5.3 Justify **Solidify Task – Notes** **Name:** _____

Let's look at the following system: $\begin{cases} 3t + 4f = 43 \\ 3t + 6f = 54 \end{cases}$

We need to solve it but for each step, we are going to label (explain) what we are doing along the way. In a way, we are going to set up a strategy to help us solve each system from here on out. Be sure that you write clearly so that if you were to pass this to your neighbor, or HEAVEN FORBID your parents saw this, they could read what you wrote down.

Problem	What is going on?
$-1(3t + 4f = 43)$ $3t + 6f = 54$ $-3t - 4f = -43$ $2f = 11$ $f = 5.5$ $3t + 4(5.5) = 43$ $3t + 22 = 43$ $-22 \quad -22$ $3t = 21$ $t = 7$ (7, 5.5)	① Multiply top by −1 to eliminate t ② Add like terms ③ Divide ④ Plug in f and solve for t ⑤ Subtract ⑥ Divide ⑦ Write as point

As you were going through ~~this problem,~~ did your mindset match what we wrote down on the right hand side?

yes

Do you stop when you find one answer? Why or why not?

No, you have to plug in and make a point

Is it necessary to show all your work? Why?

Yes, to show where a mistake happened.

Now try these two problems explaining each along the way.

Problem	What is going on?
$-2(2x + 3y = 42.50)$ $5x + 6y = 94.25$ $-4x - 6y = -85$ $x = 9.25$ $2(9.25) + 3y = 42.50$ $18.5 + 3y = 42.50$ $-18.5 \quad -18.5$ $\frac{3y}{3} = \frac{24}{3}$ $y = 8$ $(9.25, 8)$	① Multiply top by -2 to eliminate y ② Add like terms ③ Plug in and solve for y ④ Subtract ⑤ Divide ⑥ Point

Problem	What is going on?
$-1(2b + 4t = 18.50)$ $2b - 3t = 1.00$ $-2b - 4t = -18.50$ $-7t = -17.50$ $\frac{-7t}{-7} = \frac{-17.50}{-7}$ $t = 2.5$ $2b + 4(2.5) = 18.50$ $2b + 10 = 18.50$ $-10 \quad -10$ $\frac{2b}{2} = \frac{8.50}{2}$ $b = 4.25$ $(4.25, 2.5)$	① Multiply top by -1 to eliminate b ② Add like terms ③ Divide ④ Plug in t and solve for b ⑤ Subtract ⑥ Divide ⑦ Point

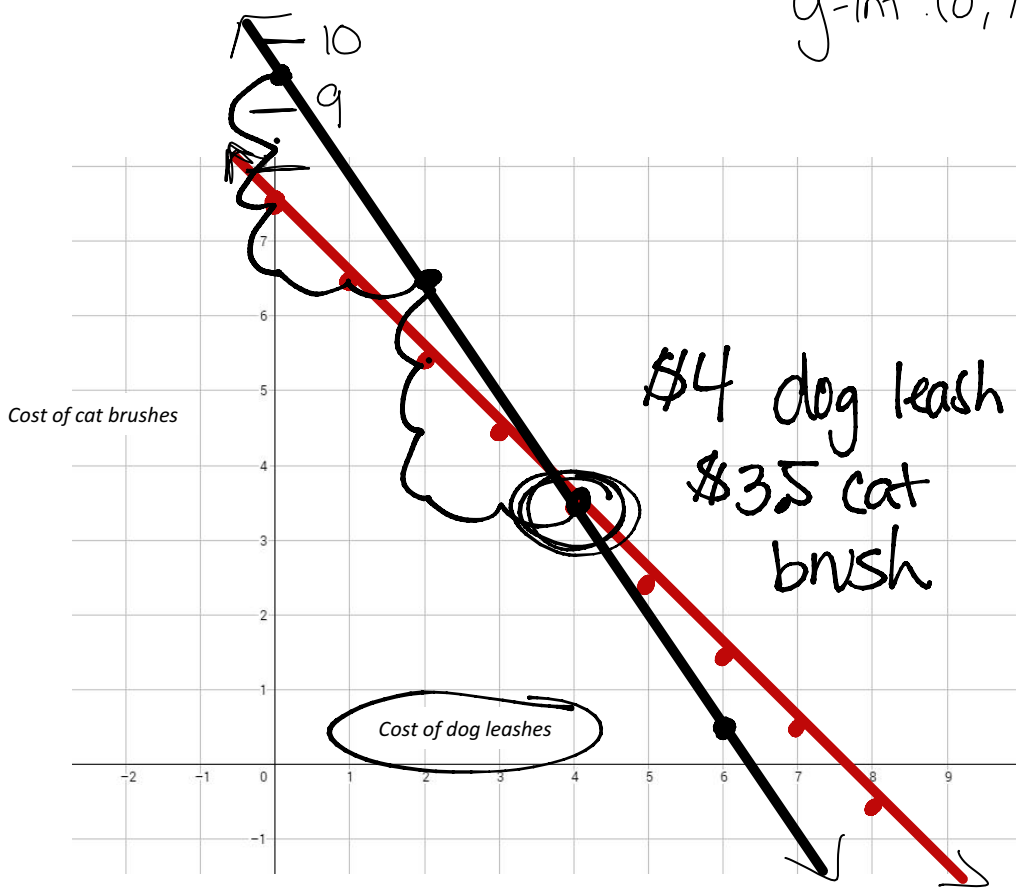
Let's look at a **graph**. Carlos thinks that when he graphs the two systems, he can show the cost of each item on the graph.

- Carlos purchased 6 dog leashes and 6 cat brushes for $45.00 for Clarita to use while pampering the pets. Later in the summer he purchased 3 additional dog leashes and 2 cat brushes for $19.00. Based on the information given, figure out the price of each item.

X= Dog leashes
y= cat brush

$6x + 6y = 45$
$-6x \quad -6x$
$\frac{6y}{6} = \frac{-6x}{6} + \frac{45}{6}$
$y = -1x + 7.5$
y-int: (0, 7.5)
slope: -1

$3x + 2y = 19$
$-3x \quad -3x$
$\frac{2y}{2} = \frac{-3x}{2} + \frac{19}{2}$
$y = -\frac{3}{2}x + 9.5$
slope: $-\frac{3}{2}$
y-int: (0, 9.5)



$4 dog leash
$3.5 cat brush

Now try this word problem. Reread it to be sure you have all the information.

- A 150 yard pipe is cut to provide drainage for two fields. If the length of the one piece (**a**) is three yards less than twice the length of the second piece (**b**), what are the lengths of the two pieces?

a = piece #1
b = piece #2

$a + b = 150$
$a = 2b - 3$

$2b - 3 + b = 150$
$3b - 3 = 150$
$+3 \quad +3$
$\frac{3b}{3} = \frac{153}{3}$
$b = 51$ yds

$a + 51 = 150$
$-51 \quad -51$
$a = 99$ yds

Pick a method. Solve these.

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

$2y = x + 2$
$-2 \quad -2$
$2y - 2 = x$

$-\frac{1}{2}(2y - 2) + y = 1$
$+1 \quad +1$
$0 = 0$
$1 = 1$
Infinitely many

2. $\begin{cases} y = x - 1 \\ -x + y = 4 \end{cases}$

$-x + x - 1 = 4$
$-1 = 4$
No Solution

3. Write the following in slope intercept form. Based on the slope, determine if the equations have no solution, 1 solution or infinitely many solutions.

a. $3x - 4y = 13$
$y = -3x - 7$

$3x - 4y = 13$
$-3x \quad -3x$
$\frac{-4y}{-4} = \frac{-3x + 13}{-4}$
$y = \frac{3}{4}x - \frac{13}{4}$
1 solution

b. $0.5x - y = 30$
$0.5x - y = -30$

-1
$-0.5x + y = -30$
$0 = -60$
No Solution
Same slope but diff y-int

c. $3x - 3y = 3$
$x - y = 1$

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

$x - y = 1$
$-x \quad -x$
$\frac{-y}{-1} = \frac{-x + 1}{-1}$
$y = x - 1$

Infinitely many

4. Given the following system of inequalities, find the **point(s)** that work (are solutions) to the system. Show your work. $\begin{cases} y \leq 3x - 5 \\ y \geq x + 2 \end{cases}$

a. (6, 10) — x y
$10 \leq 3(6) - 5$
$10 \leq 13$ ✓

b. (1, 4) — x y

c. (8, 15) — x y