3.1 – Solve Linear Systems by Graphing

A system of linear equations consists of two equations that can be written in the form:

$$Ax + By = C$$

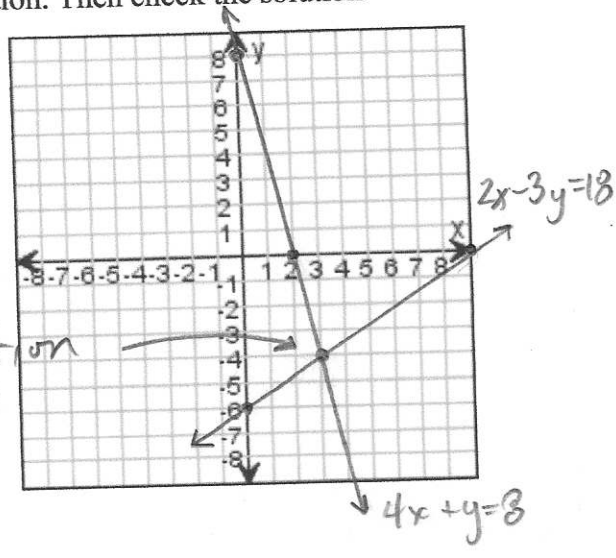
$$Dx + Ey = F$$

A solution of a system is an ordered pair (x, y) that satisfies each equation. Solutions correspond to points where the graphs of the equations intersect.

Example 1 Graph the linear system and estimate the solution. Then check the solution algebraically.

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

$2x - 3y = 18$ $x = 9$ $y = -6$



Check (3, -4)

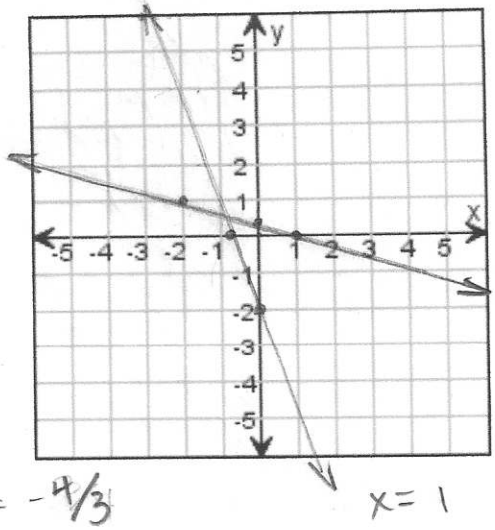
$4(3) + (-4) = 8$ $\quad 2(3) - 3(-4) = 18$

$12 - 4 = 8$ ✓ $\quad 6 + 12 = 18$ ✓

Solution (3, -4)

You Try:

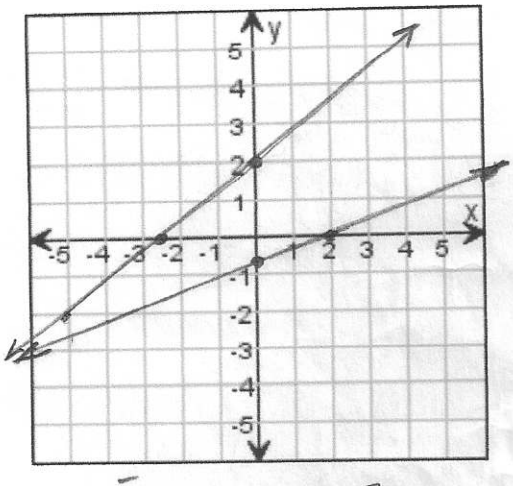
1. $3x + 2y = -4$
   $x + 3y = 1$



$x = -4/3$ $\quad y = -2$

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

2. $4x - 5y = -10$
   $2x - 7y = 4$



$x = -\frac{5}{2}$ $\quad y = 2$

$x = 2$ $\quad y = -\frac{4}{7}$

HW: 4-16 evens

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EXAMPLE 1 on p. 153 for Exs. 3–16

GRAPH AND CHECK **Graph the linear system and estimate the solution. Then check the solution algebraically.**

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

4. $y = 5x + 2$
   $y = 3x$

5. $y = -x + 3$
   $-x - 3y = -1$

6. $x + 2y = 2$
   $x - 4y = 14$

7. $y = 2x - 10$
   $x - 4y = 5$

8. $-x + 6y = -12$
   $x + 6y = 12$

9. $y = -3x - 2$
   $5x + 2y = -2$

10. $y = -3x - 13$
    $-x - 2y = -4$

11. $x - 7y = 6$
    $-3x + 21y = -18$

12. $y = 4x + 3$
    $20x - 5y = -15$

13. $5x - 4y = 3$
    $3x + 2y = 15$

14. $7x + y = -17$
    $3x - 10y = 24$

15. ★ **MULTIPLE CHOICE** What is the solution of the system?

$$-4x - y = 2$$
$$7x + 2y = -5$$

(A) $(2, -6)$ (B) $(-1, 6)$ (C) $(1, -6)$ (D) $(-3, 8)$

16. **ERROR ANALYSIS** A student used the check shown to conclude that $(0, -1)$ is a solution of this system:

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

$$3x - 2y = 2$$
$$3(0) - 2(-1) \stackrel{?}{=} 2$$
$$2 = 2$$

Describe and correct the student's error.