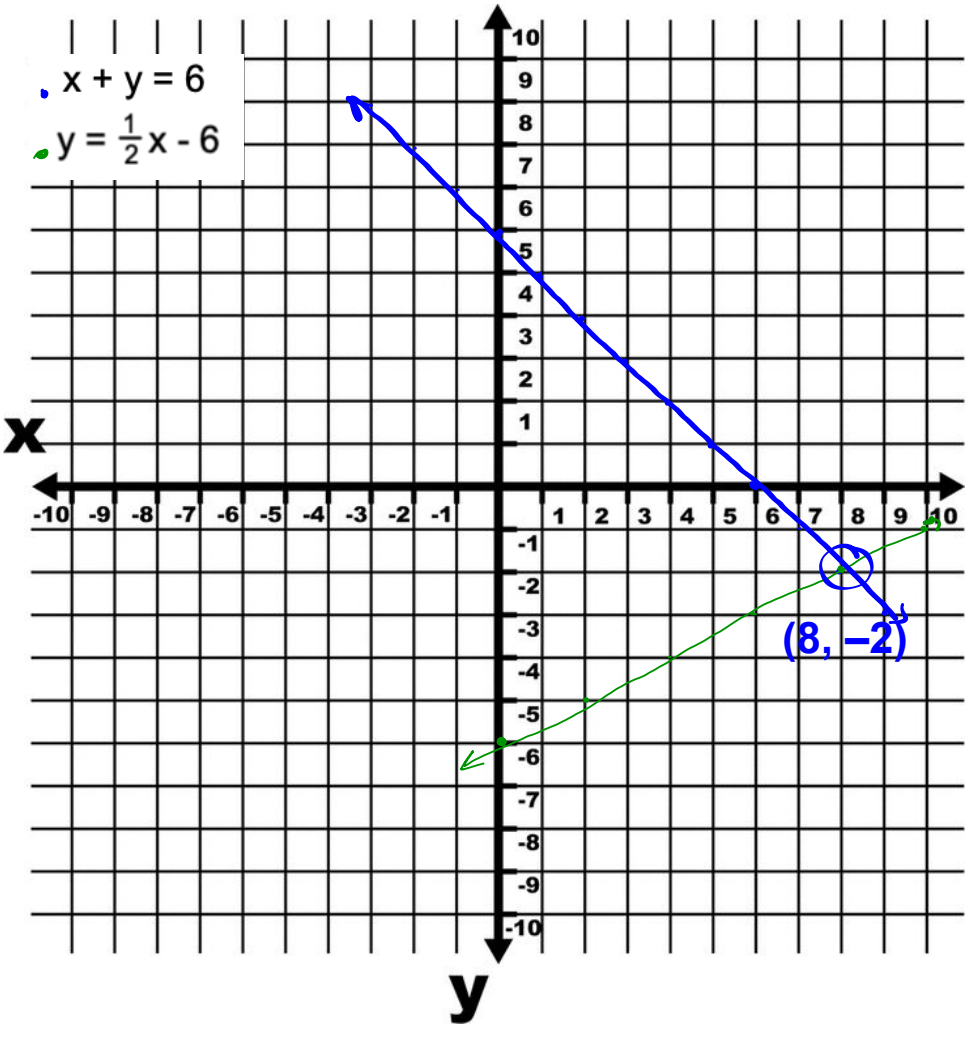
Warm Up

Graph the following two equations on the same graph:

$$x + y = 6$$

$$y = \frac{1}{2}x - 6$$

Do they have a common solution?



Homework Questions?

For Exercises 9–14, write the equation in $y = mx + b$ form.

9. $4x + 6y + 12 = 0$

10. $-7x + 9y + 4 = 0$

11. $-4x - 2y - 6 = 0$

12. $-x + 4y = 0$

13. $2x - 2y + 2 = 0$

14. $25x + 5y - 15 = 0$

16. A seventh-grade class sells mouse pads and cell phone cases with their school logo on them. The class earns \$2 profit for each mouse pad sold and \$4 profit for each cell phone case sold. They sell 100 items in total for a profit of \$268.

a. Write two equations that represent the relationship between the number of mouse pads sold m and the number of cell phone cases sold c.

b. How many mouse pads and how many cell phone cases were sold?

Let x = # mouse pads

Let y = # cases

$$\begin{cases} 2x+4y=268 \\ x+y=100 \end{cases}$$

$\frac{2x}{2}+\frac{4y}{2}=\frac{268}{2}$

$x+2y=134$

$-2y \quad -2y$

$x=-2y+134$

$x+y=100$

$-y \quad -y$

$x=-y+100$

$-y+100=-2y+134$

$-100 \qquad -100$

$-y=-2y+34$

$-34 \qquad -34$

$-y-34=-2y$

$+y \qquad +y$

$-34=-y$

$-1 \quad -1$

$34=y$

Ways to solve systems of equations:

We currently have 2!

1. Graphing

2. Symbolically using Equivalent Equations

$x + y = 5$

$x = y + 7$

already telling us what x =

We could

$x + y = 5$

$-y \quad -y$

$x = 5 - y$

Equivalent Equations

$\begin{cases} x = 5 - y \\ x = y + 7 \end{cases}$

$y + 7 = 5 - y$ and then solve

$+y \quad +y$

$2y + 7 = 5$

$-7 \quad -7$

$\frac{2y}{2} = \frac{-2}{2}$

$y = -1$

OR, since we know that x = y + 7 we can substitute y + 7 in for the value of x in the first equation.

$\begin{cases} x + y = 5 \\ x = y + 7 \end{cases}$

$x + y = 5$

$(y + 7) + y = 5$

$2y + 7 = 5$ and then solve

$-7 \quad -7$

$\frac{2y}{2} = \frac{-2}{2}$

$y = -1$

$x + y = 5$

$x - 1 = 5$

$+1 \quad +1$

$x = 6$

$(6, -1)$

This is substitution!

Substitution

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

$3 - 2x = 2 - 3x$

Name _____ Date _____

X- and Y-Intercepts

Solving Systems of Linear Equations by Substitution

$4x + 4y = 12$
$3x + y = 9 \longrightarrow y = 9 - 3x$
$4x + 4(9 - 3x) = 12$
$4x + 36 - 12x = 12$
$36 - 8x = 12$
$-8x = -24$
$x = 3$
Solution (3, 0)

Solve.

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

2. $x + y = 5$
$x = y + 7$

3. $x - y = 1 \longrightarrow x = 1 + y$
$2x + y = 8$
$2(1+y) + y = 8$
$2 + 2y + y = 8$
$2 + 3y = 8$
$-2 \quad -2$
$3y = 6$
$\frac{3y}{3} = \frac{6}{3}$
$y = 2$

4. $3x - y = 9$
$y = x + 5$

5. $3x + 4y = 26$
$-2x + y = 1$

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

7. $2x + 7y = 8$
$x + 5y = 7$

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

9. $x + 3y = 17$
$2x + 3y = 22$

10. $4x - 7y = 9$
$y = x - 3$

Now solve for x.

Homework

Finish Problems 1-10