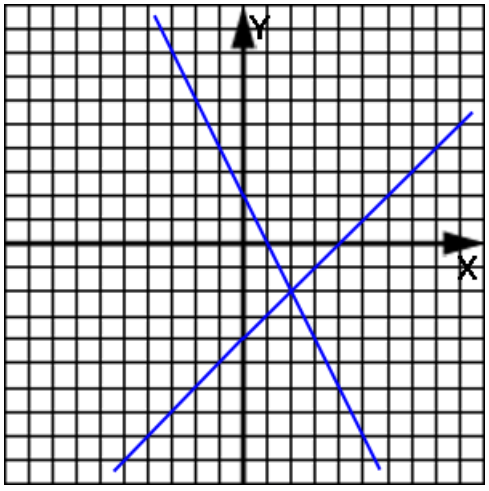
A system of two linear equations can be solved by graphing them and then observing where they intersect.

The (x, y) intersection point is the solution of the system.

Example 1: Solve this system by graphing:

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

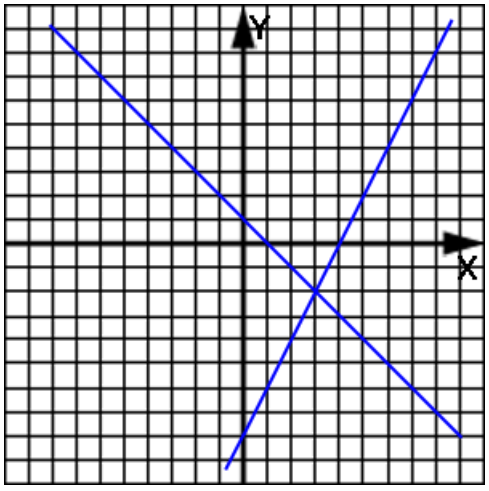
(x, y) = (2, -2)



Example 2: Graphically find the intersection point of this system:

$y = 2x - 8$
$y = -x + 1$

(x, y) = (3, -2)

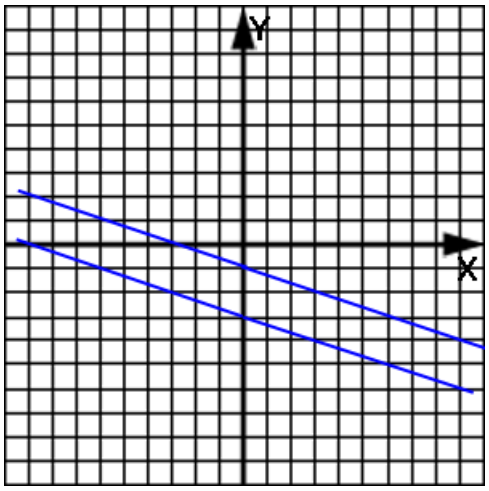


Example 3: Solve this system:

$-3y - x = 3$
$6y + 2x = -18$

$-3y - x = 3$
$-3y = x + 3$
$y = \frac{1}{-3}x + \frac{3}{-3}$
$y = -\frac{1}{3}x - 1$
$m_1 = -\frac{1}{3}$

$6y + 2x = -18$
$6y = -2x - 18$
$y = \frac{-2}{6}x + \frac{-18}{6}$
$y = -\frac{1}{3}x - 3$
$m_2 = -\frac{1}{3}$



parallel lines, no solution

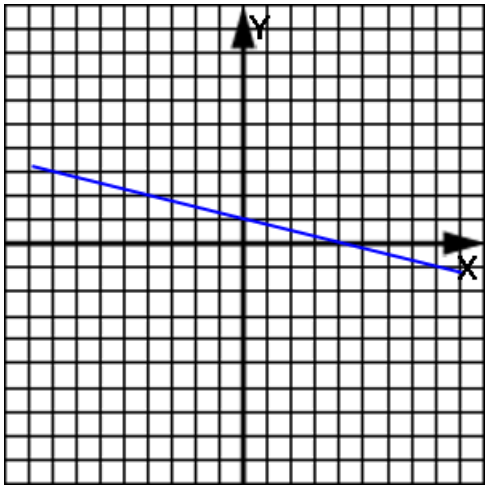
Example 4: Solve for *x* and *y* from:

$x + 4y = 4$; $-2x - 8y = -8$

$x + 4y = 4$
$4y = -x + 4$
$y = -\frac{1}{4}x + 1$

$-2x - 8y = -8$
$-8y = 2x - 8$
$y = \frac{2}{-8}x - \frac{8}{-8}$
$y = -\frac{1}{4}x + 1$

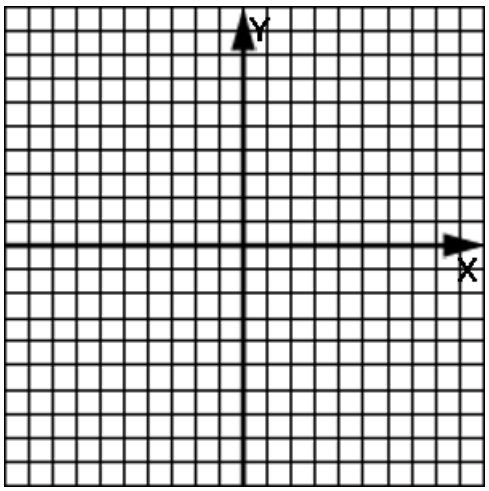
same



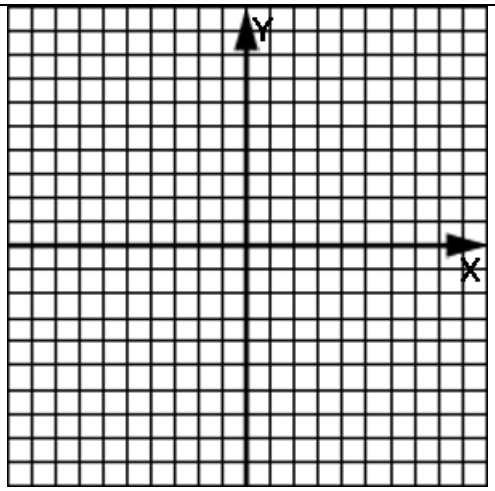
...same equation . . . so, there are two lines on top of each other. Infinitely many solutions along the line.

Assignment: Solve the following systems by graphing and finding the intersection point.

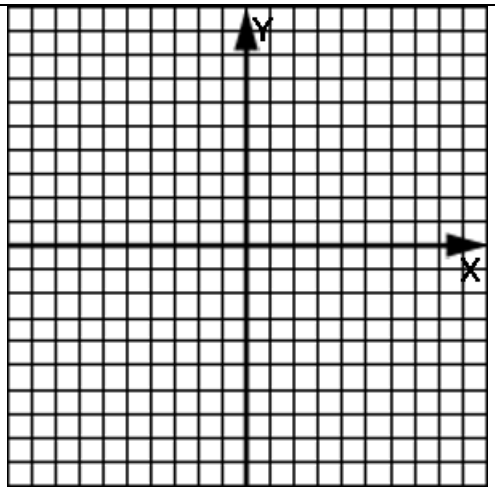
1. $y = 4x - 3$; $y = -2x + 9$



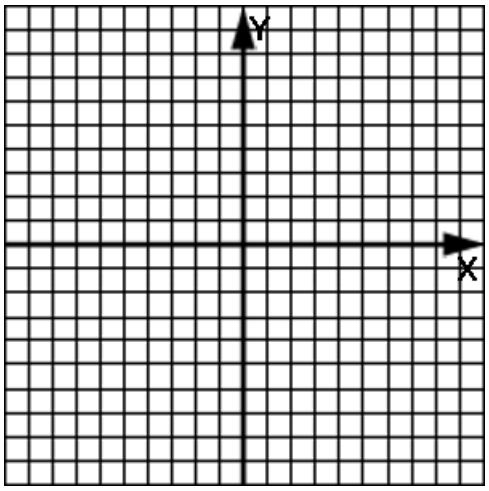
2. $2x - y = 1$; $4x - 2y = 2$



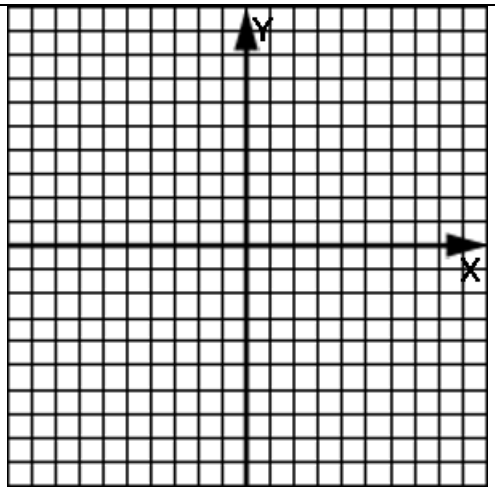
3. $y = (1/2)x - 1$; $y = (1/2)x - 4$



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



5. $4x - 3y = -6$; $4x - 2y = 0$



6. $x - 2y = 8$; $2x + y = 1$