Algebra 2

Ch.3 Handout 3.1

Graphing Systems of Equations

A system of linear equations is

a set of two or more equations that we use the same variables

A system is a linear system if the graph of

each equation in a system of two variables is a line

A solution to a system of linear equations is an ordered pair that makes every equation in that system true.

Three types of linear system:

An independent system has

a unique solution (one solution) (one ordered pair

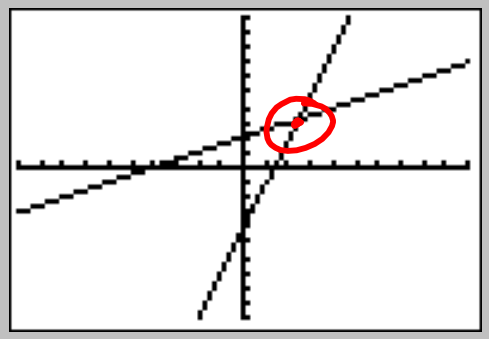
A dependent system does

not have a unique solution (all solutions or infinitely many solutions

An inconsistent system has

no solution

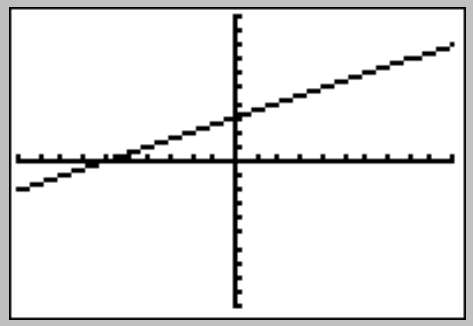
Intersecting lines



One solution
Independent

m = different

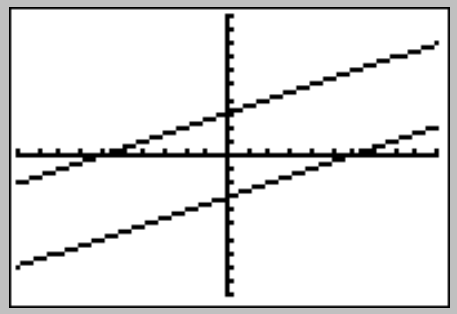
Coinciding Lines (Same line)



All solution
Dependent

m = same
b = same

Parallel lines



No solution
Inconsistent

m = same
b = different

Steps to solving a Linear System by using the graphing method:

1. Graph each equation

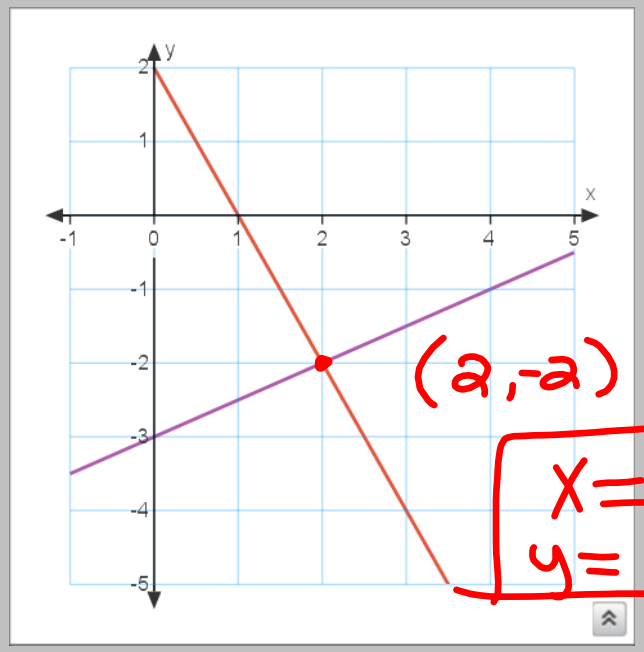
   A. You may use any method of graphing linear equations that you have learned. -- a) x|y chart, b) x-int/y-int, and 3rd point
   c) slope-intercept method

2. Find the points of intersection

What is the solution of the system graphed below?

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

$$y = -2x + 2$$



Check:

$-2 = \frac{1}{2}(2) - 3$

$-2 = -2(2) + 2$

$x = 2$

$y = -2$

1. Solve the system by graphing the equations and finding the intersection.

a) $\begin{cases} x+3y=2 \\ 3x+3y=-6 \end{cases}$

$x+3y=2$

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

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

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

$b=\frac{2}{3}$

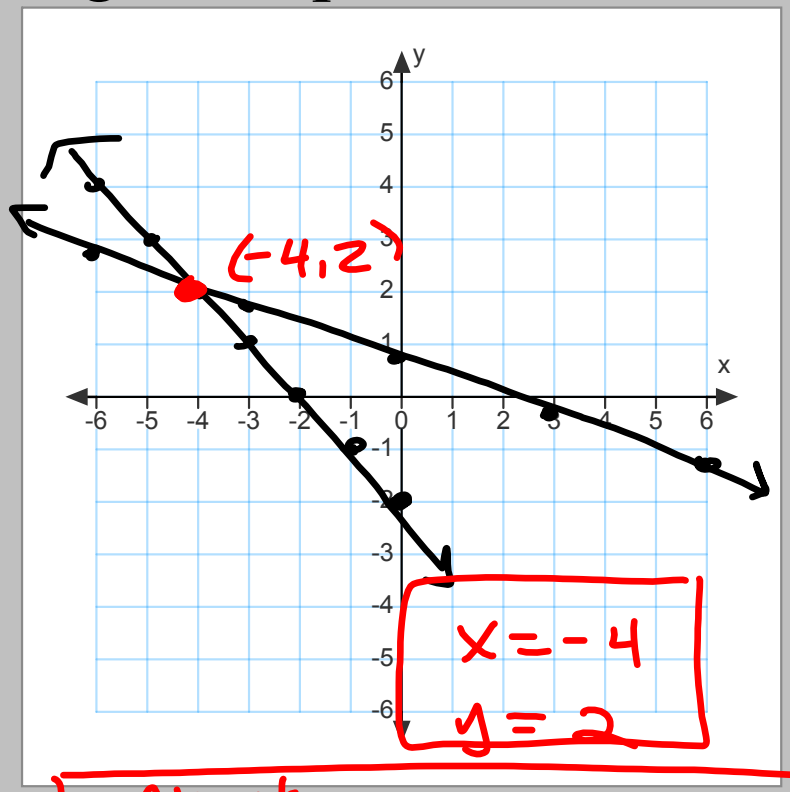
$3x+3y=-6$

$\frac{3y}{3}=\frac{-3x}{3}-\frac{6}{3}$

$y=-x-2$

$m=-1$

$b=-2$



check

$-4+3(2)=2$

$3(-4)+3(2)=-6$

b) $\begin{cases} 2x + y = 5 \\ -x + y = 2 \end{cases}$

$2x + y = 5$ $\quad m = -2$

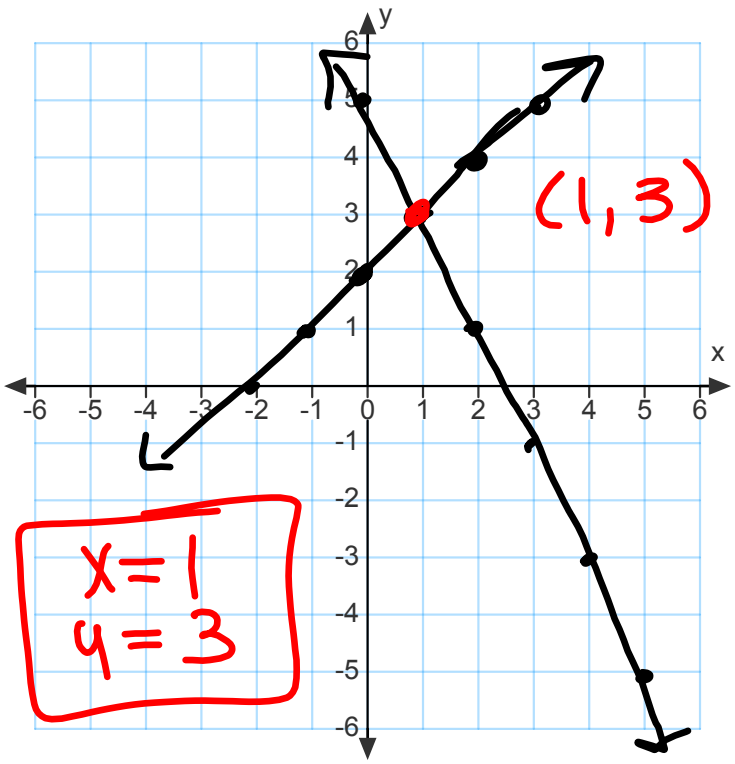
$y = -2x + 5$ $\quad b = 5$

$-x + y = 2$ $\quad m = 1$

$y = x + 2$ $\quad b = 2$

CK: $2(1) + 3 = 5$

$-1 + 3 = 2$



2. Without graphing, classify each system as independent, dependent, or inconsistent.

a) $\begin{cases} y = 3x + 2 \\ -6x + 2y = 4 \end{cases}$

$y = 3x + 2$ $m = 3$, $b = 2$

$-6x + 2y = 4$

$2y = 6x + 4$

$y = 3x + 2$ $m = 3$, $b = 2$

same, same

Dependent

All solutions

b) $\begin{cases} 2x + y = 5 \\ -x + y = 2 \end{cases}$

$2x + y = 5$ $m = -2$

$y = -2x + 5$ $b = 5$

$-x + y = 2$ $m = 1$

$y = x + 2$ $b = 2$

different

Independent

one solution

2. Without graphing, classify each system as independent, dependent, or inconsistent.

c) $\begin{cases} 3x + y = 5 \\ 15x + 5y = 2 \end{cases}$

$3x + y = 5$ $m = -3$
$y = -3x + 5$ $b = 5$

same

$15x + 5y = 2$
$5y = -15x + 2$
$y = -3x + 2/5$ $m = -3$ $b = 2/5$

different

Inconsistent
No solution

d) $\begin{cases} y = 2x + 3 \\ -4x + 2y = 6 \end{cases}$

$y = 2x + 3$ $m = 2$ $b = 3$

$-4x + 2y = 6$
$2y = 4x + 6$
$y = 2x + 3$ $m = 2$ $b = 3$

Dependent
All solutions

2. Without graphing, classify each system as independent, dependent, or inconsistent.

e) $\begin{cases} x - y = 5 \\ y + 3 = 2x \end{cases}$

$x - y = 5$

$-y = -x + 5$ $\quad m = 1$

$y = x - 5$ $\quad b = -5$

$y + 3 = 2x$ $\quad m = 2$

$y = 2x - 3$ $\quad b = -3$

Independent

One solution

Interpreting Solutions to Systems of Equations

Edit Reset ?

1. Graph both equations using either the x|y chart, intercepts, or slope-intercept form
2. Do the graphs intersect? This is the solution! Label your solution
3. Check your solution. Substitute x and y- values into both equations/solve
4. Are they the same line? Slopes and y-intercept the same then INFINITELY MANY SOLUTIONS!!
5. Are the lines parallel? Slopes are the same but y-intercepts are different then NO SOLUTION!!

Assignments

Pgs 121-123 2-8 evens, 19-24 all, 25, 27-29, 33-36, 38-42 evens

(graph highlighted problems)