

Lesson 6-4

Example 1

Solve the system of equations by graphing.

$$y = \frac{-2}{3}x + 2$$

$$y = -2x - 2$$

Solution

Graph each equation. Then read the solution.

$$y = \frac{-2}{3}x + 2 \quad b = 2, m = \frac{-2}{3}; \text{ use } (3, 0)$$

$$y = -2x - 2 \quad b = -2, m = -2; \text{ use } (1, -4)$$

The lines intersect at the point $(-3, 4)$.The solution of system of equations is $(-3, 4)$.*Check:* Substitute $(-3, 4)$ in each equation.

$$y = \frac{-2}{3}x + 2$$

$$4 = \frac{-2}{3}(-3) + 2$$

$$4 = 2 + 2$$

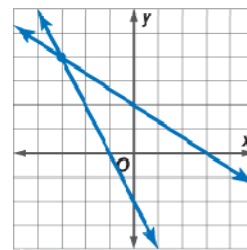
$$4 = 4 \quad \checkmark$$

$$y = -2x - 2$$

$$4 = (-2)(-3) - 2$$

$$4 = 6 - 2$$

$$4 = 4 \quad \checkmark$$



Example 2

Solve the system of equations by graphing.

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

$$-3y = x - 6$$

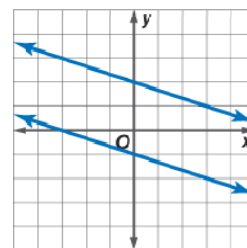
Solution

Graph each equation. Then read the solution.

$$y = \frac{-1}{3}x - 1 \quad b = -1, m = \frac{-1}{3}; \text{ use } (3, -2)$$

$$y = \frac{-1}{3}x + 2 \quad \text{Rewrite in slope-intercept form.}$$

$$b = 2, m = \frac{-1}{3}; \text{ use } (3, 1)$$



The lines are parallel and do not intersect. Therefore, there is no solution.

Example 3

Solve the system of equations by graphing. $3x - 6y = 12$
 $x - 2y = 4$

Solution

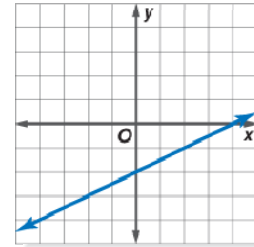
Graph each equation. Then read the solution.

$$3x - 6y = 12$$

$$y = \frac{1}{2}x - 2 \quad \text{Divide both sides by } -6.$$

$$x - 2y = 4$$

$$y = \frac{1}{2}x - 2 \quad \text{Divide both sides by } -2.$$



The equations are equivalent. The graphs are on the same line. The lines coincide. They system has an infinite number of solutions.

Example 4

INCOME TAX Refer to the table on page 259 of your textbook. Peter's taxable income in 1999 was \$22,000. Find the amount of income he will owe.

Solution

$$T = 0.15x$$

$$T = 0.15(22,000)$$

$$T = \$3300$$

His income is less than \$27,750.