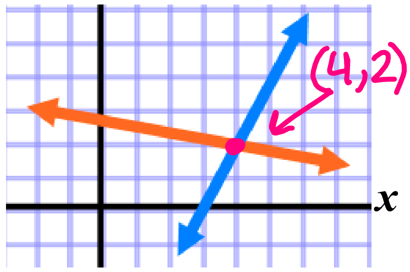
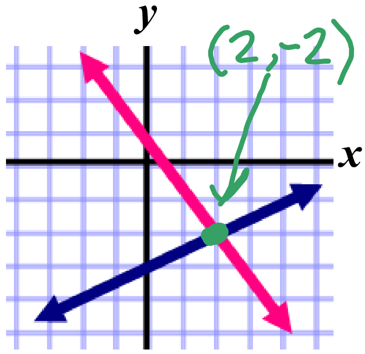
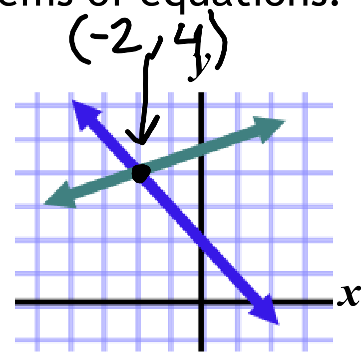
6.1 Solving Systems of Equations by Graphing

What is the solution of the following systems of equations?







The three above examples are called consistent independent 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)

$-x + y = -2$

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

$2 \neq -2$

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

2. $3x + y = 11$ $\quad (4, -1)$ ← solution
$x - 2y = 6$ $\quad$ (x, y)

$3x + y = 11$
$3 \cdot 4 + -1 \stackrel{?}{=} 11$
$12 + -1 \stackrel{?}{=} 11$
$11 = 11$ ✓

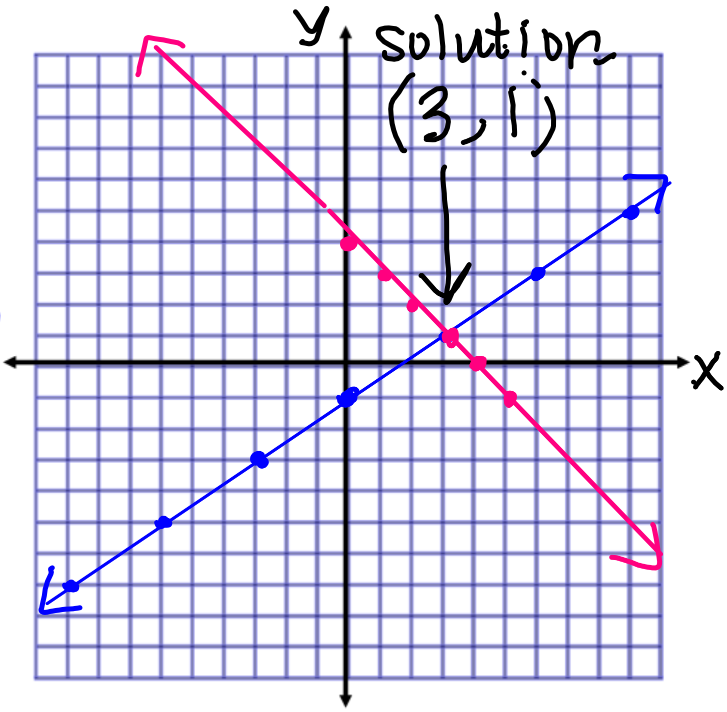
$x - 2y = 6$
$4 - 2 \cdot -1 \stackrel{?}{=} 6$
$4 + 2 \stackrel{?}{=} 6$
$6 = 6$ ✓

Solve the system of equations by graphing.

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

$y = \frac{2}{3}x - 1$
$m = \frac{2}{3}$ y-int = -1

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

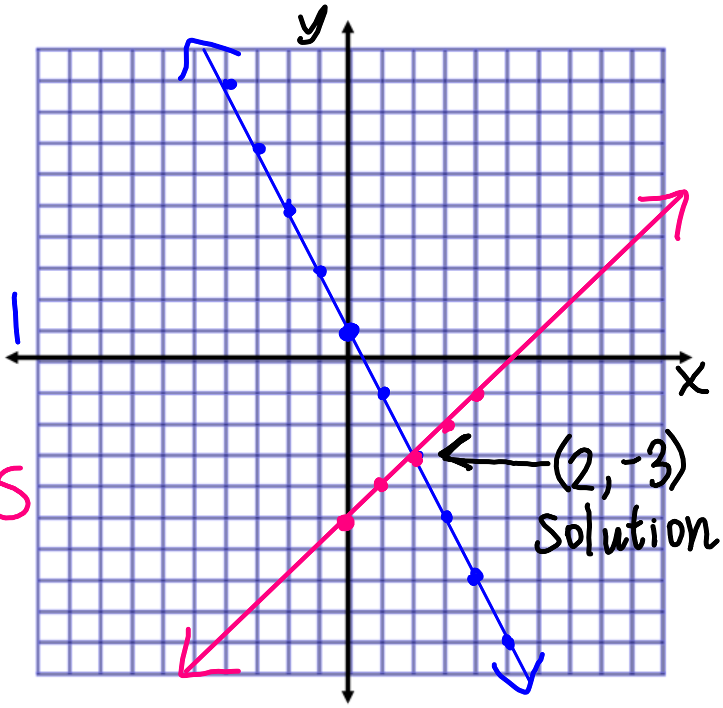


Solve the system of equations by graphing.

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

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

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

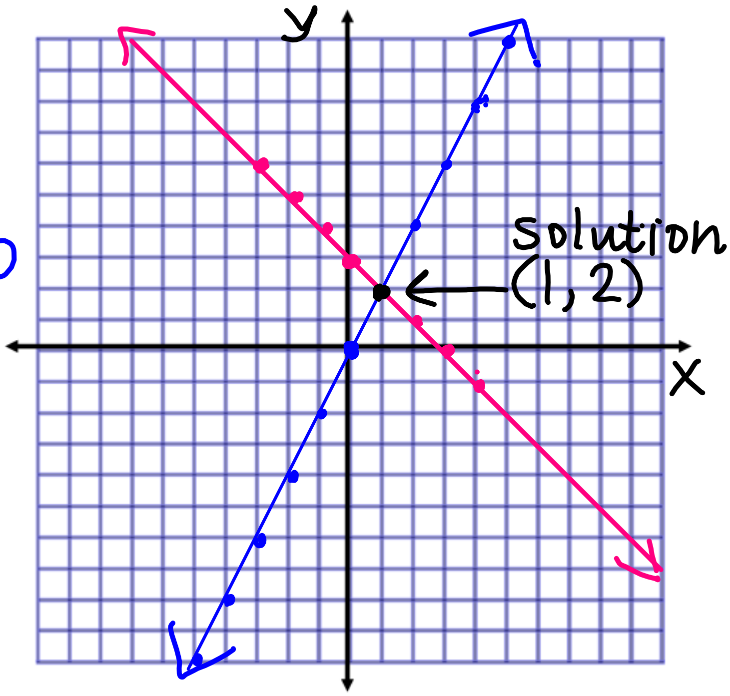


Solve the system of equations by graphing.

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

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

$x + y = 3$
$-x \qquad -x$
$y = -x + 3$
$m = -1$
$y\text{-int} = 3$



Solve the system of equations by graphing.

6. $5x + 6y = 30$

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

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

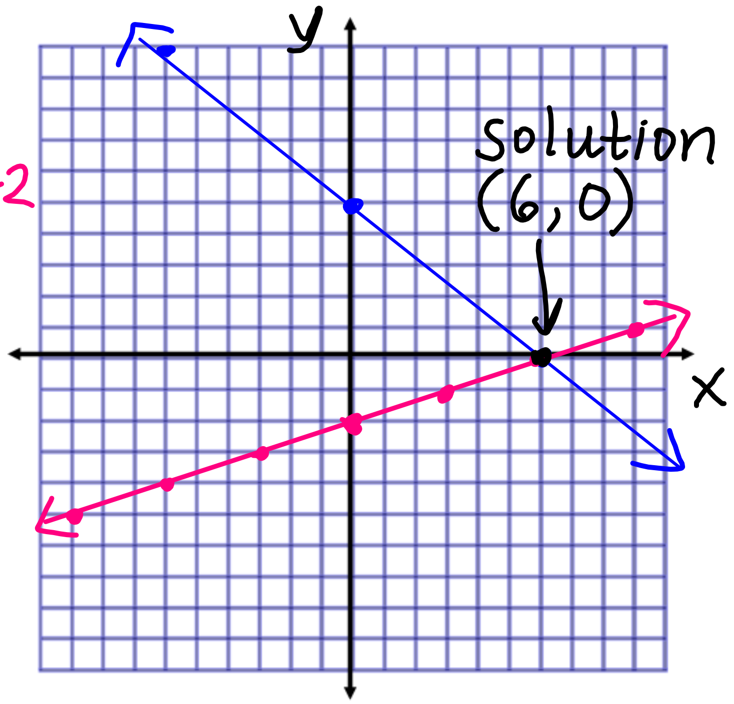
$$\begin{aligned} 5x + 6y &= 30 \\ -5x \quad & \quad -5x \\ \hline \end{aligned}$$

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

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

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

y-int $= 5$



Solve the system of equations by graphing.

$m = \frac{3}{1}$ y-int $= 1$

7. $y = 3x + 1$

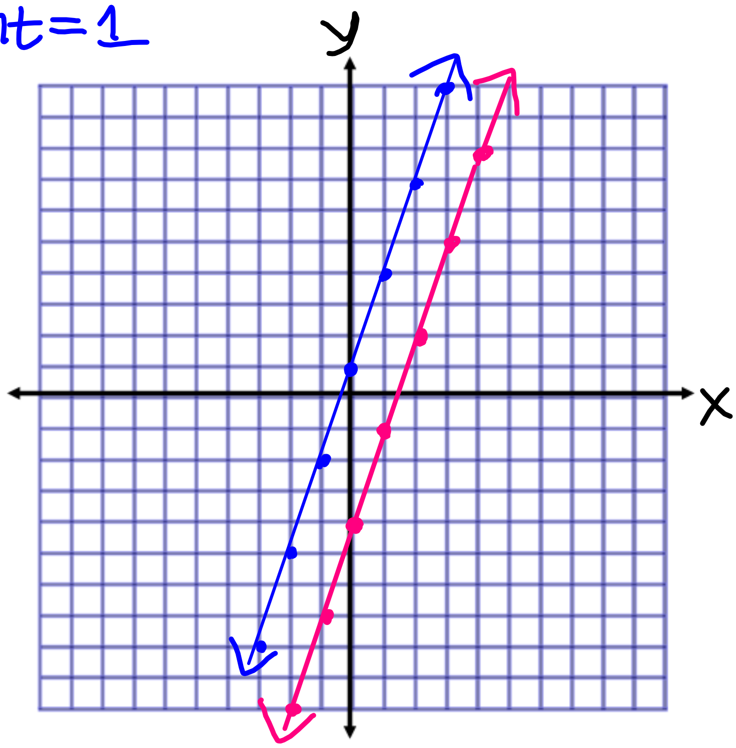
$-3x + y = -4$

$$\begin{aligned} -3x + y &= -4 \\ +3x \quad & \quad +3x \\ \hline \end{aligned}$$

$y = 3x - 4$

$m = 3$

y-int $= -4$



no solution

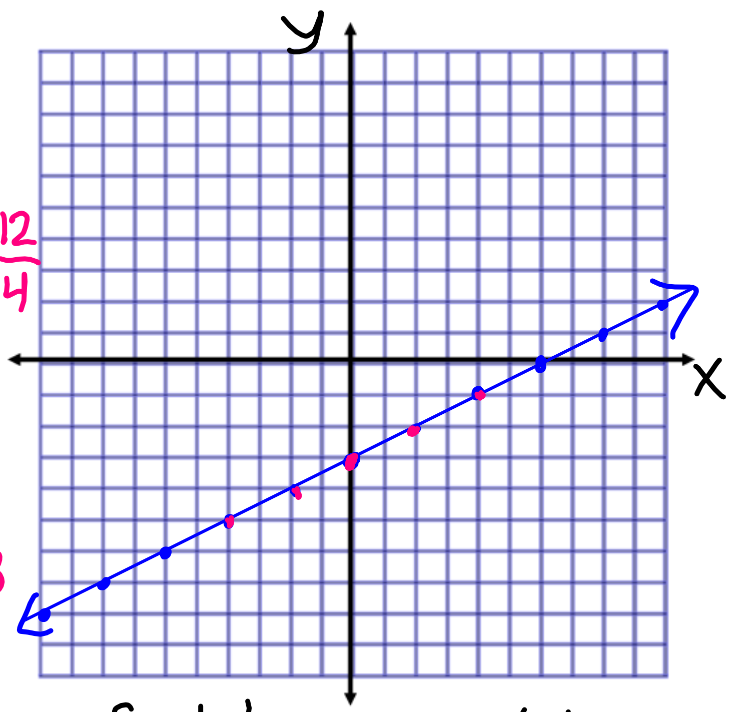
Solve the system of equations by graphing.

8. $x - 2y = 6$

$4y = 2x - 12$

$x - 2y = 6$
$-x \quad -x$
$-2y = -x + 6$
$\frac{-2y}{-2} = \frac{-x}{-2} + \frac{6}{-2}$
$y = \frac{1}{2}x - 3$
$m = \frac{1}{2}$
y-int = -3

$\frac{4y}{4} = \frac{2x}{4} - \frac{12}{4}$
$y = \frac{1}{2}x - 3$
$m = \frac{1}{2}$
y-int = -3



infinitely many solutions

9. The cost to join an art museum is $60. If you are a member, you can take lessons at the museum for $2 each. If you're not a member, lessons cost $6 each. Which system of equations can be used to find the number x of lessons after which the total cost y of lessons with a membership is the same as the total cost of lessons without a membership?

A. $y = 2x$
$y = 6x$

B. $y = 60x + 2$
$y = 6x$

C. $y = 2x + 60$
$y = 6x + 60$

(D.) $y = 2x + 60$ ← member
$y = 6x$ ← non-member

10. The school is selling tickets for a fundraising event. The school sold 35 tickets for $86 on the first day of the sale. Student tickets cost $2 each and non-student tickets cost $3 each. Find the number of student tickets and the number of non-student tickets the school sold on the first day.

x = student tickets
y = non-student tickets

$x + y = 35$ ticket equation
$2x + 3y = 86$ money equation

$(19, 16)$ → 19 student tickets
16 non-student tickets