6.1 Solving Systems of Equations by Graphing

What is the solution of the following systems of equations?

(4,2) solution   (-2,4) solution
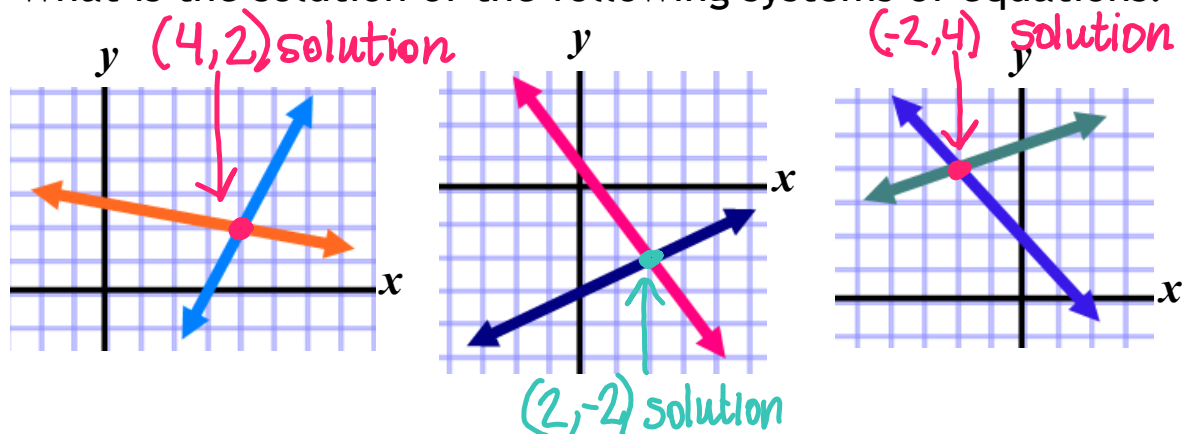
(2,-2) solution

The three above examples are called <u>consistent independent</u> systems because the lines are distinct (meaning independent) and intersect (meaning consistent).

Decide whether the ordered pair is a solution of the system of linear equations.

1. $-x + y = -2$
    $2x + y = 10$

   (-4, -2) not a solution
    x   y

$-4 + -2 \stackrel{?}{=} -2$

$2 \neq -2$

Decide whether the ordered pair is a solution of the system of linear equations.

2. $3x + y = 11$ ✓
    $x - 2y = 6$ **(4, -1)**   Solution
                           x   y

$3(4) + -1 \overset{?}{=} 11$ $4 - 2(-1) \overset{?}{=} 6$

$12 + -1 = 11$ $4 + 2 = 6$

$\quad\quad 11 = 11$ ✓ $\quad\quad 6 = 6$ ✓

Solve the system of equations by graphing.

3. $y = \frac{2}{3}x - 1$
    $y = -x + 4$

$y = \frac{2}{3}x - 1$ $y = -x + 4$

$m = \frac{2}{3}$ $m = -\frac{1}{1}$

$y\text{-int} = -1$ $y\text{-int} = 4$

solution
(3, 1)

Solve the system of equations by graphing.

4. $y = -2x + 1$
    $y = x - 5$

$y = -2x + 1$ $y = x - 5$
$m = -2$ $m = 1$
$y\text{-int} = 1$ $y\text{-int} = -5$

$\leftarrow (2, -3)$
Solution
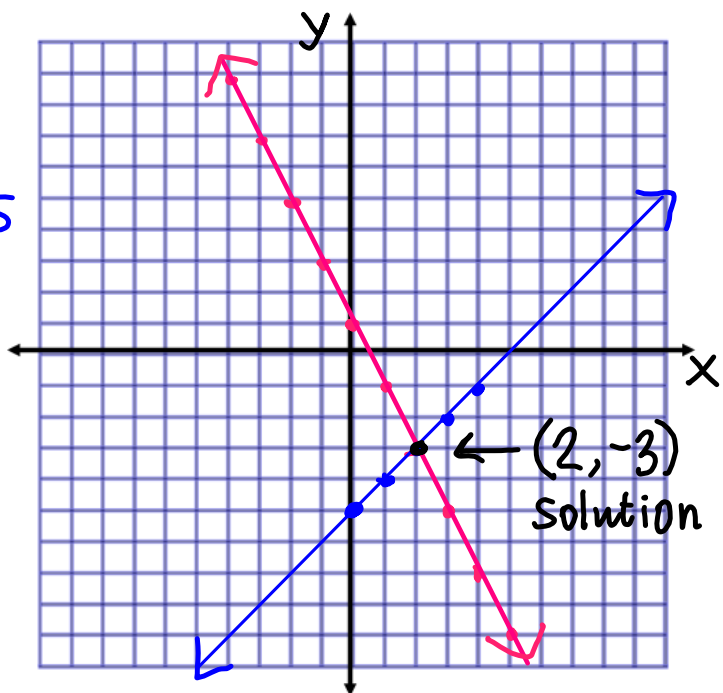
Solve the system of equations by graphing.

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

$y = 2x + 0$
$m = 2$
$y\text{-int} = 0$

$y = mx + b$
$x + \boxed{y} = 3$
$\underline{-x \qquad -x}$
$y = -x + 3$
$m = -1$
$y\text{-int} = 3$
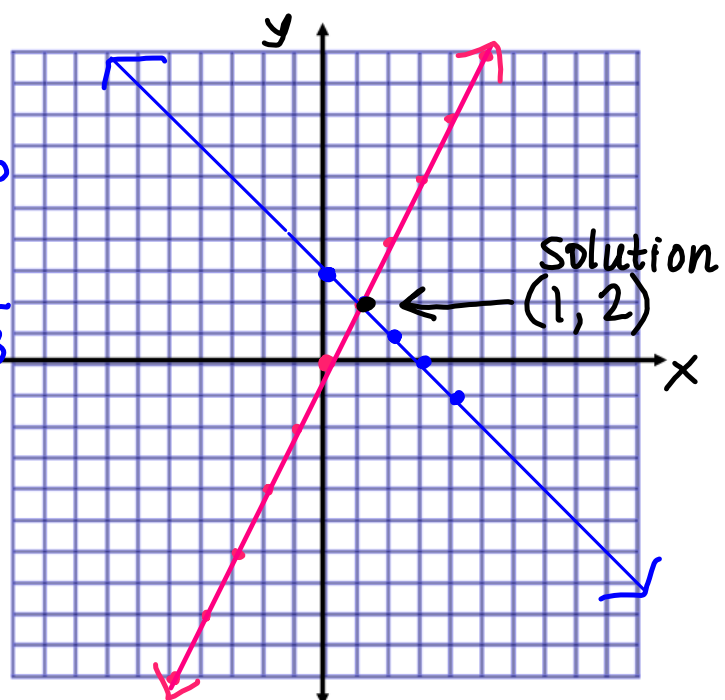
Solution
$(1, 2)$

Solve the system of equations by graphing.

6. $5x + 6y = 30$

$y = \dfrac{1}{3}x - 2$

$y = mx + b$

$5x + 6y = 30$

$-5x \qquad -5x$

$\dfrac{6y}{6} = \dfrac{-5x}{6} + \dfrac{30}{6}$

$y = -\dfrac{5}{6}x + 5$

$m = -\dfrac{5}{6}$

$y\text{-int} = 5$

$y = \dfrac{1}{3}x - 2$

$m = \dfrac{1}{3}$

$y\text{-int} = -2$

Solution
$(6, 0)$

Solve the system of equations by graphing.

no solution

7. $y = 3x + 1$

$-3x + y = -4$

$y = 3x + 1$

$m = 3$

$y\text{-int} = 1$

$y = mx + b$

$-3x + y = -4$

$+3x \qquad +3x$

$y = 3x - 4$

$m = \dfrac{3}{1}$

$y\text{-int} = -4$
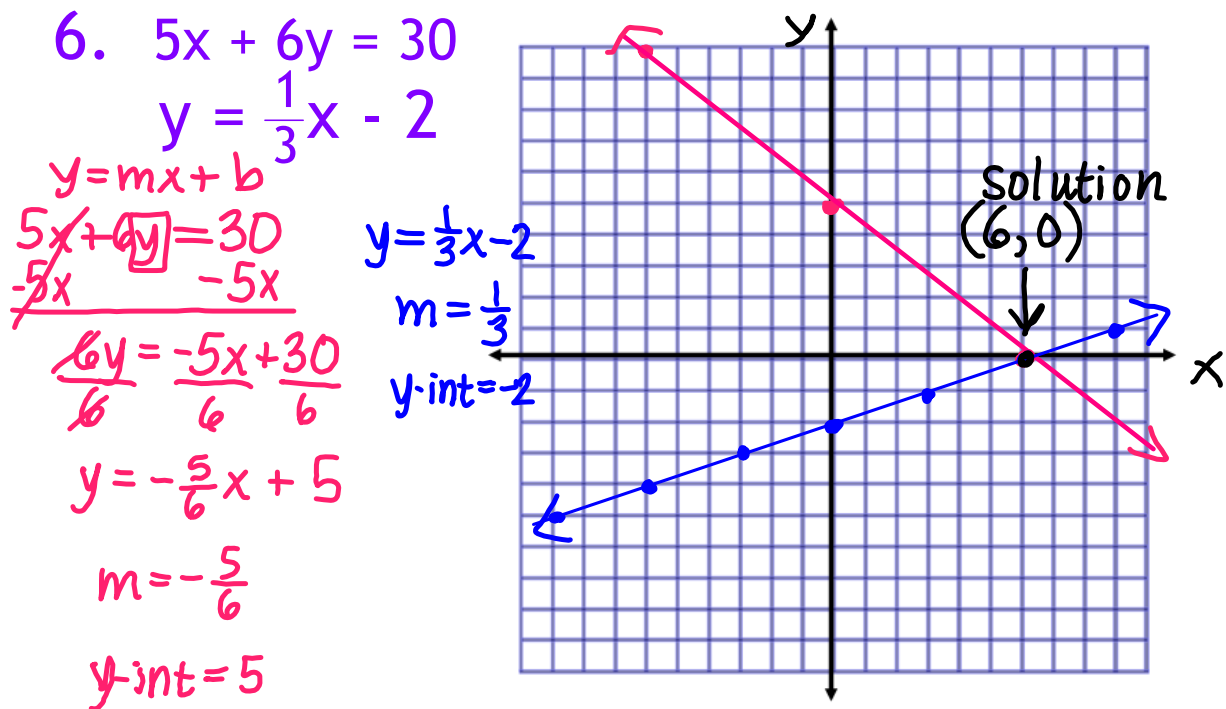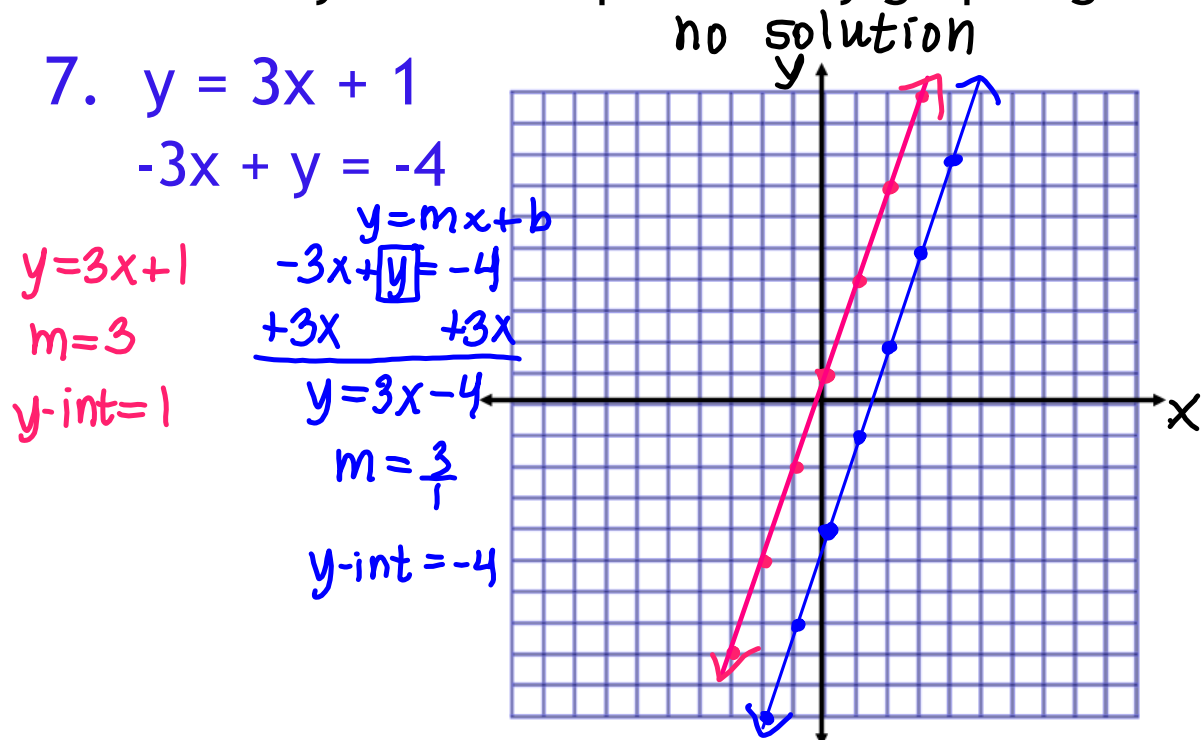
Solve the system of equations by graphing.

8. $x - 2y = 6$

$4y = 2x - 12$

$y = mx + b$

$x - 2\boxed{y} = 6$

$\cancel{x} \quad -x$

$\dfrac{-2y}{-2} = \dfrac{-x}{-2} + \dfrac{6}{-2}$

$y = \dfrac{1}{2}x - 3$

$m = \dfrac{1}{2}$

$y\text{-int} = -3$

$y = mx + b$

$\dfrac{\cancel{4}y}{\cancel{4}} = \dfrac{2x}{4} - \dfrac{12}{4}$

$y = \dfrac{1}{2}x - 3$

$m = \dfrac{1}{2}$

$y\text{-int} = -3$
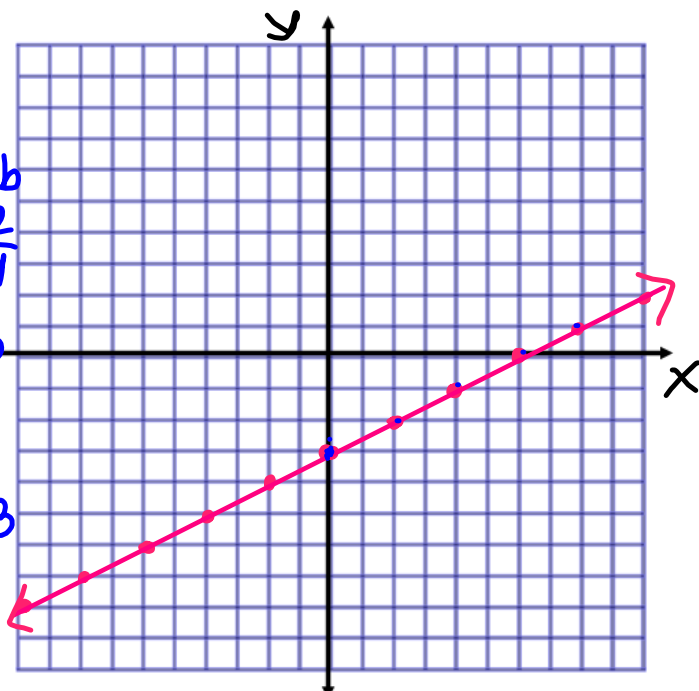
Infinitely many solutions

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10. The school is selling tickets for a fundraising event. The school sold 12 tickets for $40 on the first day of the sale. Student tickets cost $2 each and non-student tickets cost $4 each. Find the number of student tickets and the number of non-student tickets the school sold on the first day.