

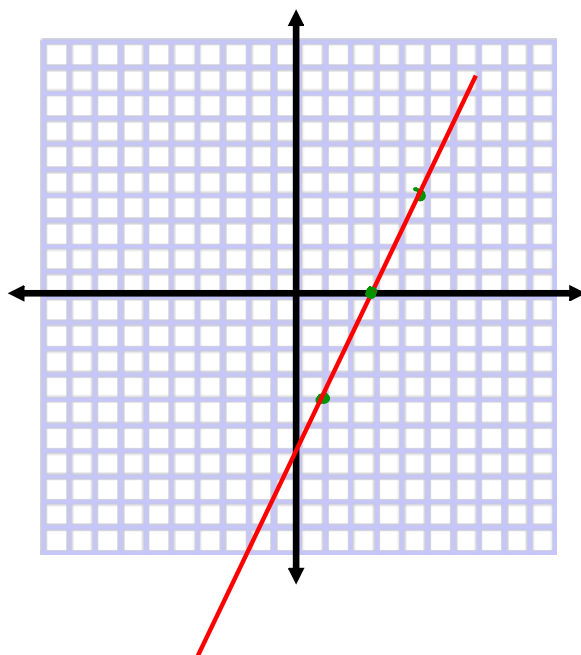
# Graphing using "two points" method:

$$\begin{aligned} 2(1) &= y + 6 \\ 2 &= y + 6 \\ -6 & \quad -6 \\ -4 &= y \end{aligned}$$

$$2x = y + 6$$

$$\begin{aligned} 2(5) &= y + 6 \\ 10 &= y + 6 \\ -6 & \quad -6 \\ 4 &= y \end{aligned}$$

$$\begin{aligned} 2(3) &= y + 6 \\ 6 &= y + 6 \\ -6 & \quad -6 \\ 0 &= y \end{aligned}$$



x	y
1	-4
5	4
3	0

(1, -4)  
(5, 4)

# Solving linear systems:

An equation with two variables that makes a line when graphed

What is a linear equation?

$$2x + y = 4$$

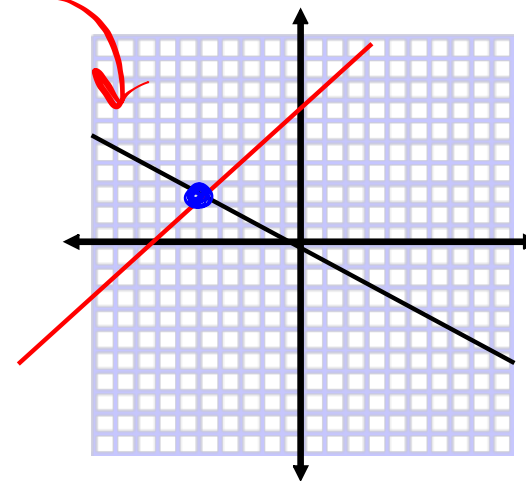
$$y = -\frac{2}{3}x + 7$$

What is a linear system?

A linear system is two (or more) linear equations graphed on the same plane

A solution to a linear system is where the two lines intersect

What is a solution to a linear system?



## Variable confusion:

Sometimes a variable means  
"an unknown but fixed number"

$x = \# \text{ of boys in this class}$

$$y = 4x + 6$$

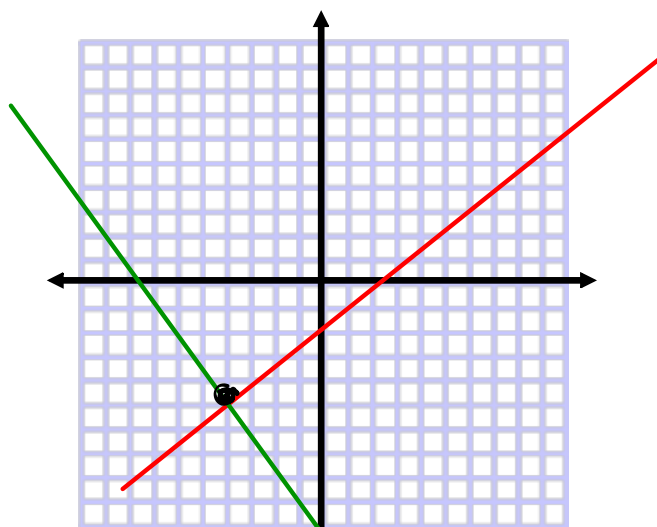
$$2y = 7x - 7$$

Sometimes a variable means  
"a number that's known but has  
different values at different times"

$y = \text{the year}$

Sometimes the same variable letter  
shows up in more than one  
equation

# What does it mean to be a solution to a linear system?



*not*  $(1,1)$   $2(1) - 2(1) = 4$   
 $2 - 2 = 4$   $0 = 4 \times$

$(4,2)$  *yes*  
 $2(4) - 2(2) = 4$   
 $8 - 4 = 4$   
 $4 = 4$  *✓*

Remember - what is a solution to a linear equation?

$2x - 2y = 4$

An ordered pair

Linear system solution: An ordered pair

What does a linear system look like on a graph?

A point

Where is the solution on a graph?

Where the two lines intersect

What is the solution?

$(-4, -5)$

the line of  
 a linear equation  
 is the graph of all  
 $x$ - $y$  pairs that make  
 the equation true

Where the  $x$ - and  
 $y$ - values make the  
 equation true

# Example:

months      # of books

x	y (Bill)	y (Bilbo)
1	17	11
2	19	15
3	21	19
4	23	23
5	25	27

Bill has 15 books, and gets 2 each month  
 Bilbo has 7 books, and gets 4 each month  
 How many months will it take for  
 them to have the same # of books?

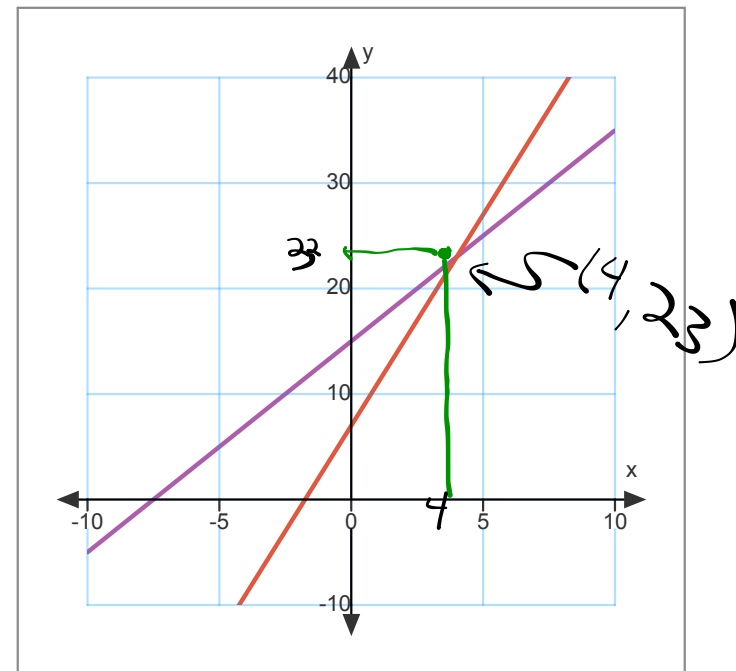
$$y = 15 + 2x$$

What are the equations?

$$y = 7 + 4x$$

Table of solutions ...

Graph

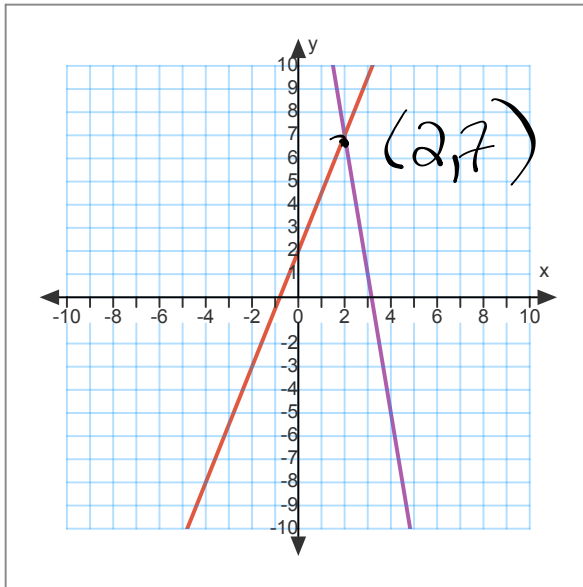


x = # of months gone by  
 y = # of books

## Solving linear systems by graphing:

$$6x + y = 19$$

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



Remember - what is a solution to a linear system?

Steps:

1. Graph both lines
2. Identify / estimate point of intersection
3. Check the point in both equations

$$\begin{array}{r} 6x + y = 19 \\ -6x \quad \quad -6x \end{array}$$

$$y = (-6)x + 19$$

$$\begin{array}{r} 5x - 2y = -4 \\ -5x \quad \quad -5x \\ \hline -2y = -5x - 4 \\ \hline -2 \quad -2 \quad -2 \end{array}$$

$$y = \frac{5}{2}x + 2$$

$$\begin{array}{l} y = -6x + 19 \\ 7 = -6(2) + 19 \\ 7 = -12 + 19 \\ \checkmark 7 = 7 \end{array}$$

$$\begin{array}{l} y = \frac{5}{2}x + 2 \\ 7 = \frac{5}{2}(2) + 2 \\ 7 = 5 + 2 \\ \checkmark 7 = 7 \end{array}$$

Tell whether the ordered pair is a solution of the linear system.

1.  $(4, 1);$

$$x + 2y = 6$$

$$3x + y = 11$$

$$4 + 2(1) = 6$$

$$4 + 2 = 6$$

$$6 = 6 \checkmark$$

$$3(4) + 1 = 11$$

$$12 + 1 = 11$$

$$13 = 11 \times$$

not a solution

2.  $(-2, 1);$

$$5x - 2y = -12$$

$$x + 3y = 1$$

$$5(-2) - 2(1) = -12$$

$$-10 - 2 = -12$$

$$-12 = -12 \checkmark$$

$$-2 + 3(1) = 1$$

$$-2 + 3 = 1$$

$$1 = 1 \checkmark$$

Solution

3.  $(4, -3);$

$$-3x + 2y = -18$$

$$6x - y = 27$$

$$-3(4) + 2(-3) = -18$$

$$-12 + -6 = -18$$

$$-18 = -18 \checkmark$$

$$6(4) - 3 = 27$$

$$24 + 3 = 27$$

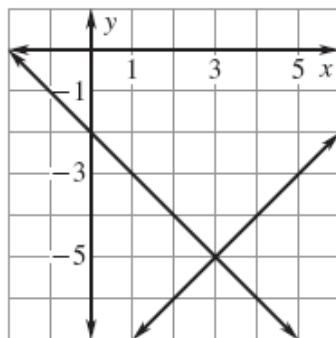
$$27 = 27 \checkmark$$

Solution

Use the graph to solve the linear system. Check your solution.

7.  $x - y = 8$

$x + y = -2$



$(3, -5)$

$3 - (-5) = 8$

$3 + (-5) = -2$

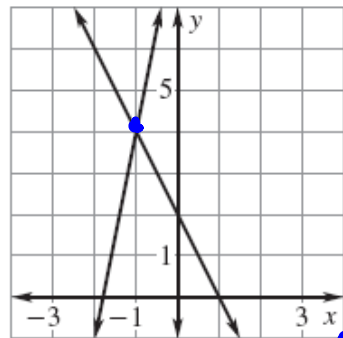
$8 = 8 \checkmark$

$3 + (-5) = -2$

$\checkmark -2 = -2$

8.  $5x - y = -9$

$y + 2x = 2$



$(-1, 4)$

$5(-1) - 4 = -9$

$-5 - 4 = -9$

$-9 = -9 \checkmark$

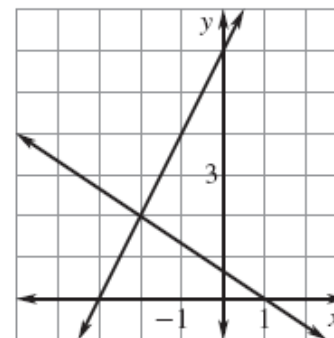
$4 + 2(-1) = 2$

$4 - 2 = 2$

$2 = 2 \checkmark$

9.  $2x + 3y = 2$

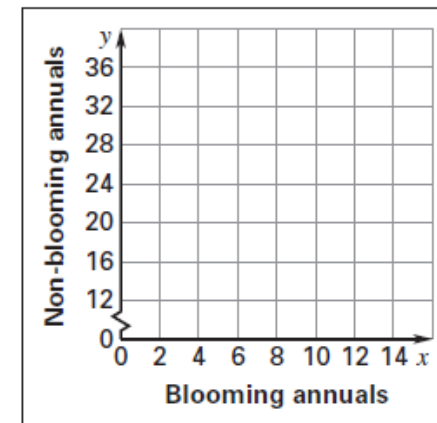
$-2x + y = 6$



$(-2, 2)$



**Hanging Flower Baskets** You will be making hanging flower baskets. The plants you have picked out are blooming annuals and non-blooming annuals. The blooming annuals cost \$3.20 each and the non-blooming annuals cost \$1.50 each. You bought a total of 24 plants for \$49.60. Write a linear system of equations that you can use to find how many of each type of plant you bought. Then graph the linear system and use the graph to find how many of each type of plant you bought.



Homework:

p. 430, 4-16 (even), 31, 33

A hand-drawn cloud shape with a wavy, irregular border, containing the text 'DUE FRIDAY, 4/6'.

DUE FRIDAY, 4/6