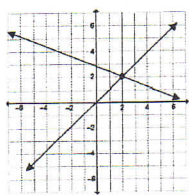


LINEAR SYSTEMS - PRACTICE QUESTIONS

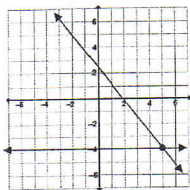
1. What are the three methods that can be used to solve a system of linear systems?

Graphing, Substitution, Elimination

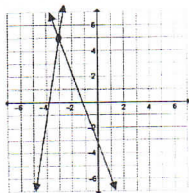
2. Graph of each system of linear equations is shown below. Determine the solution of each linear system.



POI is: (2, 2)



POI is: (5, -4)



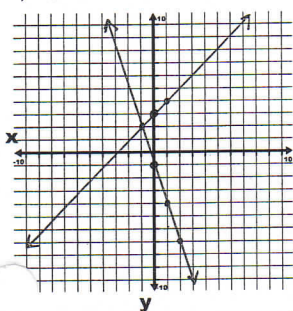
POI is: (-3, 5)

3. Describe in words what it means, when we say that (2, 7) is a solution to the following system of linear equations:

$y = 2x + 3$
 $-4x + y = -1$
It means the point of intersection of the two lines.

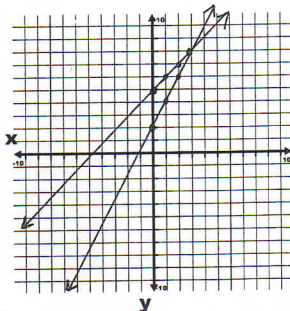
4. Solve the following system of equations by method of graphing.

a) $y = x + 5$
 $y = -3x - 1$
POI is (-1, 2)



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b) $y = x + 5$
 $y = 2x + 2$
POI is (3, 8)



6. Solve the following system of linear equations by ELIMINATION and CHECK.

a) $7x + 2y = 24$ ①
 $-8x + 2y = 30$ ②

Subtract ② from ①:
 $-1x + 0 = -6$
 $-1x = -6$
 $x = 6$

Sub. $x = 6$ into ①

$7(6) + 2y = 24$
 $42 + 2y = 24$
 $2y = 24 - 42$
 $2y = -18$
 $y = -9$

∴ POI is (6, -9)

Check in ①		Check in ②	
LS $7x + 2y$	RS = 24 ✓	LS $8x + 2y$	RS = 30 ✓
$= 7(6) + 2(-9)$		$= 8(6) + 2(-9)$	
$= 42 - 18$		$= 48 - 18$	
$= 24$		$= 30$	

b) $-4x + 9y = 9$ ①
 $x - 3y = -6$ ② (x4)

Add ② to ①:
 $-4x + 9y = 9$
 $4x - 12y = -24$
 $0 - 3y = -15$
 $-3y = -15$
 $y = 5$

Sub. $y = 5$ into ②

$x - 3(5) = -6$
 $x - 15 = -6$
 $x = 9$

∴ POI is (9, 5)

Check in ①		Check in ②	
LS $-4x + 9y$	RS = 9 ✓	LS $x - 3y$	RS = -6 ✓
$= -4(9) + 9(5)$		$= (9) - 3(5)$	
$= -36 + 45$		$= 9 - 15$	
$= 9$		$= -6$	

5. Solve the following systems of equations by SUBSTITUTION and CHECK:

a) $y = 2x - 5$ ①
 $3x + y = -10$ ②

Sub ① into ②:
 $3x + (2x - 5) = -10$
 $3x + 2x - 5 = -10$
 $5x = -10 + 5$
 $5x = -5$
 $x = -1$

Sub. $x = -1$ into ①

$y = 2(-1) - 5$
 $y = -2 - 5$
 $y = -7$

∴ POI is (-1, -7)

Check in ①		Check in ②	
LS y	RS $2x - 5$	LS $3x + y$	RS -10 ✓
$= -7$ ✓	$= 2(-1) - 5$	$= 3(-1) + (-7)$	
	$= -2 - 5$	$= -3 - 7$	
	$= -7$ ✓	$= -10$ ✓	

b) $4x - 7y = 20$ ①
 $x - 3y = 10$ ② → Rearrange

to isolate x first!

$x = 10 + 3y$ ③

Sub ③ into ①:
 $4(10 + 3y) - 7y = 20$
 $40 + 12y - 7y = 20$
 $5y = 20 - 40$
 $5y = -20$
 $y = -4$

Sub. $y = -4$ into ③

$x = 10 + 3(-4)$
 $x = 10 - 12$
 $x = -2$

POI is (-2, -4)

Check in ①		Check in ②	
LS $4x - 7y$	RS = 20 ✓	LS $x - 3y$	RS = 10 ✓
$= 4(-2) - 7(-4)$		$= (-2) - 3(-4)$	
$= -8 + 28$		$= -2 + 12$	
$= 20$ ✓		$= 10$ ✓	

7. Which method would you use to solve the following systems? DO NOT SOLVE THEM.

a) $y = 4x - 5$
 $3x + 2y = 12$
y already isolated
Substitution

b) $y = 2x + 3$
 $y = \frac{1}{3}x - 1$
In $y = mx + b$ form.
Graphing

c) $-2y + 4x = -4$
 $2y + x = 9$
Elimination

d) $10y + 15x = 140$
 $y - 9x = 45$
Elimination

e) $y = 4x$
 $y = -x + 3$
Graphing or Substitution

f) $x = y - 2$
 $2x + 4y = 8$
"x" isolated
Substitution

8. The student council at OP is selling yearbooks. The cost of the yearbook includes an \$900 design and set-up charge plus \$5 per yearbook. The yearbooks will sell for \$50 each. The cost and revenue can be represented by the following equations.

Cost: $d = 900 + 5n$ ①
Revenue: $d = 50n$ ②

a) What does each variable represent? Be specific!
 $d =$ amount in dollars
 $n =$ number of yearbooks sold

b) Solve the equation using the method of your choice. State your solution. Substitution!

Sub ① into ②:
 $900 + 5n = 50n$
 $900 = 50n - 5n$
 $900 = 45n$
 $20 = n$

Sub $n = 20$ into ②:
 $d = 50(20)$
 $d = 1000$

∴ POI is (20, 1000)

c) How many yearbooks need to be sold to break even? ∴ 20 yearbooks need to sell to break even.

d) How much would it cost to make 750 yearbooks?
Cost: $d = 900 + 5(750)$
 $= 900 + 3750$
 $= 4650$
∴ it will cost \$4650.

e) What will the revenue be if 750 yearbooks are sold?
Revenue: $d = 50(750)$
 $= 37500$
∴ Revenue will be \$37,500.

9. A store owner has a total of 56 bills in twenties and fifties in his safety deposit box. The total value of the money \$2500. The following equations represent the situation.

$$\text{Total number of bills: } t + f = 56 \quad \textcircled{1}$$

$$\text{Total value: } 20t + 50f = 2080 \quad \textcircled{2}$$

- a) Define the variables.

$t = \#$ of twenty dollar bills

$f = \#$ of fifty dollar bills.

- b) Solve the system of equations using the method that you prefer. *Elimination!*

$$\begin{array}{r} t + f = 56 \\ 20t + 50f = 2080 \end{array} \quad \begin{array}{r} (x20) \quad 20t + 20f = 1120 \\ - \quad 20t + 50f = 2080 \\ \hline 0 - 30f = -960 \end{array} \quad \begin{array}{l} \text{SUBTRACT!} \\ \text{Sub. } f=32 \text{ into } \textcircled{1} \\ t + (32) = 56 \\ t = 56 - 32 \\ \boxed{t = 24} \end{array}$$

$$0 - 30f = -960$$

$$\frac{-30f = -960}{-30 \quad -30}$$

$$\boxed{f = 32}$$

Sub. $f=32$ into $\textcircled{1}$

$$t + (32) = 56$$

$$t = 56 - 32$$

$$\boxed{t = 24}$$

POI (32, 24)

- c) How many of each bill is there?

\therefore there are 32 fifties and 24 twenties.

- d) If the store owner made a mistake while counting, and he realizes that there are 22 twenty dollar bills, then how many fifty dollar bills are there?

If $t=20$, sub into $\textcircled{1}$

$$t + f = 56$$

$$(22) + f = 56$$

$$f = 56 - 22$$

\therefore there will be 34 fifties.

$$\boxed{f = 34}$$