

Cornell Notes

Name Adriana Lopez / Asberry Date 1/3/12

Topic Systems of Linear Equations Class/Subject Alg. II p.3

9:30 Notes:

System of Eq. —

Linear equations —

System Classification —

see "solving Systems of Equations"

Graph of a Linear equation

9:45 Practice solving by graphing

Solving Systems of Linear Equations:

a set or collection of equations that you deal with all together at once.

(ones that graph as straight lines) are simpler than non-linear eq. * the simplest linear system is one with 2 equations & 2 variables.

1 solution - independent sys.

X lines intersect

No solution - inconsistent sys.

// lines never intersect

Infinite # of solutions - dependent sys.

/ same line

- put in slope intercept form if equation isn't already to make graphing easier.

see graph paper notes

Assignment: worksheet #1-18 #58

Do work on a separate sheet of graph paper!

Cornell Notes

Name

Date

Topic

Class/
Subject

[Large empty box for notes]

[Lined area for notes]

[Large empty box for summary]

ex. 1

$$7x + 2y = -6$$

$$2y = -7x - 6$$

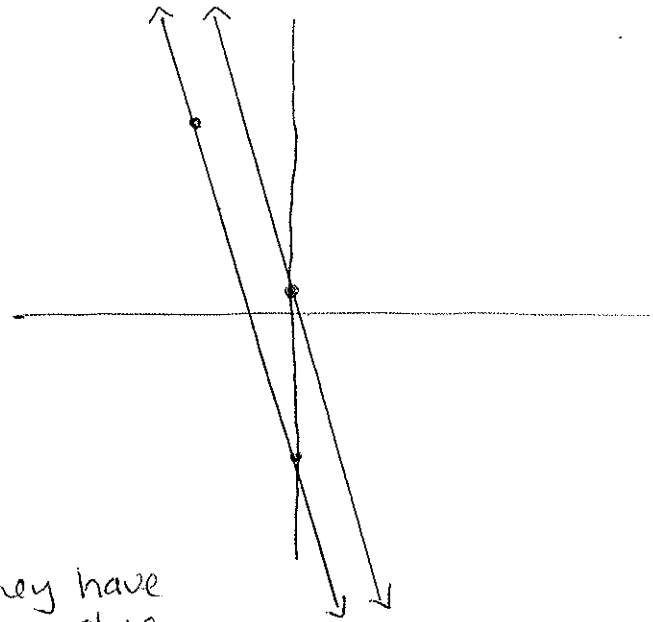
$$y = -\frac{7}{2}x - 3$$

$$-14x - 4y = -2$$

$$-4y = 14x - 2$$

$$y = -\frac{7}{2}x + \frac{1}{2}$$

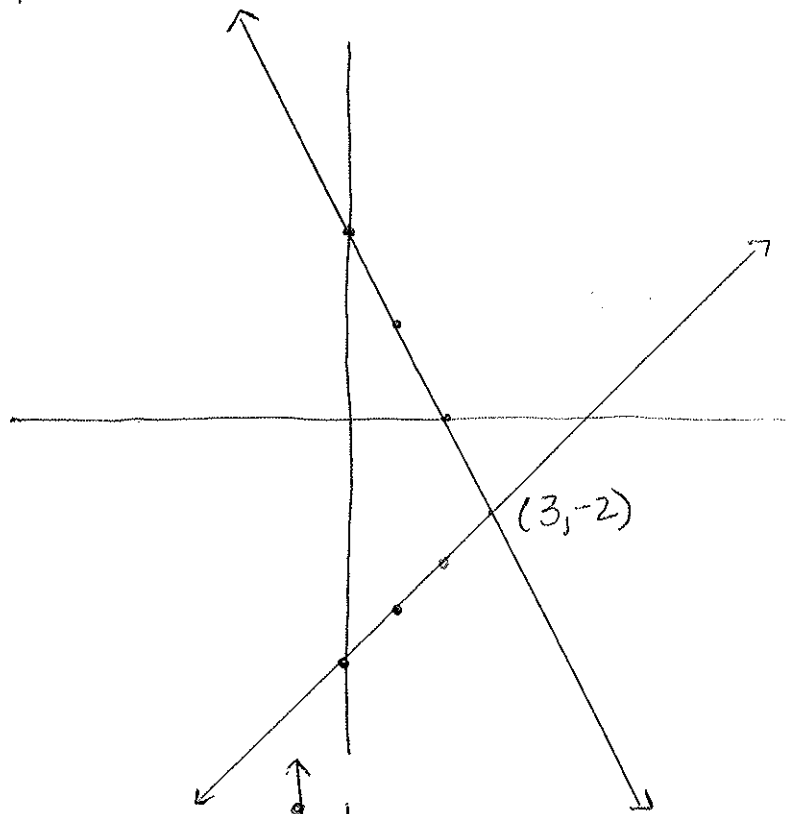
* they have same slope (parallel lines) → No solution



ex. 2

$$y = x - 5$$

$$y = -2x + 4$$



ex. 3

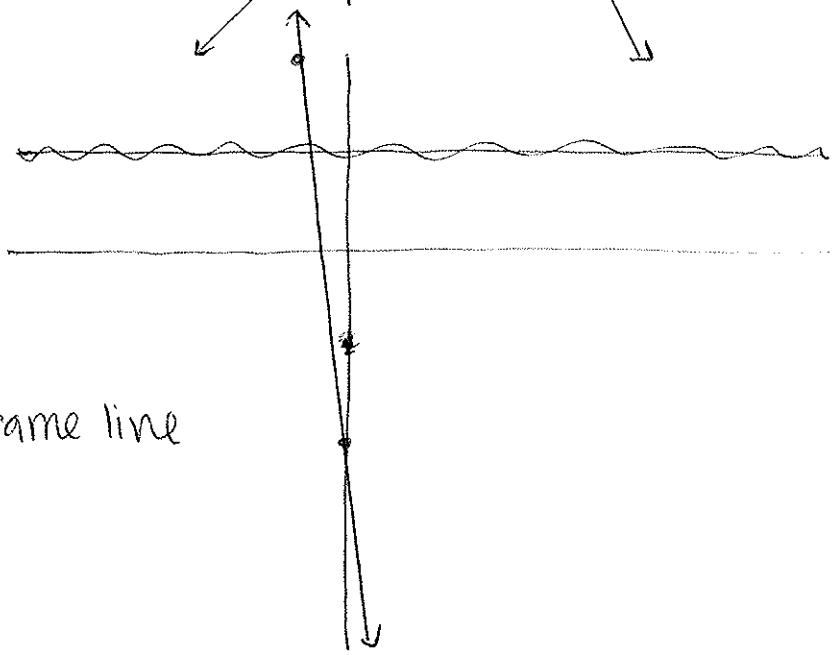
$$8x + y = -4$$

$$y = -8x - 4$$

$$0 = -4 - y - 8x$$

$$y = -8x - 4$$

* same equation = same line
→ Inf. many sol.



ex. 4

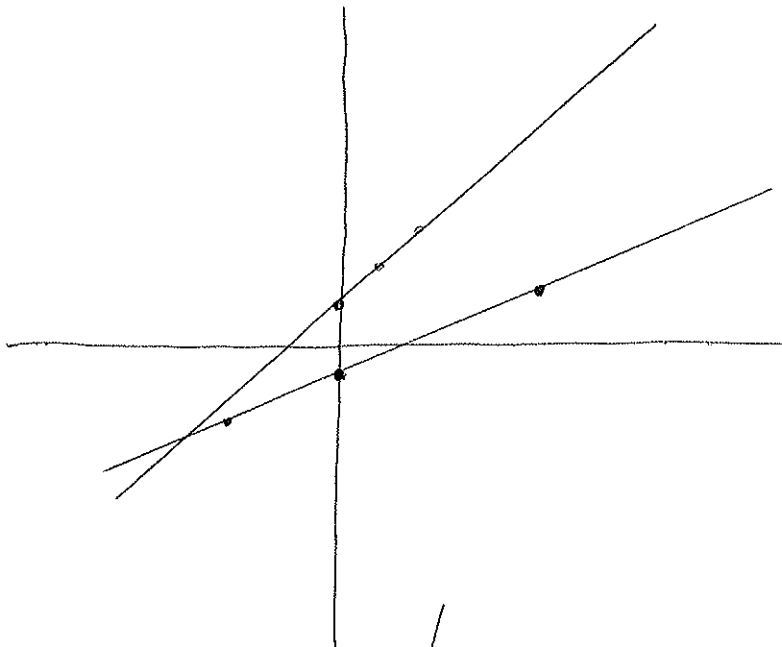
$$y = x + 1$$

$$2x - 5y = 4$$

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

$$y = \frac{2}{5}x - \frac{4}{5}$$

* solution should be $(-3, -2)$



ex. 5 $y = 4x + 1$

$$2x + 2y = 7$$

$$2y = -2x + 7$$

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

* solution should be $(\frac{1}{2}, 3)$

✓ check

$$y = 4x + 1$$

$$3 = 4(\frac{1}{2}) + 1$$

$$3 = 2 + 1$$

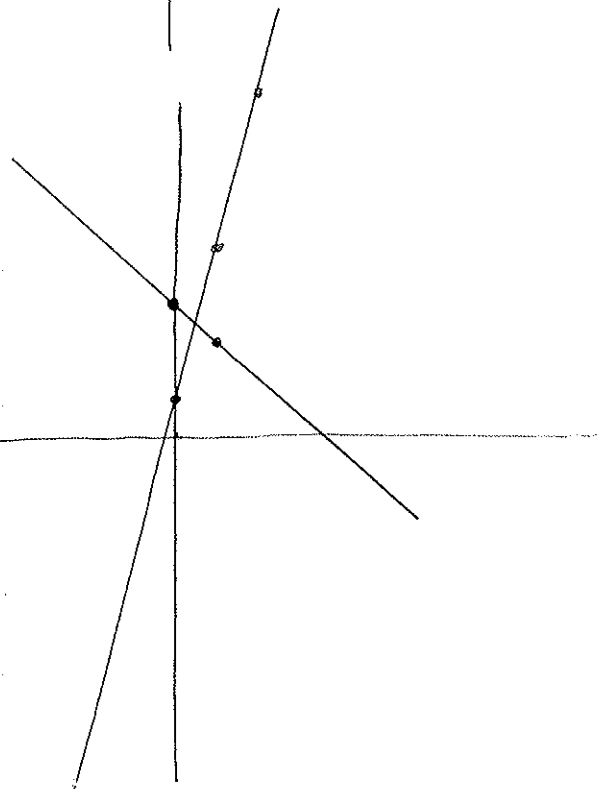
$$3 = 3 \checkmark$$

$$2x + 2y = 7$$

$$2(\frac{1}{2}) + 2(3) = 7$$

$$1 + 6 = 7$$

$$7 = 7 \checkmark$$

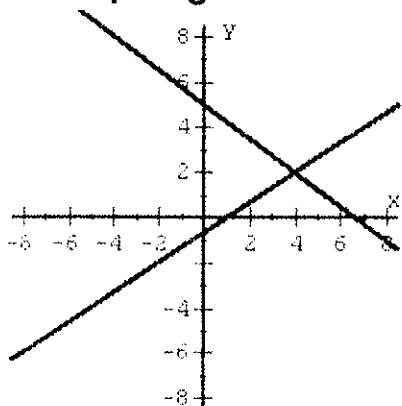


Solving Systems of Equations

Case 1: One Solution: Independent System

Addition / Elimination Method

Graphing Method

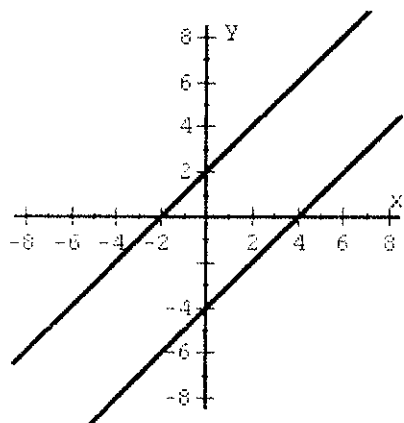


$$\begin{array}{rcl} \downarrow & & \\ 2x - 3y = 2 & \times 4 & 8x - 12y = 8 \\ 3x + 4y = 20 & \times 3 & 9x + 12y = 60 \\ \hline 17x & & = 68 \\ x & = & 4 \\ 3x + 4y = 20 & & \\ 3(4) + 4y = 20 & & \\ 4y = 8 & & \\ y & = & 2 \end{array}$$

Conclusion : $x = 4, y = 2$

Case 2: No Solution: Inconsistent System

Substitution Method



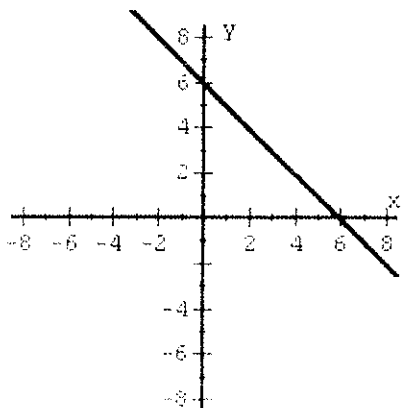
$$\begin{array}{rcl} y = x + 2 & \rightarrow & y = (x + 2) \\ x - y = 4 & \rightarrow & x - y = 4 \\ & & x - (x + 2) = 4 \\ & & x - x - 2 = 4 \\ & & -2 = 4 \end{array}$$

A Contradiction \rightarrow

Conclusion: No Solution

Case 3: Infinite Number of Solutions: Dependent System

Addition / Elimination Method



$$\begin{array}{rcl} x + y = 6 & \rightarrow & x + y = 6 \times 1 \\ x = 6 - y & \rightarrow & x + y = 6 \times (-1) \\ \hline & & \cancel{x} + \cancel{y} = \cancel{6} \\ & & -\cancel{x} - \cancel{y} = -\cancel{6} \\ \hline & & 0 + 0 = 0 \\ \text{An Identity} & \rightarrow & 0 = 0 \end{array}$$

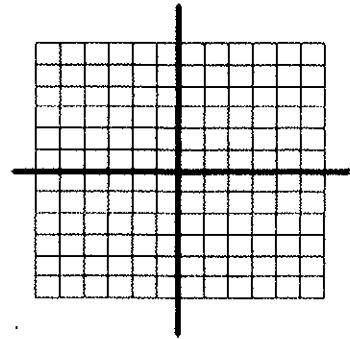
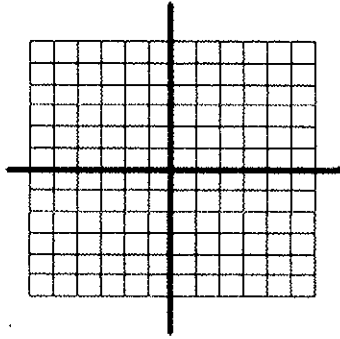
Conclusion : Dependent System

All points on the line: $x + y = 6$

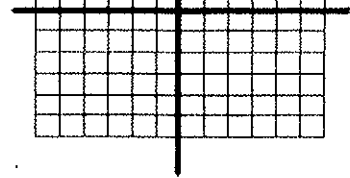
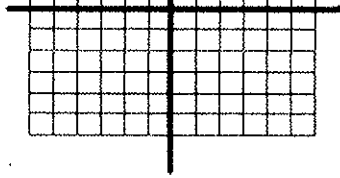
Algebra 2
Solving Systems of Equations

Solve the following systems of equations by graphing.

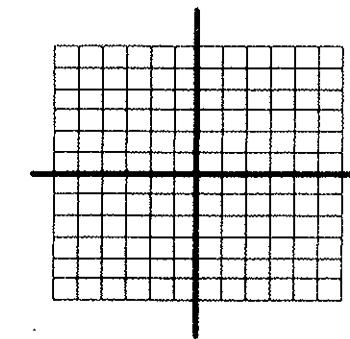
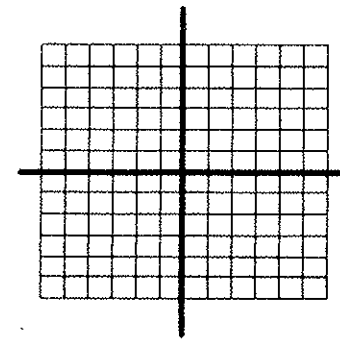
1. $7x + 2y = -6$
 $-14x - 4y = -2$



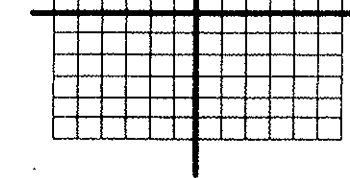
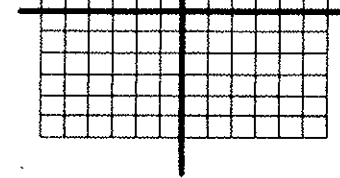
2. $y = x - 5$
 $y = -2x + 4$



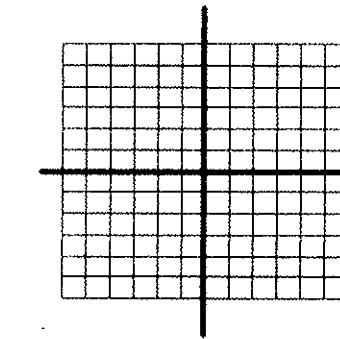
3. $8x + y = -4$
 $0 = -4 - y - 8x$



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



5. $y = 4x + 1$
 $2x + 2y = 7$



Answers: 1. No solution 2. $(3, -2)$ 3. Inf. Many sol. 4. $(-3, -2)$ 5. $\left(\frac{1}{2}, 3\right)$

Perform all work on a separate piece of paper. Make sure to do all graphs on graph paper in order to have accurate solutions.

Determine if the ordered pair is a solution of the system.

- | | | | |
|----------------------------------|------------------------------------|--|--|
| (1, 2) | (5, 3) | (3, 3) | (-1, -5) |
| 1) $x + 4y = 9$
$3x - 2y = 1$ | 2) $3x - 4y = 3$
$4x - 3y = 11$ | 3) $2x - y = 3$
$y = 2x^2 - 4x - 3$ | 4) $2x - y = 3$
$y = 2x^2 - 4x - 3$ |

Graph the systems *by hand* and determine the solutions.

- | | | |
|--|-------------------------------------|---|
| 5) $3x - 2y = 2$
$-2x + y = -2$ | 6) $4x - y = 3$
$-8x + 2y = -6$ | 7) $x + 3y = 2$
$-3x - 9y = 18$ |
| 8) $x = 5$
$y = -2$ | 9) $x + 2y = 7$
$x = -1$ | 10) $y = x$
$2x + 3y = 12$ |
| 11) $y = -\frac{1}{2}x + 3$
$y = 1$ | 12) $2x - 2y = -10$
$y = 2x + 6$ | 13) $y = \frac{4}{3}x + 3$
$y = -\frac{2}{3}x - 3$ |
| 14) $y = -\frac{3}{2}x - 4$
$-x + 2y = 8$ | | |

Choose the correct answer. Make sure to show your work!

15) Which point is the solution for the following system?

$$\begin{cases} y = \frac{1}{2}x + 2 \\ x - 4y = 8 \end{cases}$$

A) (0, 2) B) (-16, -6) C) (12, 1) D) (-2, 0)

Practice: Classify each system as **dependent or independent** without graphing. State the number of solutions-THEN graph the system on a calculator to verify your prediction.

$$16) \begin{cases} 3x + y = 5 \\ 15x + 5y = 2 \end{cases}$$

$$17) \begin{cases} y = 2x + 3 \\ -4x + 2y = 6 \end{cases}$$

$$18) \begin{cases} x - y = 5 \\ y + 3 = 2x \end{cases}$$