

SYSTEMS OF LINEAR EQUATIONS AND INEQUALITIES REVIEW!

Part I Questions:

1. Which of the following points is a solution to the system shown below?

(1) (5, 12)

(3) (1, 10)

$y = x + 7$

$$\begin{array}{r} x + 7 = 11 - x \\ +x \quad \quad +x \\ \hline 2x + 7 = 11 \\ -7 \quad -7 \\ \hline 2x = 4 \end{array}$$

$y = (2) + 7$
 $y = 9$

(2) (2, 9)

(4) (-4, 7)

$y = 11 - x$

$$\begin{array}{r} 2x + 7 = 11 \\ -7 \quad -7 \\ \hline 2x = 4 \end{array} \quad \mathbf{x = 2}$$

2. The system shown below has a solution when $x = 1$. What must be the value of b in the second equation?

(1) 10

(3) 5

$y = 3x + 5$

$$\begin{array}{l} y = 3(1) + 5 \\ y = 3 + 5 \\ y = 8 \end{array}$$

$$\begin{array}{l} y = -2x + b \\ 8 = -2(1) + b \\ 8 = -2 + b \\ +2 \quad +2 \\ \hline 10 = b \end{array}$$

(2) 2

(4) 6

$y = -2x + b$

3. Which of the following is the x -coordinate of the solution to the system shown below?

(1) $x = -5$

(3) $x = 3$

(1) $y = 4x + 7$

$$\begin{array}{r} 4x + 7 = -x - 3 \\ +x \quad \quad +x \\ \hline 5x + 7 = -3 \end{array}$$

(2) $x = 7$

(4) $x = -2$

$$\begin{array}{r} x + y = -3 \\ -x \quad -x \\ \hline y = -3 \end{array}$$

$$\begin{array}{r} 5x + 7 = -3 \\ -7 \quad -7 \\ \hline 5x = -10 \end{array}$$

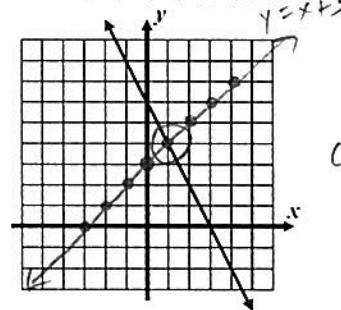
(2) $y = -x - 3$

$$\frac{5x}{5} = \frac{-10}{5} \quad x = -2$$

4. The linear equation $y = -2x + 6$ is shown graphed below. If it creates a system with the linear equation $y = x + 3$, which of the following would be the y -coordinate of the solution?

(1) $y = -3$

(3) $y = 8$



(1, 4)

(2) $y = -1$

(4) $y = 4$

5. The point (2, 5) is a solution to the system of equations $x + 2y = 12$. Which of the following equations would it **not** be a solution to?

it **not** be a solution to?

(1) $4x + y = 13$ ✓

(3) $6x - 2y = 2$ ✓

$x + 2y = 12$

$$\begin{array}{r} x + 2y = 12 \\ -3x - y = 1 \\ \hline -2x + 3y = 11 \end{array}$$

$$\begin{array}{l} x + 2y = 12 \\ 2(3x - y) = (1)2 \\ \hline 6x - 2y = 2 \end{array}$$

(2) $-2x + 3y = 11$ ✓

(4) $2x + 4y = 12$

$$\begin{array}{r} x + 2y = 12 \\ + 3x - y = 1 \\ \hline 4x + y = 13 \end{array}$$

$-2x + 3y = 11$

$6x - 2y = 2$

6. Which of the following values of x solves the system shown below?

CALC TRICK
if you want

(1) $x = -5$ (3) $x = -3$ $3x - 2y = -19$

(2) $x = 7$ (4) $x = -25$ $+ 2x + 2y = -6$

$$\frac{5x}{5} = \frac{-25}{5} \quad x = -5$$

7. Which value of y below is the solution to the system shown below?

(1) $y = 6$ (3) $y = -4$ $x + 2y = 27$

(2) $y = -1$ (4) $y = 8$ $2x + 3y = 46$

CALC TRICK

$x = 11$
 $y = 8$

8. The sum of two integers is 23 and the positive difference of the same two integers is 13. What is the product of these two integers?

(1) 90 (3) 46

(2) 75 (4) 299

let $x = 1^{st}$ integer
let $y = 2^{nd}$ integer

(1) $x + y = 23$

system \rightarrow (2) $+ x - y = 13$

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

$x = 18$

$x + y = 23$

$18 + y = 23$

$\frac{-18}{-18} \quad \frac{-18}{-18}$

$y = 5$

$(18)(5) = 90$

9. The line $y = -x + 3$ and parabola $y = x^2 - 6x + 7$ are graphed below. Which of the following represents the solution set (x values in the brackets below) to the equation:

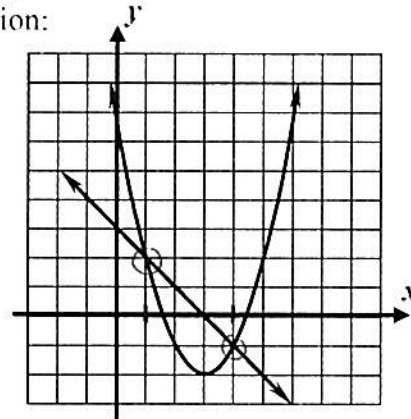
$x^2 - 6x + 7 = -x + 3$

(1) $\{-1, 5\}$

(3) $\{1, 4\}$

(2) $\{-1, 2\}$

(4) $\{0, 4\}$



1 and 4

which
 x -values?

Free Response Questions:

10. Explain how you can tell that the point (5, 13) is a solution to the system shown below.

$$y = 4x - 7$$

$$2x + y = 23$$

$$\begin{aligned} y &= 4x - 7 \\ 13 &= 4(5) - 7 \\ 13 &= 20 - 7 \\ 13 &= 13 \checkmark \end{aligned}$$

$$\begin{aligned} 2x + y &= 23 \\ 2(5) + 13 &= 23 \\ 10 + 13 &= 23 \\ 23 &= 23 \checkmark \end{aligned}$$

11. If the point (2, 5) is a solution to the system of equations shown below, then determine the missing values of b and m . Show how you arrive at your answer.

$$y = 3x + b$$

$$y = mx + 9$$

$$\begin{aligned} y &= 3x + b \\ 5 &= 3(2) + b \\ 5 &= 6 + b \\ \underline{-6} \quad \underline{-6} \\ -1 &= b \end{aligned}$$

$$\begin{aligned} y &= mx + b \\ 5 &= m(2) + (-1) \\ 5 &= 2m - 1 \\ \underline{+1} \quad \underline{+1} \\ 6 &= 2m \\ \frac{6}{2} &= \frac{2m}{2} \\ 3 &= m \end{aligned}$$

$$\begin{aligned} b &= -1 \\ m &= 3 \end{aligned}$$

12. Solve the following system of equation using the method of substitution. Show the work that leads to your answer.

$$y = -2x - 10$$

$$2x + 5y = 6$$

$$2x + 5(-2x - 10) = 6$$

$$2x - 10x - 50 = 6$$

$$\begin{aligned} -8x - 50 &= 6 \\ \underline{+50} \quad \underline{+50} \end{aligned}$$

$$\begin{aligned} -8x &= 56 \\ \underline{-8} \quad \underline{-8} \end{aligned}$$

$x = -7$

now find y :

$$y = -2x - 10$$

$$y = -2(-7) - 10$$

$$y = 14 - 10$$

$y = 4$

FINAL
ANS

$-7, 4$

13. Would the point (5, 10) lie in the solution set of the system of inequalities shown below? Justify your answer.

$$x > 2$$

$$y \geq 3x - 7$$

$$x > 2$$

$$5 > 2 \quad \checkmark$$

$$y \geq 3x - 7$$

$$10 \geq 3(5) - 7$$

$$10 \geq 15 - 7$$

$$10 \geq 8 \quad \checkmark$$

Yes! (5, 10) satisfies both inequalities.

14. Danny used the method of elimination to solve the system below:

$$\textcircled{1} \quad 4x + 3y = 12$$

$$\textcircled{2} \quad 2x + y = 5$$

(a) Danny first rewrote the second equation as $-6x - 3y = -15$. Is he allowed to do this? If so, what did he do?

Yes, he can do this.

He multiplied the 2nd equation by -3

$$\textcircled{2} \quad -3(2x + y) = (5) \cdot (-3)$$

$$-6x - 3y = -15$$

(b) What is the solution to the system?

CALC TRACK

$$\boxed{\begin{matrix} x = 1.5 \\ y = 2 \end{matrix}}$$

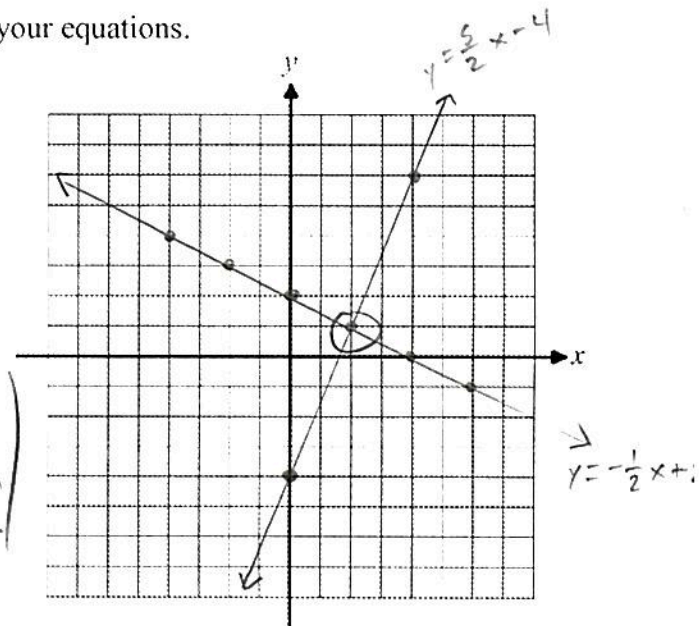
15. Solve the following system of equations graphically. Label your equations.

$$2y - 5x = -8 \quad \rightarrow \quad \frac{2y}{2} = \frac{5x - 8}{2}$$

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

$$y = \frac{5}{2}x - 4$$

(2, 1)
Solves
the system



16. Solve the following system by the method of elimination. Make sure to check your answer using your calculator.

$$2x + 5y = 5$$

$$3x + 2y = -9$$

$$\textcircled{1} \quad 3(2x + 5y) = (5)3 \quad \rightarrow \quad 6x + 15y = 15$$

$$\textcircled{2} \quad -2(3x + 2y) = (-9) \cdot -2 \quad \rightarrow \quad -6x - 4y = 18$$

$$\begin{array}{r} \text{GONE} \\ \hline 11y = 33 \\ \hline 11 \end{array}$$

$$y = 3$$

$$2x + 5y = 5$$

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

$$2x + 15 = 5$$

$$\underline{-15 \quad -15}$$

$$\underline{2x = -10} \\ \underline{\quad 2}$$

$$x = -5$$

$$\boxed{-5, 3}$$

17. For a class picnic, two teachers went to the same store to purchase drinks. One teacher purchased 18 juice boxes and 32 bottles of water, and spent \$19.92. The other teacher purchased 14 juice boxes and 26 bottles of water, and spent \$15.76.

Write a system of equations to represent the costs of a juice box, j , and a bottle of water, w .

let j = cost of a juice box

let w = cost of a bottle of water

$$\textcircled{1} \quad 18j + 32w = 19.92$$

$$\textcircled{2} \quad 14j + 26w = 15.76$$

Kara said that the juice boxes might have cost 52 cents each and that the bottles of water might have cost 33 cents each. Use your system of equations to justify that Kara's prices are *not* possible.

$$18j + 32w = 19.92$$

$$14j + 26w = 15.76$$

$$18(.52) + 32(.33) = 19.92$$

$$14(.52) + 26(.33) = 15.76$$

$$9.36 + 10.56 = 19.92$$

$$7.28 + 8.58 = 15.76$$

$$19.92 = 19.92 \quad \checkmark$$

$$15.86 \neq 15.76$$

NOT POSSIBLE.

Both must work.

