

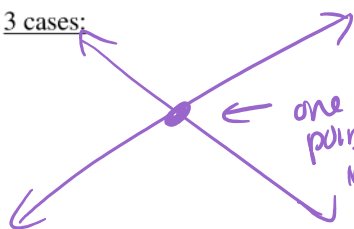
Math 1314 – College Algebra
Section 7.1-7.2 Systems of Linear Equations: Two Variables/Three Variables

- Can solve systems of equations by three methods:

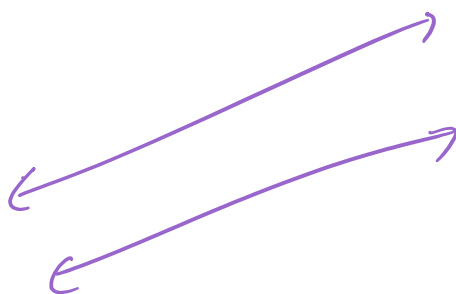
- Graphing
- Substitution
- Addition/Elimination

- What does it mean to solve a system of linear equations?

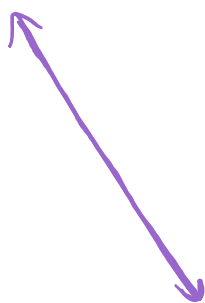
- 3 cases:



Exactly one soln
(x, y)



NO SOLN
lines are distinct &
parallel.



Infinite many solns
lines are coincident.

Ex: Solve

(a) $3x + y = 1$ $y = 1 - 3x$
 $-x + 2y = 9$

$-x + 2(1 - 3x) = 9$
 $-x + 2 - 6x = 9$
 $-7x = 7$
 $x = -1$

$y = 1 - 3(-1)$
 $y = 1 + 3$
 $y = 4$
 $(-1, 4)$

Exactly one soln

(b) $\begin{cases} 3x + 2y = 8 \\ 2x - 5y = 18 \end{cases}$

$15x + 10y = 40$
 $4x - 10y = 36$

 $19x = 76$
 $x = 4$

Choose an eqn to plug $x=4$ into to solve for y

Exactly one soln $(4, -2)$

$3(4) + 2y = 8$
 $12 + 2y = 8$
 $2y = -4$
 $y = -2$

(c) $\begin{cases} 4x - 6y = 8 \\ 6x - 9y = 12 \end{cases}$

$12x - 18y = 24$
 $-12x + 18y = -24$

 $0 = 0$

Infinitely many solns

true no matter what x & y are

$4x - 6y = 8$ Solve for y

$-6y = -4x + 8$
 $\frac{-6y}{-6} = \frac{-4x + 8}{-6}$
 $y = \frac{2}{3}x - \frac{4}{3}$

Solns:
 $(x, \frac{2}{3}x - \frac{4}{3})$

$(x\text{-stuff}, y)$

$$\begin{array}{r} 3 \\ (d) \left(\begin{array}{l} 5x + 15y = 19 \\ 3x + 9y = 11 \end{array} \right) \\ -5 \end{array}$$

$$15x + 45y = 57$$

$$\underline{-15x - 45y = -55}$$

$$0 \neq 2$$

False, no matter
what x & y are.

NO SOLN

Ex: A farmer raises corn and soybeans on 350 acres of land. He will plant 100 more acres of corn than soybeans. How many acres of each should he plant?

Ex: A college student earns \$198.50 per week. He works half of the 30-hour week at a fast food chain earning \$5.70 per hour. He earns \$6.30 per hour at a gas station. He earns \$10 per hour doing janitorial work. How many hours per week does he work at each job?

Ex: A Mississippi riverboat can travel 30 kilometers downstream in 3 hours and can make the return trip in 5 hours. Find the speed of the boat in still water.