Linear Systems Review

1. Solve the linear system graphically.

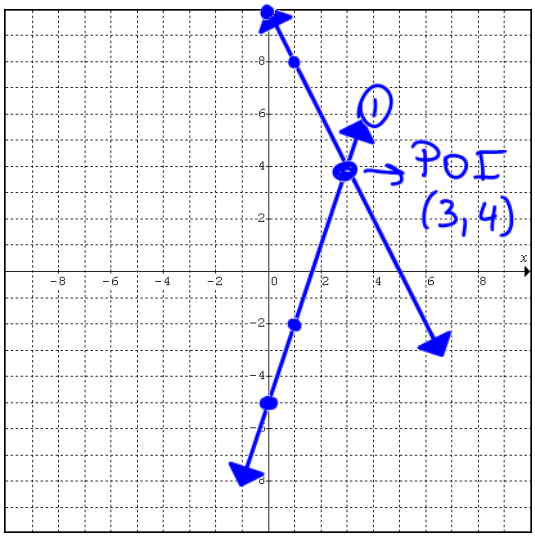
① y=3x-5

② y=-2x+10

① $y = 3x - 5$ ② $y = -2x + 10$

$m = \frac{rise}{run} = \frac{3}{1}$ $m = \frac{rise}{run} = \frac{-2}{1}$

y-int = -5 y-int = 10



2. Solve the linear system graphically.

① 5x – 2y = 10

② y = –x + 2

① $5x - 2y = 10$

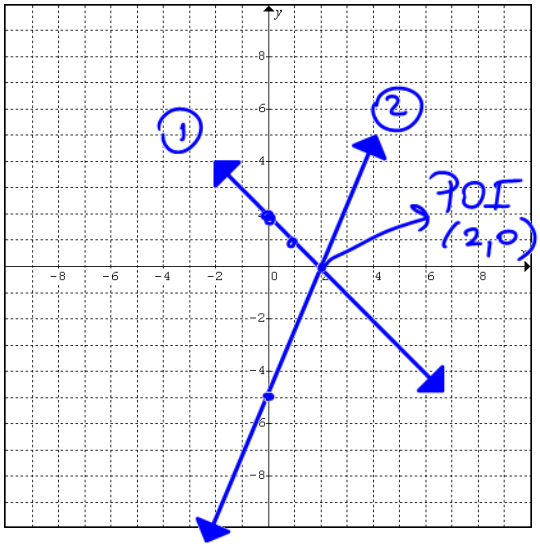
x = 2

y = -5

② $y = -x + 2$

$m = \frac{-1}{1}$

y-int = 2



3. Solve the linear system graphically.

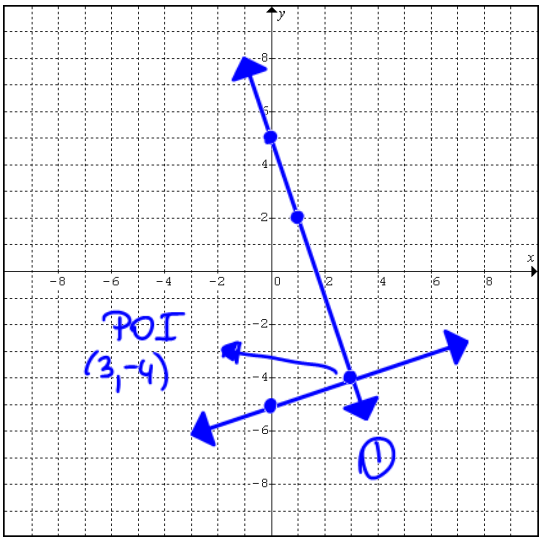
① 3x+y=5

② -x+3y=-15

① $y = -3x + 5$ ② $\frac{3y}{3} = \frac{x}{3} - \frac{15}{3}$

$m = \frac{-3}{1}$ $y = \frac{1}{3}x - 5$

y-int = 5



4. Determine the number of solutions to the following linear systems.

A) $y = 3x - 4$
$y = 3x + 6$

NO SOL

B) $5x - 2y - 10 = 0$
$x + y = 2$

$\frac{5}{1}, \frac{-2}{}, \frac{10}{2}$ ONE SOL

C) $y = 2x + 5$
$4x - 2y + 10 = 0$

rearrange in $y = mx + b$

① $y = 2x + 5$
② $y = 2x + 5$ ∞ sol.

5. Solve the linear system using substitution and check your answer.

A) ① $x + 2y = 6 \rightarrow x = -2y + 6$
② $4x + 3y = 4$

Step 1: Sub "$-2y+6$" for "x" into ②

$4(-2y+6) + 3y = 4$
$-8y + 24 + 3y = 4$
$-5y = 4 - 24$
$\frac{-5y}{-5} = \frac{-20}{-5}$
$y = 4$

Step 2: Sub "4" for "y" in ①

$x + 2(4) = 6$
$x = -2$

∴ POI is $(-2, 4)$

CHECK

$4x + 3y = 4$

LS	RS
$4(-2) + 3(4)$	4
$-8 + 12$	
4	4

LS = RS

∴ POI is $(-2, 4)$

B) ① $x + 5y = 11 \rightarrow x = -5y + 11$
② $4x - y = 2$

Step 1: Sub "$-5y+11$" for "x" in ②

$4(-5y + 11) - y = 2$
$-20y + 44 - y = 2$
$-21y = 2 - 44$
$\frac{-21y}{-21} = \frac{-42}{-21}$
$y = 2$

Step 2: Sub "2" for "y" in ①

$x + 5(2) = 11$
$x = 1$

∴ POI is $(1, 2)$

CHECK

$4x - y = 2$

LS	RS
$4(1) - 2$	2
2	2

LS = RS

∴ POI is $(1, 2)$

C) ① $x - 7 = y$
② $x - 4 = 4y$

Step 1: Sub "$x-7$" for "y" in ②

$x - 4 = 4(x - 7)$
$x - 4 = 4x - 28$
$-4 + 28 = 4x - x$
$\frac{24}{3} = \frac{3x}{3}$
$x = 8$

Step 2: Sub "8" for "x" in ①

$8 - 7 = y$
$y = 1$

∴ POI is $(8, 1)$

CHECK

$x - 4 = 4y$

LS	RS
$8 - 4$	$4(1)$
4	4

LS = RS

∴ POI is $(8, 1)$

6. Solve the linear system using elimination and check your answer.

A) 2x ($3x + y = 5$)
$x - 2y = 11$

Step 1
① $6x + 2y = 10$
\+ ② $x - 2y = 11$

$6x + x = 10 + 11$
$\frac{7x}{7} = \frac{21}{7}$
$x = 3$

Step 2
$x - 2y = 11$
$3 - 2y = 11$
$\frac{-2y}{-2} = \frac{8}{-2}$
$y = -4$

∴ (3, −4)

B) $3x - 2y = -8$
$y - 7 = 3x$

Step 1
① $3x - 2y = -8$
\+ ② $-3x + y = 7$

$-2y + y = -8 + 7$
$-y = -1$
$y = 1$

Step 2
$1 - 7 = 3x$
$\frac{-6}{3} = \frac{3x}{3}$
$x = -2$

∴ (−2, 1)

C) 5 ($3a + b = 12$)
$2a + 5b = 21$

Step 1
① $15a + 5b = 60$
− ② $2a + 5b = 21$

$15a - 2a = 70 - 21$
$\frac{13a}{13} = \frac{39}{13}$
$a = 3$

Step 2
$3a + b = 12$
$3(3) + b = 12$
$b = 3$

∴ a = 3 when b = 3

7. Kelly invested his savings of $4800. She invested part in mutual funds, at 9% per year, and the rest in GIC's at 10% per year. After one year, the interest from the mutual funds was $43 less than the interest from the GIC. How much was invested in each type of investment? (Remember "let" statements)

Let "m" be the amount invested in mutual funds.
Let "g" " " " " in GIC

① $m + g = 4800$
② $0.09m = 0.10g - 43$ → interest from mutual funds is 43 less than GIC

Step 1
rearrange $m = 4800 - g$
then sub it in ②
$0.09(4800 - g) = 0.10g - 43$
$432 - 0.09g = 0.10g - 43$
$432 + 43 = 0.10g + 0.09g$
$\frac{475}{0.19} = \frac{0.19g}{0.19}$
$g = 2500$

Step 2 Sub 2500 in ①
$m + 2500 = 4800$
$m = 2300$

∴ $2500 was invested in GIC and $2300 in mutual funds.

8. Joey gets a summer job as a lab technician, and needs three litres of an 8% saline solution. He has a 5% saline solution and a 9% solution in the lab stock room. How many litres of the 5% and 9% solution should he mix together? (Remember "let" statements)

let "f" be 5% solution and "n" be 9% solution

f		n		3L
5%	+	9%	=	8%

① $f + n = 3$

② $5\%f + 9\%n = 8\%(3)$

5. ① $5f + 5n = 15$

② $5f + 9n = 24$

$5n - 9n = 15 - 24$

$\frac{-4n}{-4} = \frac{-9}{-4}$

$n = 2.25$

$f + n = 3$

$f + 2.25 = 3$

$f = 0.75$

∴ Mix 0.75L of 5% with 2.25L of 9% solution

9. Jayden gets a summer job as a cashier at Canadian Tire. He has a total of $580 in bills at the end of his shift. He has 76 bills, consisting of $5 bills and $10 bills. How many of each type does he have? (Remember "let" statements)

let "f" be the number of $5 bills and "t" be the number of $10 bills.

$f + t = 76$ ← total bills

$(5f + 10t = 580) \div 5$ ← total value of the bills.

you can divide the equation by 5 because each coefficient is a multiple of 5.

① $f + t = 76$

② $f + 2t = 116$

$t - 2t = 76 - 116$

$-t = -40$

$t = 40$

$f + t = 76$

$f + 40 = 76$

$f = 36$

∴ There're 40 10 dollar, and 36 5 dollar bills.

Answers:

1. (3, 4) 2. (2, 0) 3. (3, -4) 4a. 0 b. 1 c. ∞ 5a. (-2, 4) b. (1, 2) c. (8, 1)
6a. (3, -4) b. (-2, 1) c. (3, 3) 7. $2300, $2500 8. 2.25L, 0.75L 9. 36, 40