

Notes 3-1A Solving Systems of Equations
Algebra II

Name _____
Period _____

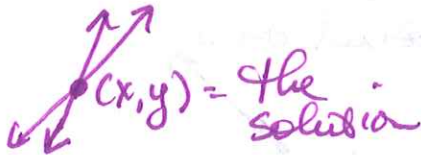
A system of equations is a set of 2 or more equations containing 2 or more variables.
A linear system is a system containing only linear equations.

There are 3 different types of solutions to a system of equations.

one solution * no solution * infinitely many solutions

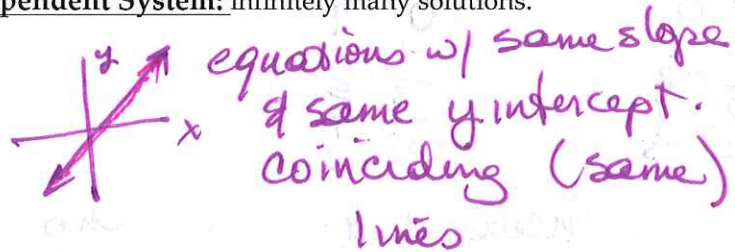
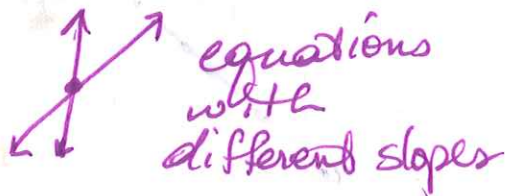
Consistent System: at least one solution

Inconsistent System: no solutions



Independent System: only one solution

Dependent System: infinitely many solutions.



Graphs & tables can help us find solutions.

Ex: $y + 2 = x$ and $2x - 3y = 3$

Ex: $3y + 6x = 3$ and $x - y = -7$

$$y = x - 2$$

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

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

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

$$y = -2x + 1$$

$$-x - y = -7$$

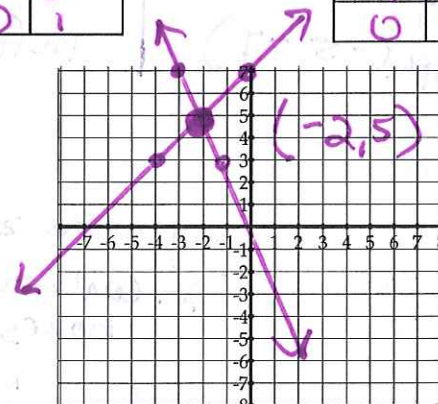
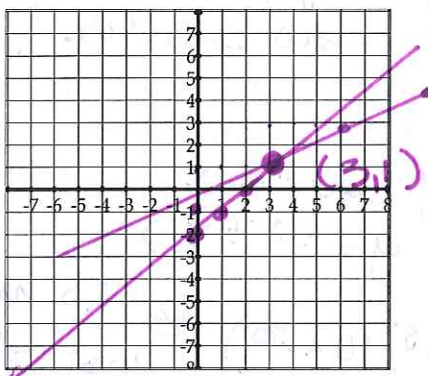
$$y = x + 7$$

x	y
0	-2
3	1
6	4

x	y
0	-1
3	1
6	3

x	y
-4	9
-3	7
-2	5
-1	3
0	1

x	y
-4	3
-3	4
-2	5
-1	6
0	7



Classification: Independent & Consistent

Solution: $(3, 1)$

Classification: Consistent & independent

Solution: $(-2, 5)$

Ex: $x = 2y + 6$ and $3x - 6y = 18$

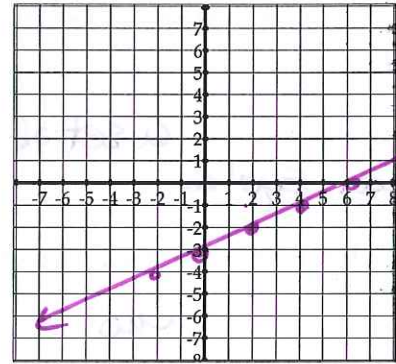
$x - 6 = 2y$
 $y = \frac{1}{2}x - 3$

$-\frac{6y}{-6} = \frac{-3x + 18}{-6}$
 $y = \frac{1}{2}x - 3$

x	y
4	-1
2	-2
0	-3
2	-4

x	y
4	-1
2	-2
0	-3
2	-4

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



Classification: **Consistent & Dependent**

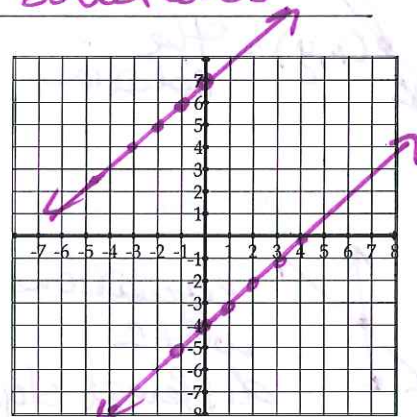
Solution: **Infinitely many solutions**

Ex: $y + 4 = x$ and $5y = 5x + 35$

$y = x - 4$ and $y = x + 7$

x	y
4	0
3	-1
2	-2
0	-4
-1	-5

x	y
0	7
-1	6
-2	5
-3	4
-2	3



Classification: **Inconsistent**

Solution: **no solution**

Use your graphing calculator to find the solutions to the systems: (remember to solve for y first!)

$\begin{cases} x - y = 2 \\ 2y - 3x = -1 \end{cases}$

$\begin{cases} x = 2y + 6 \\ 3x - 6y = 18 \end{cases}$

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

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

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

Solution: $(-5, -7)$

$x = 2y + 6$
 $2y = x - 6$
 $y = \frac{1}{2}x - 3$

$3x - 6y = 18$
 $-\frac{6y}{-6} = \frac{-3x + 18}{-6}$
 $y = \frac{1}{2}x - 3$

Infinitely many solutions

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

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

parallel lines w/ dif y intercepts
 no solution!

City Park Golf Club charges \$20 to rent clubs, plus \$55 per hour for cart rental. Sea Vista charges \$35 for clubs and \$45 per hour for cart rental. At how many hours is the cost the same for either course?

- 1) define your variables
- 2) write 2 equations
- 3) solve using algebra, table or graph.

$y = \text{total cost}$
 $x = \text{cart rental hours}$

City Park: $y = 20 + 55x$
 Sea Vista: $y = 35 + 45x$

Window: $x \text{ min} = -1$
 $x \text{ max} = 5$
 $y \text{ max} = 200$

$(1.5, 102.50)$
 @ 1.5 hrs
 cost = \$102.50
 for both courses!