FMP 10 - Systems of Equations PRACTICE Test **(ver.1105-A)**

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Name:_____ **Date:**_____

Multiple Choice: Identify the choice that best completes the statement or answers the question.
Make sure to show your work or justify our answer using words.
Full marks will not be given for the correct answer only.

1). Create a linear system to model this situation:
In a board game, Judy scored 3 points more than twice the number of points Ann scored. There was a total of 39 points scored.

(a.) $j = 3 + 2a$, $j + a = 39$

b. $j - 3 = 2a$, $j + 2a = 39$

c. $j + 3 = 2a$, $j + a = 39$

d. $a = 3 + 2j$, $j + a = 39$

2). Create a linear system to model this situation:
Cheri operates a grass-cutting business. She charges \$19 for a small lawn and \$29 for a large lawn. One weekend, Cheri made \$287 by cutting 13 lawns.

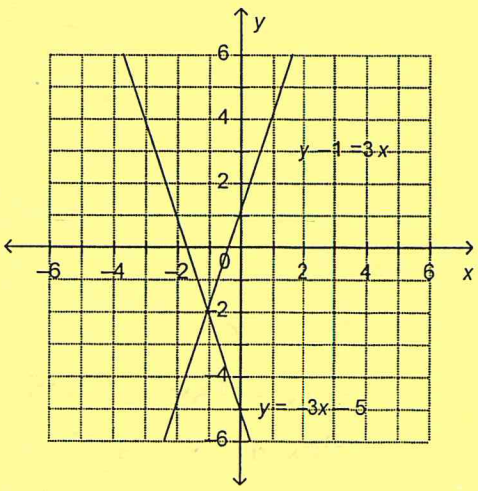
(a.) $s + l = 13$, $19s + 29l = 287$

b. $s + l = 287$, $19s + 29l = 13$

c. $s + l = 13$, $29s + 19l = 287$

d. $s + l = 287$, $29s + 19l = 13$

3). Use the graph to solve the linear system: $y = -3x - 5$, $y - 1 = 3x$



a. (1, –2)

b. (–1, 0)

c. (1, 0)

(d.) (–1, –2)

Check your answer. *(1 mark)*

4). Use substitution to solve this linear system. $x = 2y - 56$, $5x + 13y = 410$

$5(2y - 56) + 13y = 410$
$10y - 280 + 13y = 410$
$23y = 690$
$y = 30$

$x = 2(30) - 56$
$x = 60 - 56$
$= 4$

a. (4, –30)

b. (–4, 30)

(c.) (4, 30)

d. (–4, –30)

8

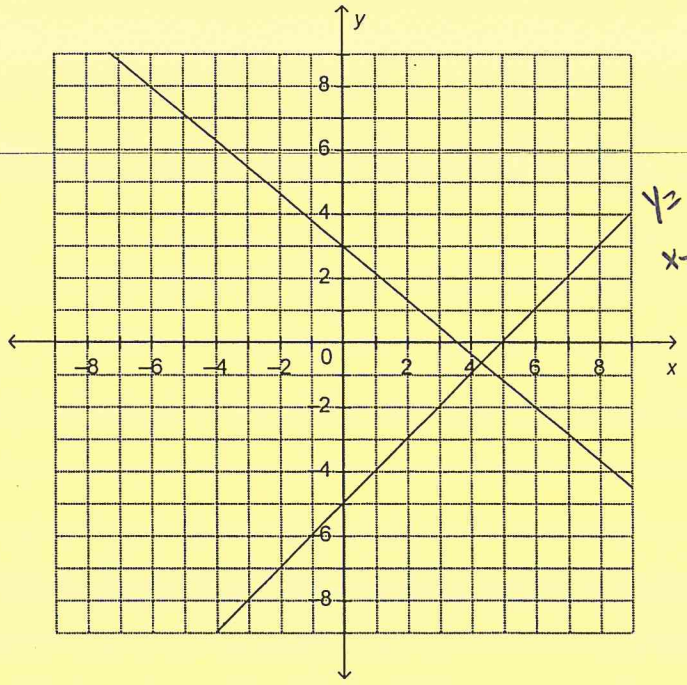
5). Which linear system is represented by this graph?

a) $x - y = 5$
$5x + 6y = 18$ → $x - 5 = y$

b) $x - y = 7$
$5x + 6y = 18$

c) $x - y = 9$
$6x + 6y = 18$

d) $x - y = 11$
$6x + 5y = 18$



$y = x - 5$
$x - y = 5$

6). Use substitution to solve this linear system:

$$x - y = 18$$
$$\frac{3}{4}x + \frac{3}{4}y = -\frac{15}{2}$$

$x = y + 18$

$\frac{3}{4}(y+18) + \frac{3}{4}y = -\frac{15}{2}$

$3(y+18) + 3y = -30$

$3y + 54 + 3y = -30$

$6y = -84$

$y = -14$

$x = -14 + 18$

$x = 4$

$(4, -14)$

a. $x = 4; y = 18$ b. $x = -14; y = -14$ c. $x = 4; y = -14$ d. $x = 4; y = 4$

7). Use an elimination strategy to solve this linear system.

$20x - 24y = -52$) 2
$8x + 32y = 104$) 5

elim "x"

$40x - 48y = -104$

$-40x + 160y = 520$

$-208y = -624$

$y = 3$

$20(x) - 24(3) = -52$

$20x - 72 = -52$

$20x = 20$

$x = 1$

$(1, 3)$

a. $x = -1$ and $y = -3$

b. $x = 3$ and $y = 1$

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

d. $x = 1$ and $y = 3$

6

8). Use an elimination strategy to solve this linear system.

$(14x+3y=-231)\times 7$
$(3x-7y=-210)\times 3$

elim. y

$98x+21y=-1617$
$+9x-21y=-630$
$107x = -2247$
$x=-21$

$\left(\frac{2}{3}x+\frac{1}{7}y=-11\right)21$
$\left(\frac{1}{7}x-\frac{1}{3}y=-10\right)21$

$14(-21)+3y=-231$
$-294+3y=-231$
$3y=63$
$y=21$

$(-21, 21)$

a. $x=-21$ and $y=21$
b. $x=21$ and $y=21$
c. $x=21$ and $y=-21$
d. $x=-21$ and $y=-21$

9). Without graphing, determine the equation whose graph intersects the graph of $-6x+3y=11$ exactly once.

$3y=6x+11$
$y=2x+\frac{11}{3}$

$3y=4x+11$
$y=\frac{4}{3}x+\frac{11}{3}$

$12y=24x+44$
$y=2x+\frac{11}{3}$

$3y=6x+13$
$y=2x+\frac{13}{3}$

a. $-4x+3y=11$
b. none
c. $-24x+12y=44$
d. $-6x+3y=13$

10). Determine the number of solutions of the linear system: $14x-5y=123$ $14x-5y=73$

$5y=14x-73$
$y=\frac{14}{5}x-\frac{73}{5}$

$14x-123=5y$
$y=\frac{14}{5}x-\frac{123}{5}$

a. no solution
b. infinite solutions
c. two solutions
d. one solution

Short Answer: Show work.

11). Create a linear system to model this situation:
A sack of wheat costs \$10.75 and a sack of oats costs \$12.75.
If the total cost was \$778.75 and 65 sacks were ordered, how many sacks of each grain were purchased?

Define variables: ① $w=$ # of sacks of wheat & $t=$ # of sacks of oats

① $10.75w+12.75t=778.75$
① $w+t=65$
$w=65-t$

$10.75(65-t)+12.75t=778.75$
$698.75-10.75t+12.75t=778.75$
$2t=80$
$t=40$
$w=65-40$
$w=25$

There were 40 sacks of oats and 25 sacks of wheat ordered. /3

Verify that 25 sacks of wheat and 40 sacks of oats represent the solution of the linear system.

$25+40=65$
$65=65$ ✓

~~&~~

$10.75(25)+12.75(40)=778.75$
$268.75+510=778.75$
$778.75=778.75$ ✓ /1

/10

12). Chad wrote this linear system to represent a situation involving sleeves and boxes of golf balls.

$$s + b = 14$$
$$3s + 12b = 141$$

a) What problem might Chad have solved?

How many sleeves and boxes of golf balls were ordered.

1/2

b) What does each variable represent?

$s =$ # of sleeves of golf balls

$b =$ # of boxes of golf balls

1/1

13). Solve this linear system by graphing. $-3x - 2y = 16$ $-x + y = -8$

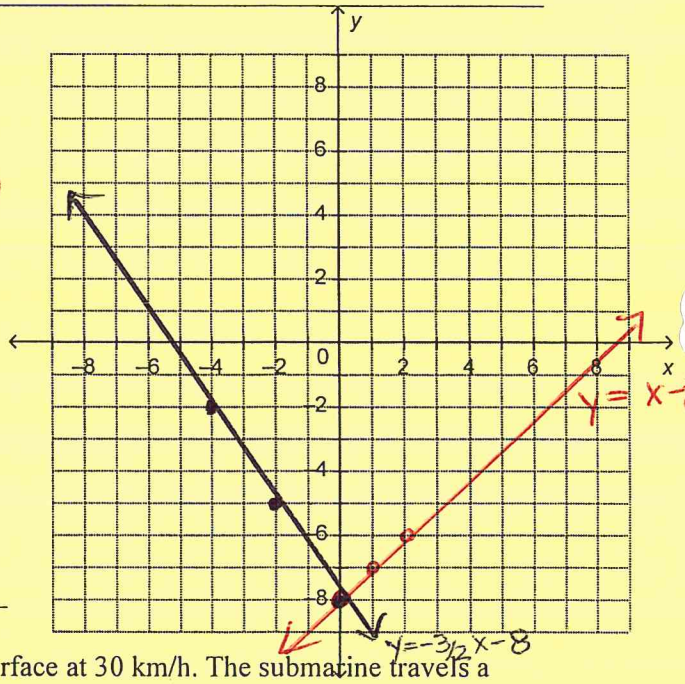
$-3x - 2y = 16$

$-3x - 16 = 2y$

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

$-x + y = -8$

$y = x - 8$



1/3

Solution $(0, -8)$

14). A submarine cruises underwater at 20 km/h and on the surface at 30 km/h. The submarine travels a distance of 650 km in 25 h. A linear system that models this situation is:

$$u + s = 25$$
$$20u + 30s = 650$$

where u represents the time in hours cruising underwater, and (x)
s represents the time in hours cruising on the surface. (y)

a) Graph the linear system above.

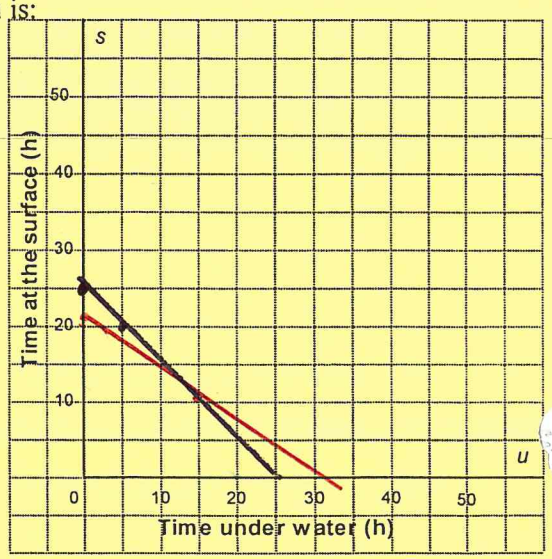
$u + s = 25$

$s = -u + 25$

$20u + 30s = 650$

$30s = -20u + 650$

$s = -\frac{2}{3}u + \frac{65}{3}$



1/4

check

b) Use the graph to solve the problem:
How long did the submarine travel underwater. $u = 10$ h

How long did it travel on the surface? $s = 15$ h

1/10

15). Use substitution to solve this linear system: $8x + y = -458$, $-5x + 3y = 221$ *(3 marks)*

Solution: _____

16). Use an elimination strategy to solve this linear system. $12c + 28d = 12$, $-20c + 16d = 168$ *(3 marks)*

Solution: _____

17). Define the variables & model this situation with a linear system:
A box of 24 golf balls has a mass of 1290 grams. When 5 balls are removed, the mass is 1065 grams.
Define your variables. Do NOT solve. *(3 marks)*

g = mass of one golf ball (g)
b = mass of the box (g)

$b + 24g = 1290$
$b + 19g = 1065$

18). Without solving, determine the number of solutions of this linear system. $7x - 3y = 43$, $7x - 3y = 13$

Justify your answer.

19). The first equation of a linear system is $9x + 6y = 213$. Write a second equation to form a linear system with infinite solutions.

$6y = -9x + 213$

$y = -\frac{9}{6}x + \frac{213}{6}$

$y = -\frac{3}{2}x + \frac{213}{6}$

35.5

ANY MULTIPLE OF $9x+6y=213$ (2)

20). For what values of k does the linear system $\begin{aligned} \frac{2}{3}x + y &= 16 \\ kx + 3y &= 48 \end{aligned}$ have :

a) infinite solutions?

same line or multiple of line (1c $\times 3$)

$k = 2$ (2)

b) one solution?

NOT PARALLEL NOR SAME LINE

(2)

ANYTHING BUT $k=2$

21). A stained glass design was made of triangles, each with area 14 cm^2, and hexagons, each with area 84 cm^2. The design used 81 shapes and covered an area of 5334 cm^2.

a) Create a linear system & define your variables to model the situation

(3 marks)

t = # of triangles (1)

h = # of hexagons

$t + h = 81$ (1)

$14t + 84h = 5334$ (1)

b) Solve the system and state what you answer represents.

$h = 81 - t$

$14t + 84(81 - t) = 5334$ 1-solution

$14t + 6804 - 84t = 5334$

$-70t = 1470$

$t = 21$

the design is made up of

Answer: 21 triangles & 60 hexagons (2) 1-explanation

22). Gino's class was assigned the following three-part question for homework.

a) Define the variables & write a linear system to model this situation (do not solve):
Save-Way-More food store received a delivery of 86 boxes of apples and bananas. Each box of apples had a mass of 32 lb., and each box of bananas had a mass of 16 lb. The total mass of the delivery was 1968 lb.

(3 marks)

a = # of boxes of apples

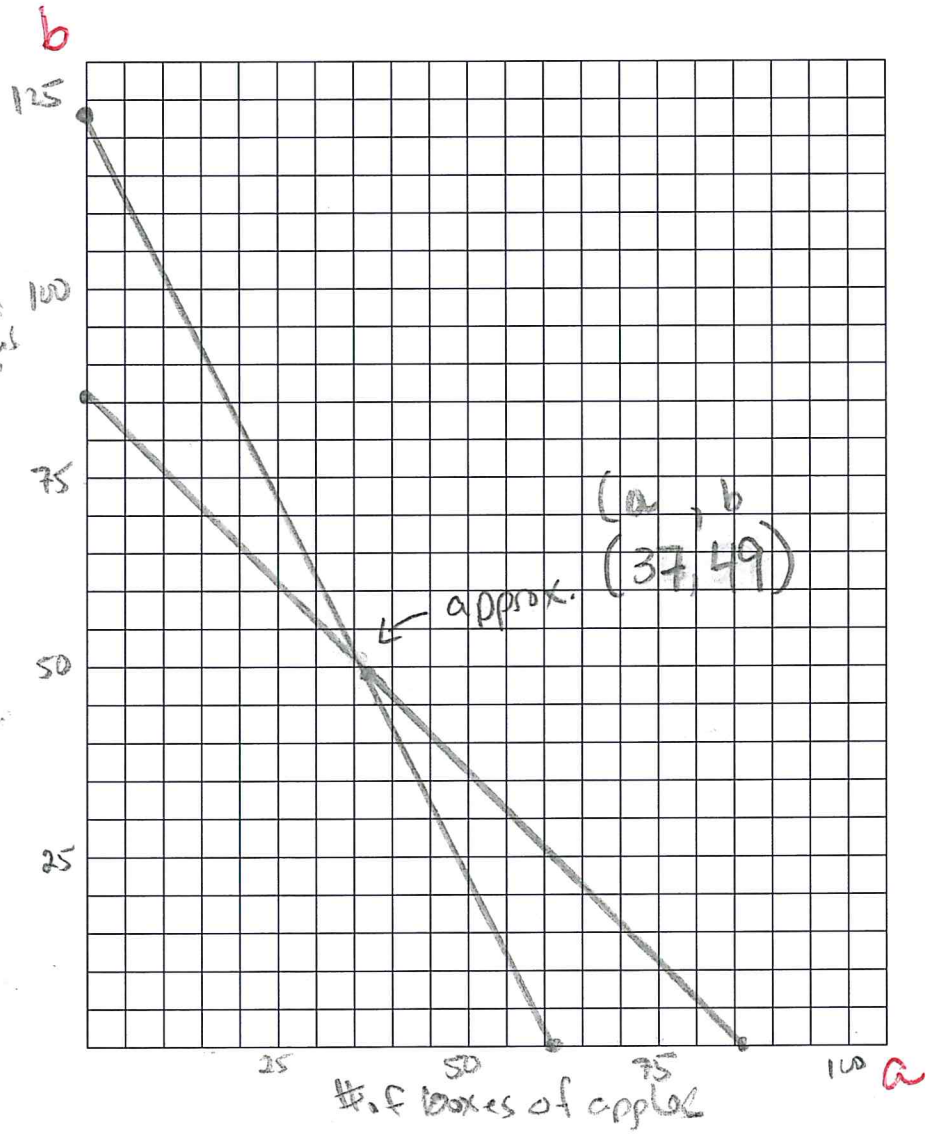
b = # of boxes of bananas

$a + b = 86$

$32a + 16b = 1968$

b) Use a graph to solve this problem: How many boxes of each fruit were there?

(3 marks)



$b = -a + 86$

$16b = -32a + 1968$

$b = -2a + 123$

check (a, b) (37, 49)

$37 + 49 = 86$ ✓

$32(37) + 16(49) = 1968$

$1184 + 784 = 1968$

$1968 = 1968$

Solution

37 boxes of apples

49 boxes of bananas

c) Gino answered part **a)** correctly, but could not understand why his solution of 49 boxes of apples and 37 boxes of bananas was incorrect for part **b).** Explain what he likely did wrong.

(1 mark)

Gino got the variables mixed up

15). Use substitution to solve this linear system:

$8x + y = -458 \rightarrow y = -8x - 458$

$-5x + 3y = 221$

$-5x + 3(-8x - 458) = 221$

$-5x - 24x - 1374 = 221$

$-29x = 1595$

$x = -55$

$\therefore 8(55) + y = -458$

$-440 + y = -458$

$y = -18$ 1/3

$(-55, -18)$

16). Use an elimination strategy to solve this linear system.

$(12c + 28d = 12) \times 5$

$(-20c + 16d = 168) \times 3$

eliminate c

$60c + 140d = 60$

$+ \; -60c + 48d = 504$

$188d = 564$

$d = 3$

$12c + 28(3) = 12$

$12c + 84 = 12$

$12c = -72$

$c = -6$ 1/3

$(-6, 3)$

17). Model this situation with a linear system:

A recycling depot pays 0.06¢ for a small can and 0.23¢ for a large can.
Chara took 70 cans to the recycling depot and her total refund was $22.35.
Do NOT solve.

Define Variables

s = # of small cans

l = # of large cans (1)

$s + l = 70 \rightarrow s = 70 - l$

$0.06s + 0.23l = 22.35$ (2) 1/3

18). Without solving, determine the number of solutions of this linear system.

$7x - 3y = 43$

$7x - 3y = 13$

Justify your answer.

$3y = 7x - 43$

$y = \frac{7}{3}x - \frac{43}{3}$

$3y = 7x - 13$

$y = \frac{7}{3}x - \frac{13}{3}$

No ~~infinite~~ solutions. 1/2

Same slope / diff y-int parallel lines.

19). The first equation of a linear system is $9x + 6y = 213$. Write a second equation to form a linear system with infinite solutions. 1/2

$9x + 6y = \_\_\_$

or $3x + 2y = 71$ ~~any other #~~ any multiple of 213.

/12

20). For what values of k does the linear system $\begin{matrix} \frac{2}{3}x + y = 16 \\ kx + 3y = 48 \end{matrix}$ have :

a) infinite solutions?

$2x+3y=48$

$Kx+3y=48$

$K=2.$ 1/2

b) one solution?

$2x+3y=48$

$Kx+3y=48$

Any # other than 2. 1/2

21). A stained glass design was made of triangles, each with area 14 cm^2, and hexagons, each with area 84 cm^2. The design used 81 shapes and covered an area of 5334 cm^2.

a) Create a linear system to model the situation. Define your variables

t = # of triangles used

h = # of hexagons used

$t + h = 81$

$14t + 84h = 5334$ 1/2

b) Solve the system and state what your answer represents.

$h = 81 - t$

$\therefore 14t + 84(81-t) = 5334$

$14t + 6804 - 84t = 5334$ (1)

$-70t = -1470$

$t = 21$

$\therefore h = 60$

$\therefore$ 21 triangles & 60 hexagons are in the stained glass. (1) 1/2

22). Gino's class was assigned the following two-part question for homework.

a) Write a linear system to model this situation: Define the variables

Save-Way-More food store received a delivery of 86 boxes of apples and bananas. Each box of apples had a mass of 32 lb., and each box of bananas had a mass of 16 lb. The total mass of the delivery was 1968 lb.

A = # of boxes of apples (1)

B = # of boxes of bananas

$A + B = 86$ (1)

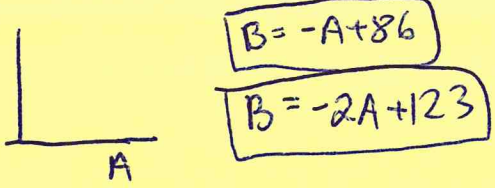
$32A + 16B = 1968$ (1) 1/3

49 boxes of apples
37 boxes of bananas 1/1

Separate Sheet

b) Use a graph to solve this problem: How many boxes of each fruit were there?

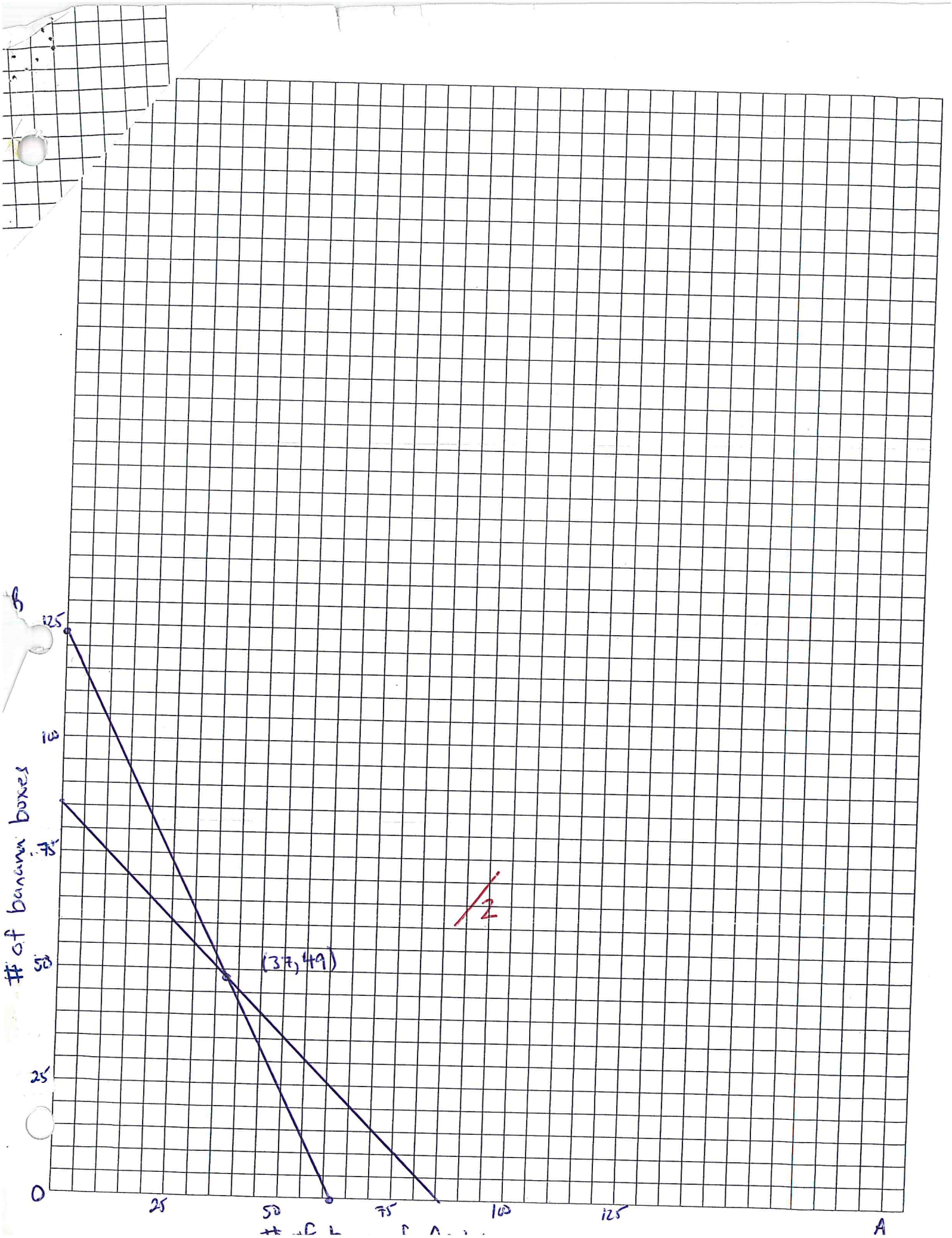
Gino answered part a correctly, but could not understand why his solution of 49 boxes of apples and 37 boxes of bananas was incorrect for part b. Explain what he likely did wrong.



GRAPH (2)

Switched variables (1) 1/1

13


125
100
75
50
25
0
# of banana boxes
25
50
75
100
125
A
(37, 49)
1/2