Ch 6.1 Solving Systems of Equations by Graphing

* Two or more linear equations involving the same variables form a <u>system of equations</u>

<u>Example:</u> $x + y = 2$
$2x + 4y = 14$

* A solution of the system is an ordered pair that satisfies <u>BOTH</u> equations.

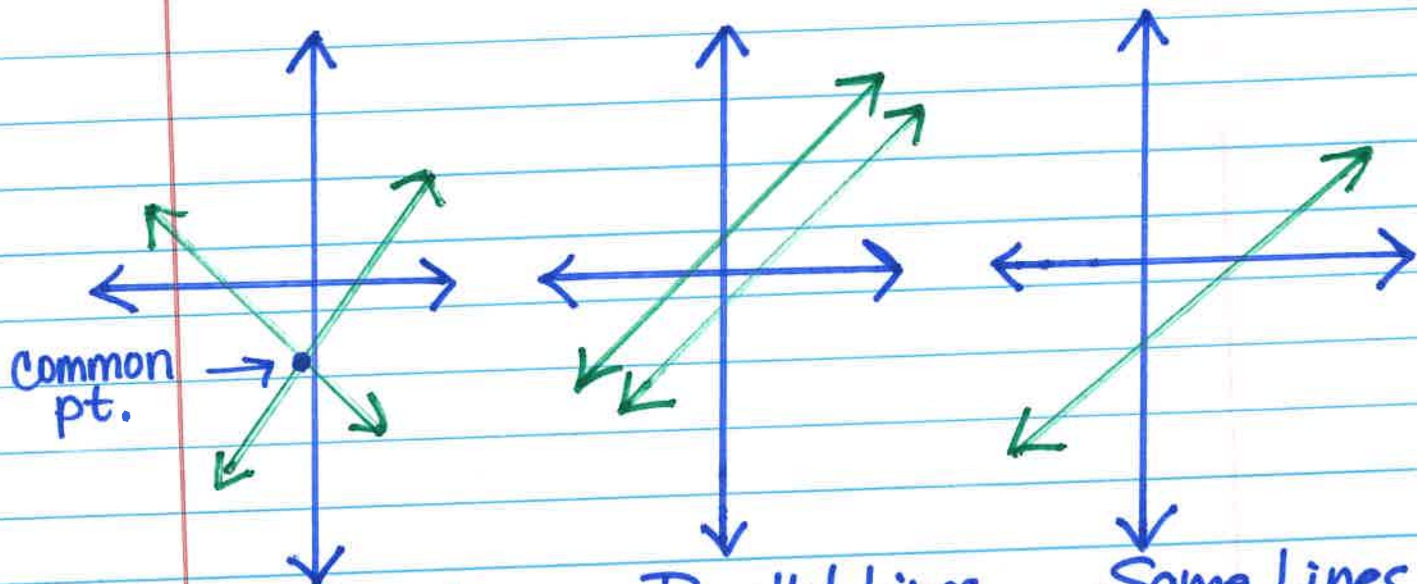
<u>Example:</u> Determine whether $(1,2)$ is a solution of the system
$y = x + 1$
$2x + y = 4$

$y = x + 1$
$2 = 1 + 1$
$2 = 2$ ✓ TRUE

$2x + y = 4$
$2(1) + 2 = 4$
$2 + 2 = 4$
$4 = 4$ ✓
TRUE

* $(1,2)$ is a solution to the system

* By deturmining the type of lines that make up the system, you can tell how many solutions each system will have.



	Intersecting Lines	Parallel Lines	Same Lines
Number of Solutions:	1	0	Infinite or Many
Type of System:	consistent independent	inconsistent	consistent dependent
	different slopes, y-intercept could be different, but if they are the same it is the solution	same slope, different y-intercepts	same slope & y-intercept (same Equation)

* consistent - system has at least one solution
* inconsistent - system that has no solution

* independent - consistent system that has exactly one solution

* dependent - consistent system that has infinitely many solutions

* By rewriting equations in a system to slope-intercept form, you can tell if the equations will be intersecting, same line or paralle lines.

Example : What is the relationship between the following equations/system?

(A) $2x + 2y = -6$
$y = -x + -3$

Rewrite $2x+2y=-6$ in slope-intercept form

$$2x + 2y = -6$$
$$-2x \qquad -2x$$
$$\frac{2y = -2x + -6}{2}$$

$$y = -x + -3$$

Same equation, same line, many solutions

(B) $2x+2y=-6$
$3x+y=3$

Rewrite both equations in slope intercept form.

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

$3x+y=3$
$-3x \quad\quad -3x$
$y=-3x+3$

Different slopes, Intersecting Lines, 1 Solution

* Review Problem 2 "Writing a System of Equations" on pg. 365.

* Got it? #2)

$y=10x+20$

$y=11x+15$

* Graph is hard to tell the exact intersecting pt.

$\approx$ 5 months

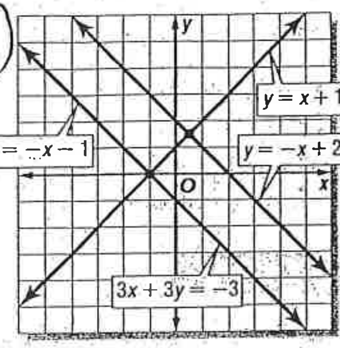
NAME ______________________ DATE __________ PERIOD ____

Practice : Number of Solutions

* Write what type of lines the system is (intersecting, parallel or same.)

Use Graph A at the right to determine whether the system has *no* solution, *one* solution, or *infinitely many* solutions.

A



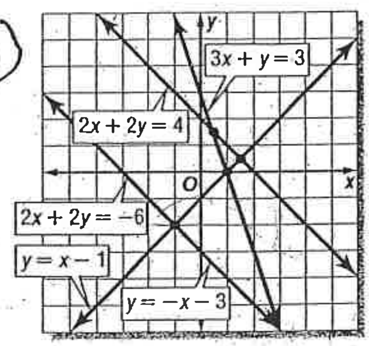
a. $y = -x + 2$
$y = x + 1$

b. $y = -x + 2$
$3x + 3y = -3$

c. $3x + 3y = -3$
$y = -x - 1$

Use Graph B at the right to determine whether each system has *no* solution, *one* solution, or *infinitely many* solutions.

B



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

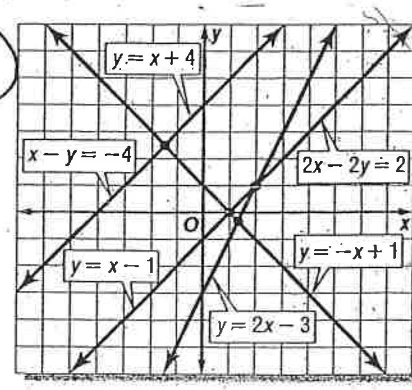
2. $2x + 2y = -6$
$y = -x - 3$

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

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

Use Graph C at the right to determine whether each system has *no* solution, *one* solution, or *infinitely many* solutions.

C



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

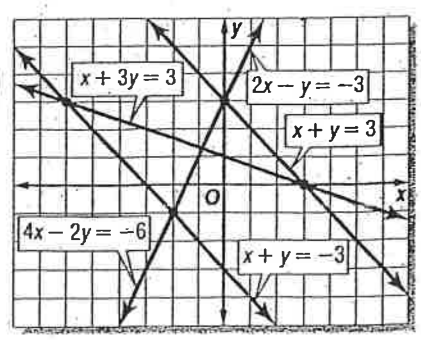
2. $x - y = -4$
$y = x + 4$

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

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

Use Graph D at the right to determine whether each system has *no* solution, *one* solution, or *infinitely many* solutions.

D



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

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

3. $x + 3y = 3$
$x + y = -3$

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

10,40 graphs

6.1 pg. 367 #6-28 EVEN, 32, 35-38 & 40

6) A III
B II
C I

8) No

10) see graph
Intersecting
One solution
(2,4)

12) See graph
Intersecting
One solution, (3,2)

14) See graph
Intersecting
One solution (1,2)

16) See graph
Intersecting
One solution (-4,4)

18) See graph
Intersecting
One solution (-3,5)

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

See graph (2,5)

2 years

24) $3x + y = 2$
$-3x \qquad -3x$
$y = -3x + 2$

$\frac{4y = 12 - 12x}{4}$

$y = 3 - 3x$
$y = -3x + 3$

26) $y = 2x - 2$

$\frac{2y = 4x - 4}{2}$

$y = 2x - 2$

28) $2x + 2y = 4$

$-2x \quad\quad -2x$

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

$y = -1x + 2$

$\frac{12 - 3x = 3y}{3}$

$4 - x = y$

$y = -x + 4$

32) The student did not show enough of the graph, the lines will intersect. at $(-4, 7)$.

34) $\cancel{y = .20x + \cancel{40}}$

$\cancel{y = \quad +60}$

31) $\cancel{y = 9x + 39}$

$\cancel{y = 12x + 39}$

35) parallel, no solution

36) Same, many

37) Same, many

38) Intersecting, one

40) Answers on board

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skip

30) $3x - y = 2$

$-3x \quad\quad -3x$

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

$y = 3x + -2$

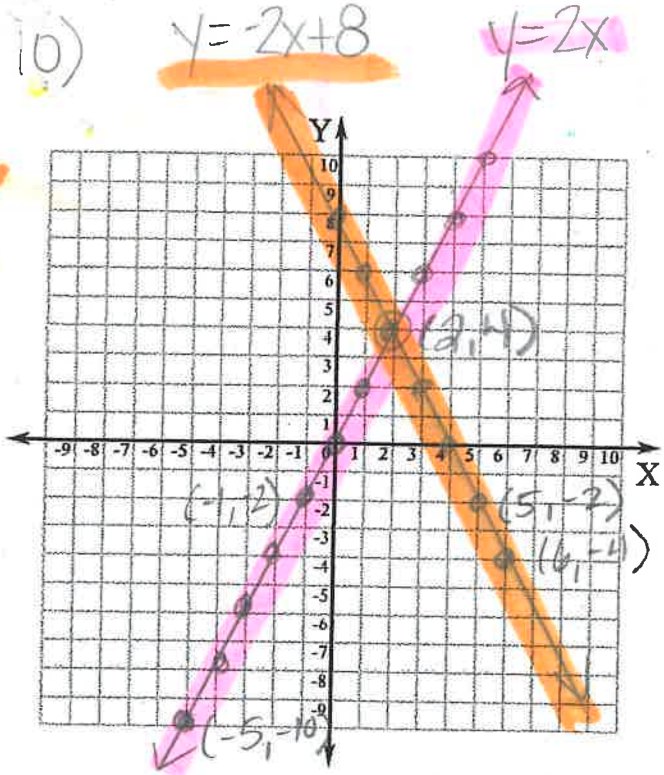
$\frac{4y = -x + 5}{4}$

$y = -\frac{1}{4}x + \frac{5}{4}$

→ Hard to graph

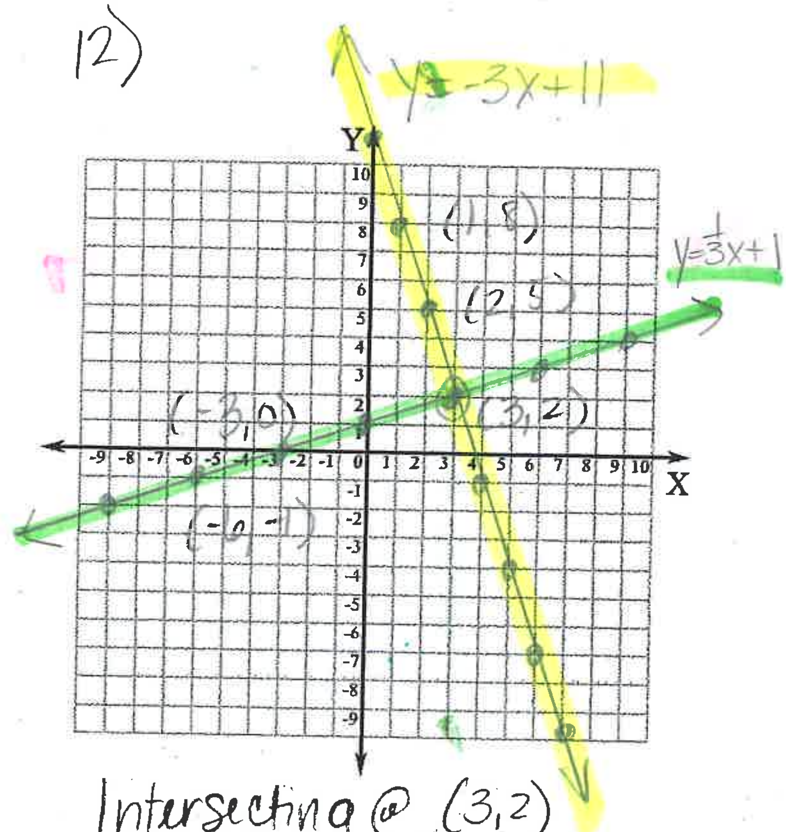
6.1 Homework

10)



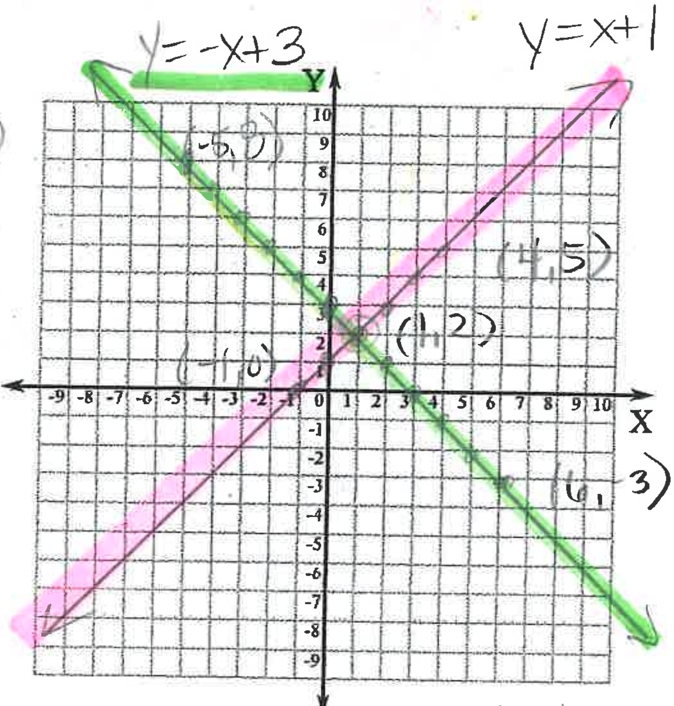
Intersecting @ (2,4)

12)



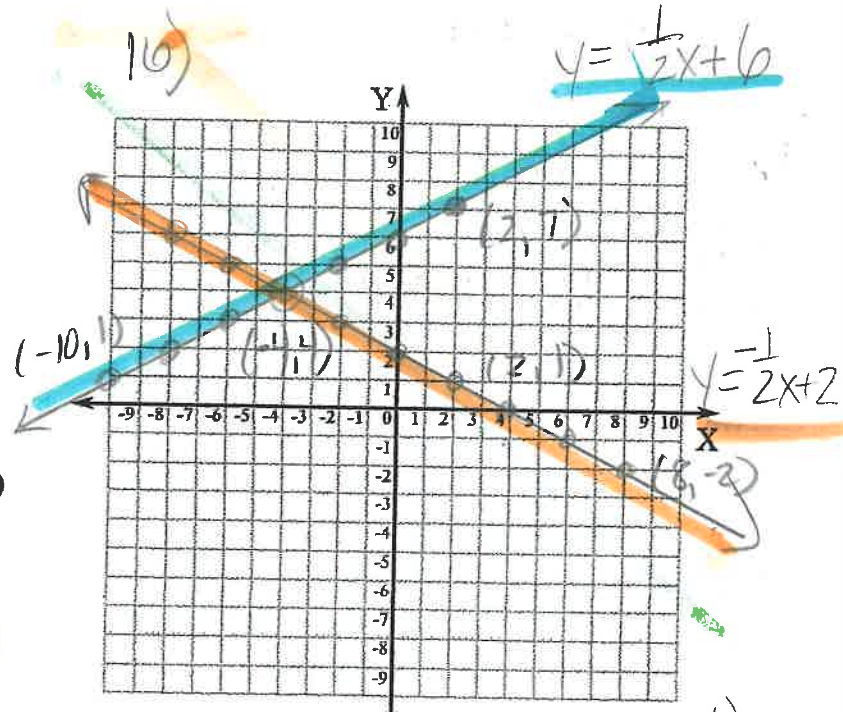
Intersecting @ (3,2)

14)



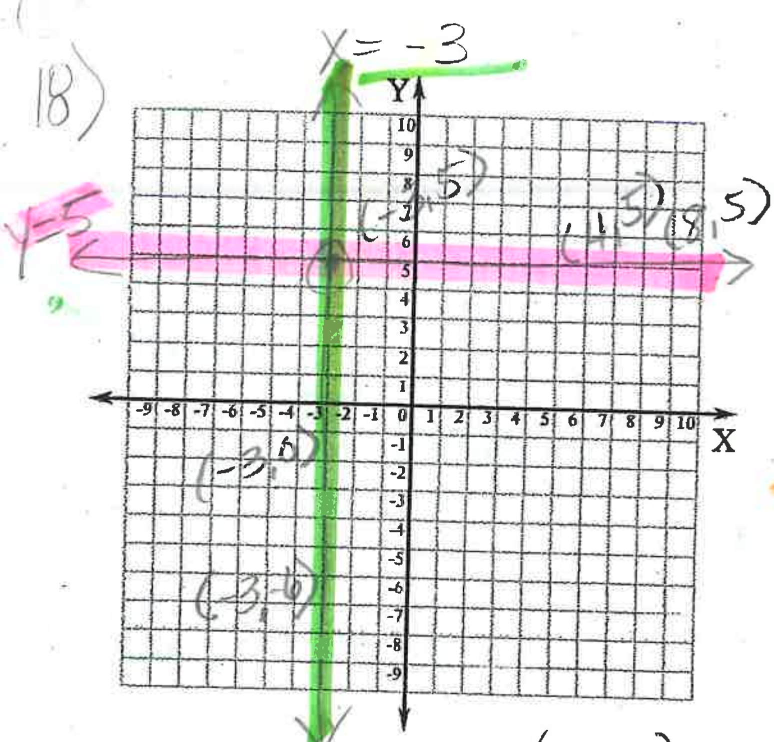
Intersecting @ (1,2)

16)



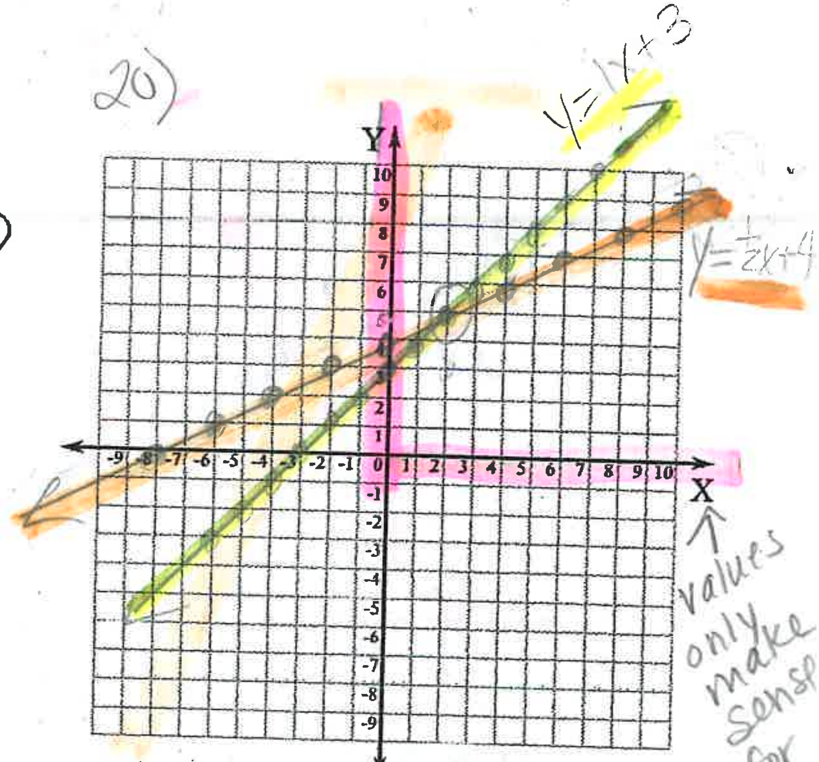
Intersecting @ (-4,4)

18)



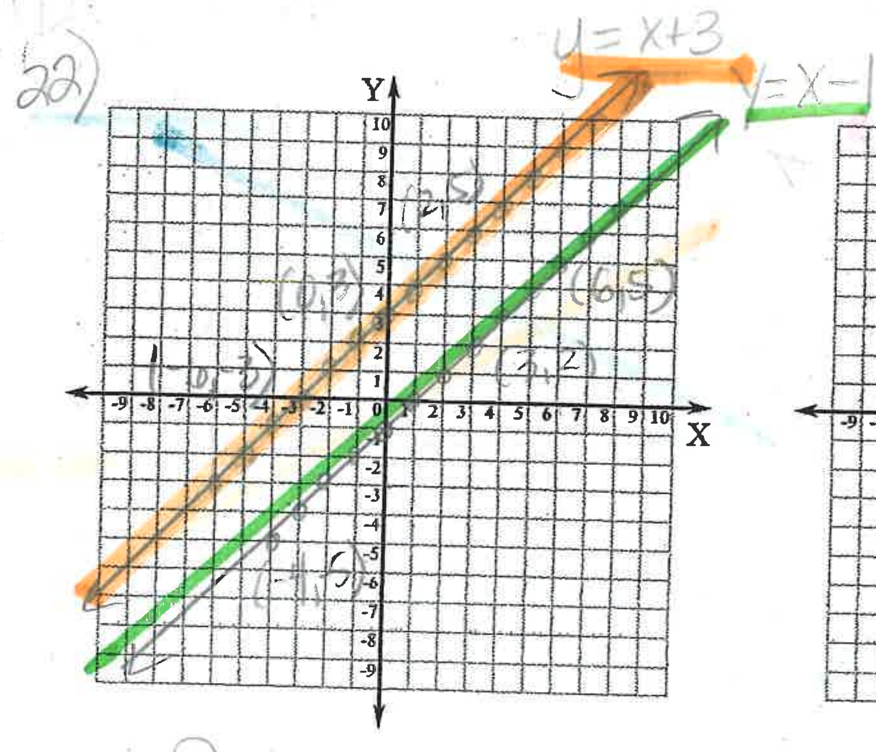
Intersecting @ (-3,5)

20)



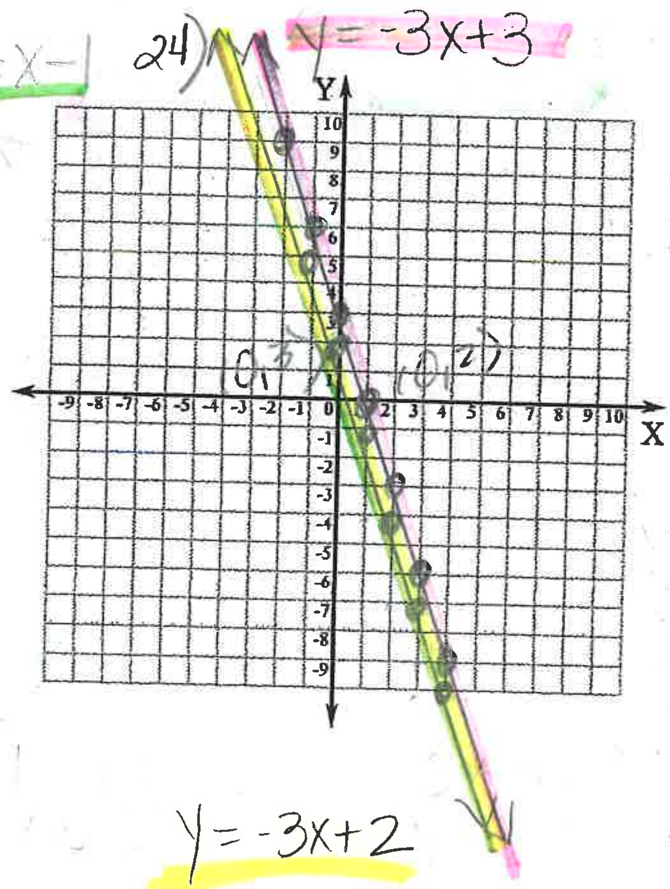
Intersecting @ 2years

22)



Parallel
No Solution

24)

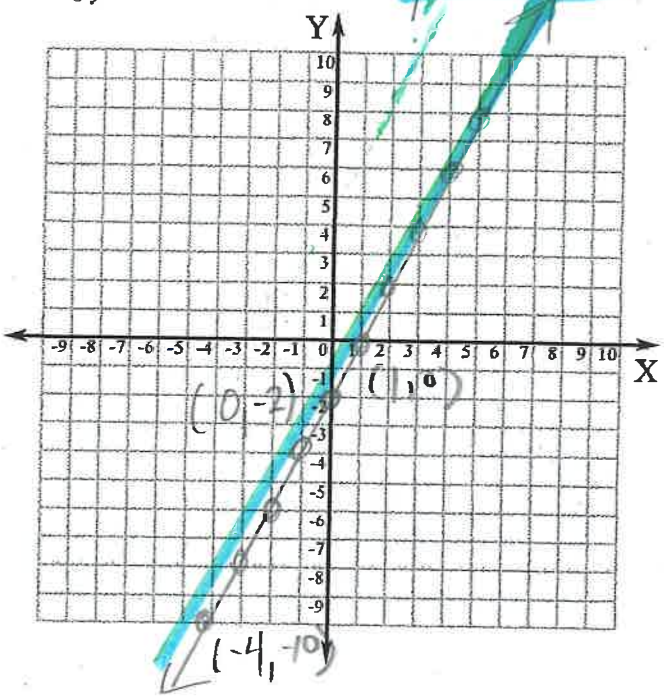


Parallel - No solution

Same line
infinitely many solution

26)

$y=2x-2$

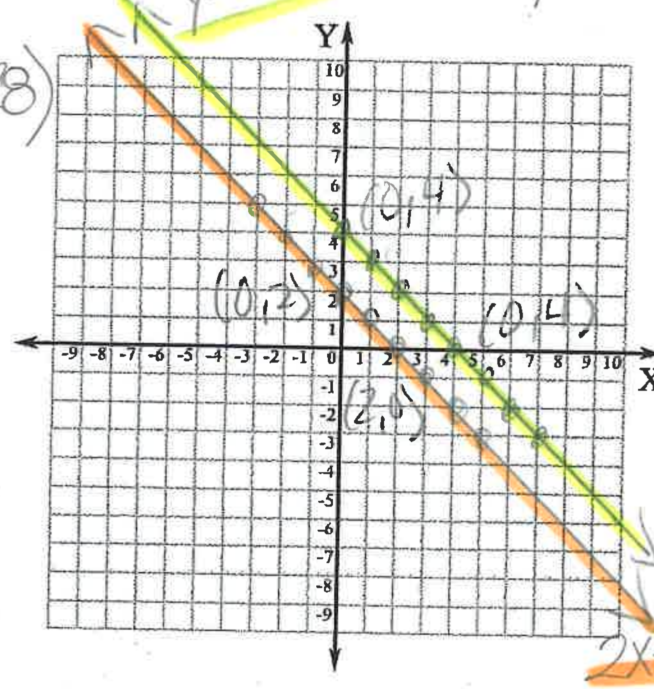


$12-3x=3y$

$y=-x+4$

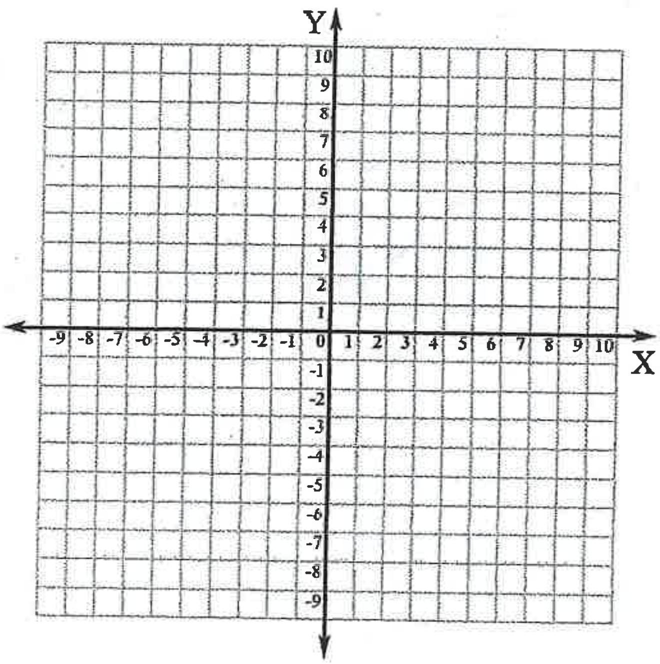
Parallel
∅ solution

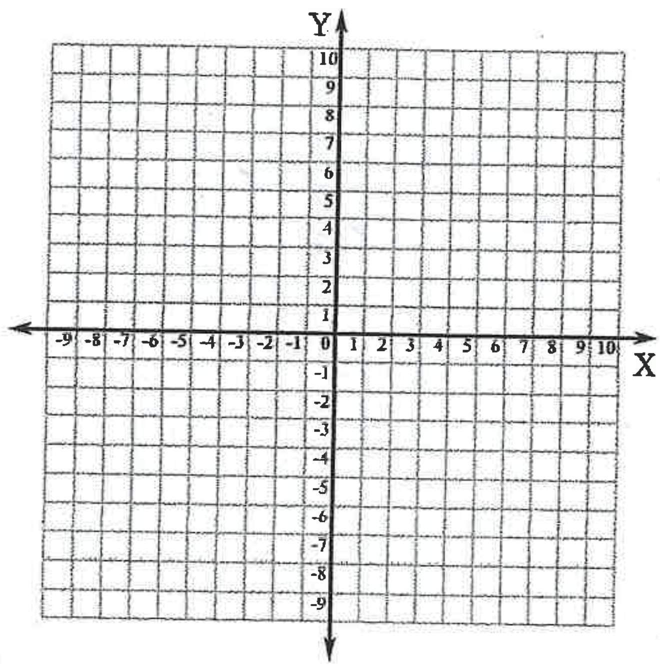
28)



$2x+2y=4$

$y=-1x+2$





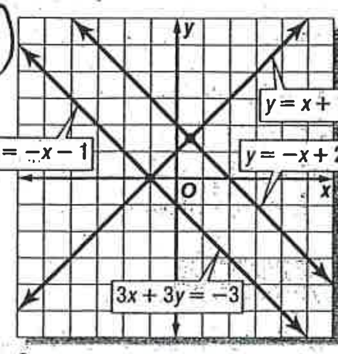
NAME Key DATE ______ PERIOD ____

8-1 Practice : Number of Solutions

*Write what type of lines the system is (intersecting, parallel or same.)

Use Graph A at the right to determine whether the system has *no* solution, *one* solution, or *infinitely many* solutions.

A



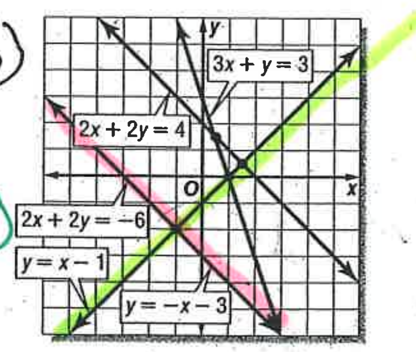
a. $y = -x + 2$
$y = x + 1$ intersecting, one

b. $y = -x + 2$
$3x + 3y = -3$ parallel, none

c. $3x + 3y = -3$
$y = -x - 1$ Same, many

Use Graph B at the right to determine whether each system has *no* solution, *one* solution, or *infinitely many* solutions.

B



1. $y = -x - 3$
$y = x - 1$ intersecting one

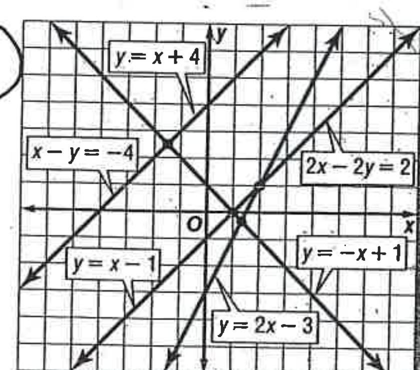
2. $2x + 2y = -6$
$y = -x - 3$ same many

3. $y = -x - 3$
$2x + 2y = 4$ parallel none

4. $2x + 2y = -6$
$3x + y = 3$ intersecting one

Use Graph C at the right to determine whether each system has *no* solution, *one* solution, or *infinitely many* solutions.

C



1. $y = x - 1$
$y = -x + 1$ inters. one

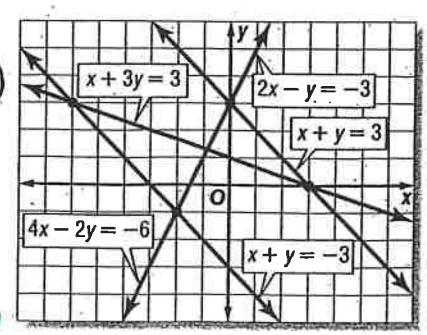
2. $x - y = -4$
$y = x + 4$ same many

3. $y = x + 4$
$2x - 2y = 2$ parallel none

4. $y = 2x - 3$
$2x - 2y = 2$ inter. one

Use Graph D at the right to determine whether each system has *no* solution, *one* solution, or *infinitely many* solutions.

D



1. $x + y = 3$
$x + y = -3$ parallel none

2. $2x - y = -3$
$4x - 2y = -6$ same many

3. $x + 3y = 3$
$x + y = -3$ inter. one

4. $x + 3y = 3$
$2x - y = -3$ inter. one