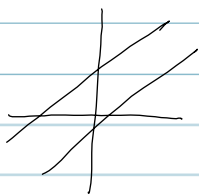
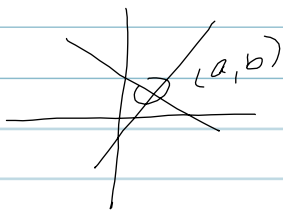


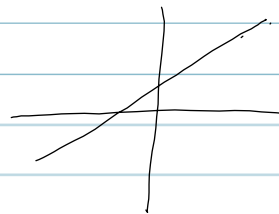
4.1 Systems of Linear Equations



parallel
no solution



unique crossing
point
(a, b)



same line
(coinciding lines)
infinite solutions

solution = crossing point(s)

(every point on line)

methods to solve systems of linear equations

1) graphing

2) substitution

3) elimination (addition)

* 4) Cramer's rule *

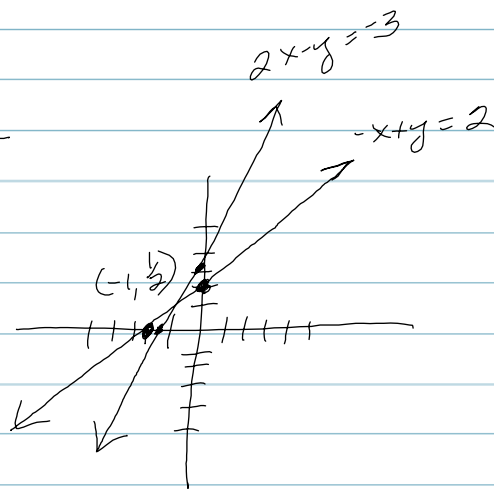
* 5) matrix *

$$\begin{aligned} -x + y &= 2 \\ 2x - y &= -3 \end{aligned}$$

method 1 - graph

$$\begin{array}{c|c} -x + y = 2 & \\ \hline x & y \\ \hline 0 & 2 \\ -2 & 0 \end{array}$$

$$\begin{array}{c|c} 2x - y = -3 & \\ \hline x & y \\ \hline 0 & 3 \\ -3/2 & 0 \end{array}$$



Substitution

$$\begin{aligned} -x + y &= 2 \\ 2x - y &= 3 \end{aligned}$$

$$\begin{aligned} y &= 2 + x \\ 2x - y &= -3 \end{aligned}$$

$$\begin{aligned} 2x - (2 + x) &= -3 \\ 2x - 2 - x &= -3 \\ x - 2 &= -3 \\ x &= -1 \end{aligned}$$

$$\begin{aligned} -x + y &= 2 \\ -(-1) + y &= 2 \\ 1 + y &= 2 \\ y &= 1 \end{aligned}$$

$$(-1, 1)$$

elimination

$$\begin{array}{r} \textcircled{1} \quad -x + y = 2 \quad \textcircled{2} \\ \textcircled{2} \quad 2x - y = -3 \end{array} \quad \begin{array}{r} -2x + 2y = 4 \\ \underline{2x - y = -3} \\ y = 1 \end{array}$$

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

$$(-1, 1)$$