Skill: Solve by Elimination

$$\begin{cases} 2x + 2y = 60 \\ +\ 2x - 2y = 72 \end{cases}$$

$$\frac{4x}{4} = \frac{48}{4}$$

$$x = 12$$

$2(12) + 2y = 60$

$24 + 2y = 60$

$-24 \quad -24$

$\frac{2y}{2} = \frac{36}{2}$

$y = 18$

(12, 18)

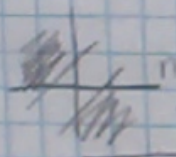
System of Inequalities

$y < mx+b$ or $ax+by$

$y > mx+b$ or $ax+by$

Solution is the set of points that make all of the inequalities true. (The points are in the intersection of the half-planes)

- infinite solutions



no solution
- parallel lines

To solve: Make Graph!

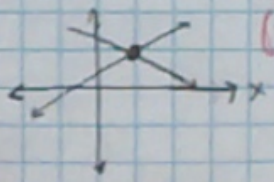
System of Equations

$y = mx+b$

$ax+by=c$

Solution: Set of point(s) that make the equation true

(the intersection of two lines)



To solve: - graph
- substitute
- eliminate

Example 1:

$$\begin{cases} 3x + 4y = 23 \\ 6x + 3y = 31 \end{cases}$$

a) story
b) solve - elimination
c) interpret solution in terms of story

On Monday Sherri spent $3 per hotdog and $4 per hamburger at the concession stand. She spent a total of $23. On Tuesday she went to Bongo's and spent $5 per hotdog + $3 per hamburger. How much of each item did she buy?

$-3(3x + 4y = 23)$

$4(6x + 3y = 31)$

$-9x - 12y = -69$

$24x + 12y = 124$

$\frac{15x}{15} = \frac{55}{15}$

$x = 5$

$3(5) + 4y = 23$

$15 + 4y = 23$

$-15 \quad -15$

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

$y = 2$

Sherri bought 5 hotdogs 2 hamburgers

Example 2: $2(2x + 3y = 14)$

$4x + 6y = 28$

$-(4x + 6y = 28)$

$0x + 0y = 0$

$0 = 0$ infinite solutions

(0, 4.6) (7, 0)

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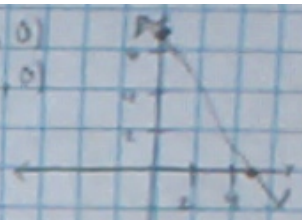


(same line)

Example 3: $3(3x + 2y = 20)$

$9x + 6y = 35$

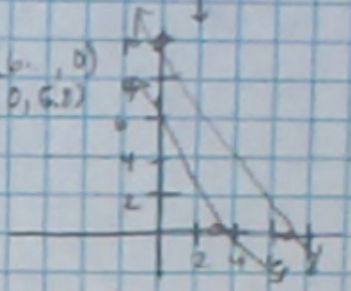
$-(9x + 6y = 60)$

$0x + 0y = -25$

$0 = -25$ no solution

(0, 10) (6.7, 0)

(3.8, 0) (0, 6.2)



Example 4: $3(4x + 2y = 8)$

$2(5x + 3y = 9)$

$12x + 6y = 24$

$-(10x + 6y = 18)$

$\frac{2x}{2} = \frac{6}{2}$

$\boxed{x = 3}$

$4(3) + 2y = 8$

$12 + 2y = 8$

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

$\boxed{y = -2}$ (3, -2)

one solution

6. Stan: $2(1n + 3p + 2m = \$7.50)$

Jan: $2n + 6p + 5m = \$15.50$

Fran: $1n + 2p + 2m = \$6.25$

$1n + 3p + 2m = 7.50$

$-(1n + 2p + 2m = 6.25)$

$\boxed{1p = \$1.25}$

$2n + 6p + 5m = 15.00$

$-(2n + 6p + 5m = 15.50)$

$-1m = -\$0.50$

$\boxed{m = \$0.50}$

$1n + 3(1.25) + 2(0.50) = 7.50$

$1n + 3.75 + 1 = 7.50$

$1n + 4.75 = 7.50$

$-4.75 \quad -4.75$

$\boxed{1n = 2.75}$