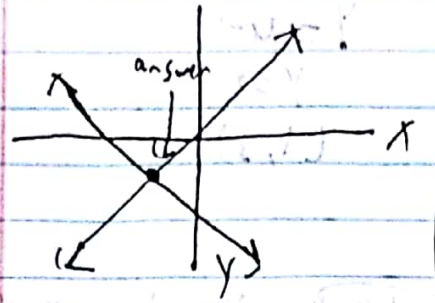
8/28
Ch. 8.1

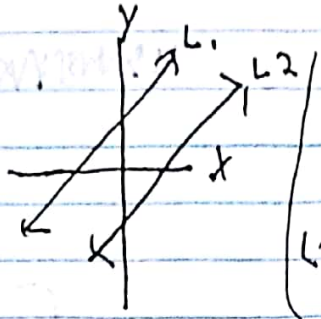
8.1 Solving Systems of Equations in two Variables

$4x + 5y = 9$ Example
$2x - 3y = 7$

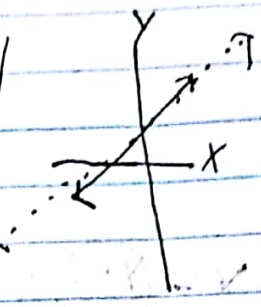
Three types of solutions



1- solution where the lines cross (x, y)



Line L_1 is parallel to L_2 No solution Variables will be eliminated and the remaining Statement is false



Infinite number of solution (x, y) Variables will be eliminated and the remaining statement is true

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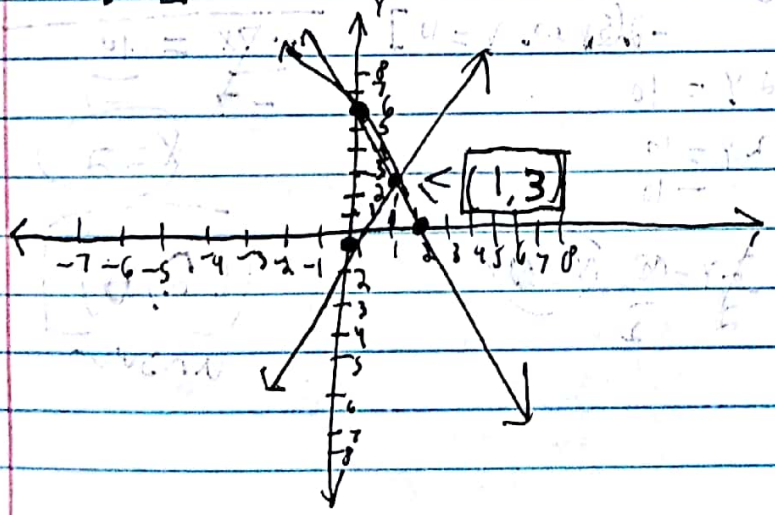
Three ways to solve..

1.) Graphing 3 approximate solution
2.) Substitution } Exact
3.) Elimination } Solutions

$y = 4x - 6$
$y = -3x + 6$ ← easily divisible



x-int	y-int
$y = 0$	$x = 0$
$0 = -3x + 6$	$y = -3(0) + 6$
$3x = 6$	$y = 0 + 6$
$x = 2$	$y = 6$
$(2, 0)$	$(0, 6)$

Sub

$y = 4x - 1$ $\quad 4x - 1 = -3x + 6$

$y = -3x + 6$ $\quad 7x = 7$

$x = 1$

$y = 4 - 1$

$y = 3$

$(1, 3)$

$x = \frac{y+6}{5}$ $\quad \frac{y+6}{5} = \frac{(y-3)}{4}$ $\quad 4(y+6) = 5(y-3)$

$4x = 4 - (y-3)$ $\quad 4y + 24 = 5(-y + 3)$

$4y + 24 = -5y + 15$

$-15 \quad -15$

$x = \frac{-1+6}{5}$ $\quad x = \frac{5}{5}$ $\quad 4x + 9 = -5y$

$x = 1$ $\quad -4y \quad -4y$

$(1, -1)$ $\quad -9y = 9$

$y = -1$

$y = -\frac{3}{5} = \frac{-3}{5} = \frac{3}{5}$ $\quad x = 2/3 = .6$

$x = \frac{3}{4} = 0.75$

Elimination

$5x + 2y = 10$ $\quad \leftarrow$ Eliminate y's $\quad -10x - 4y = -20$

$3x + 4y = 6$ $\quad$ LCM = 4 $\quad 3x + 4y = 6$

$-2[5x + 2y = 10]$ $\quad -7x = -14$

$-7 \quad -7$

$x = 2$

$5(2) + 2y = 10$

$10 + 2y = 10$

$-10 \quad -10$

$\frac{2y}{2} = \frac{0}{2}$ $\quad y = 0$

$(2, 0)$

answer

$(5x + 3y = -11)4$

$(3x + 4y = -11)-3$

$20x + 12y = -44$

$-9x - 12y = +33$

$11x = -11$

$x = -1$

$3(-1) + 4y = -11$

$-3 + 4y = -11$

$+3 \quad +3$

$\frac{4y}{4} = \frac{-8}{4}$

$y = -2$

$(-1, -2)$

$2x - 8y = 10$

$x - 4y = 4$

$-4y \quad +4y$

$x = 4y + 4$

$2(4y+4) - 8y = 10$

$8y + 8 - 8y = 10$

$-8 \quad -8$

$0 = 2$

NO SOLUTION

$2x - 8y = 10$

$(x - 4y = 5) -2$

$2x - 8y = 10$

$-2x + 8y = -10$

$0 + 0 = 0$

$\left(x, \frac{x-5}{4}\right)$

Infinite solutions