

SYSTEM OF LINEAR INEQUALITIES Exit Quiz

Solve the following inequalities and graph its solution

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

2.
$$\begin{cases} 4x + y \leq 5 \\ -2x + y \geq 4 \end{cases}$$

3.
$$\begin{cases} y \geq x + 1 \\ y > 2x \end{cases}$$

Solve the following word problem:

4. Adam works half a day as a waiter for \$5 per hour. He also works by night as a bartender for \$10. He is allowed to work 15 hours per week and he wants to make at most \$100. Write and graph a system of linear inequalities.

SYSTEM OF LINEAR INEQUALITIES Exit Quiz**ANSWERS**

Solve the following inequalities and graph its solution

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

We have to graph each of the linear function that compound the system. One easy way to graph each linear function is to find its intercepts with the axes.

- $y = -x + 2$

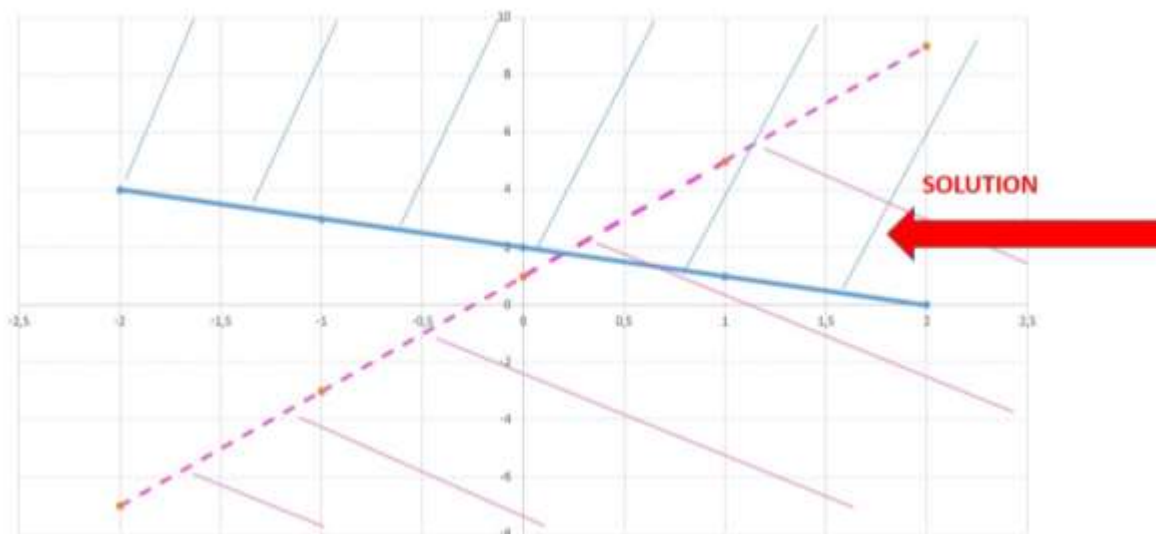
$$x = 0 \rightarrow y = 2 \rightarrow (0, 2)$$

$$y = 0 \rightarrow x = 2 \rightarrow (2, 0)$$

- $y = 4x + 1$

$$x = 0 \rightarrow y = 1 \rightarrow (0, 1)$$

$$y = 0 \rightarrow x = -1/4 \rightarrow (-1/4, 0)$$



The segmented line is because the border of the line does not belong to the solution and the straight line is because the border of the line belongs to the solution.

Proving with the point (1,2) that belongs to the solution region to verify if it satisfies the inequalities:

$$x + y \geq 2 \rightarrow 1 + 2 \geq 2 \rightarrow 3 \geq 2$$

$$-4x + y < 1 \rightarrow -4(1) + 2 < 1 \rightarrow -2 < 1$$

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2.
$$\begin{cases} 4x + y \leq 5 \\ -2x + y \geq 4 \end{cases}$$

We have to graph each of the linear function that compound the system. One easy way to graph each linear function is to find its intercepts with the axes.

- $y = -4x + 5$

$$x = 0 \rightarrow y = 5 \rightarrow (0,5)$$

$$y = 0 \rightarrow x = 5/4 \rightarrow (5/4,0)$$

- $y = 2x + 4$

$$x = 0 \rightarrow y = 4 \rightarrow (0,4)$$

$$y = 0 \rightarrow x = -2 \rightarrow (-2,0)$$



Proving with the point $(-1,4)$ that belongs to the solution region to verify if it satisfies the inequalities:

$$4(-1) + 4 \leq 5 \rightarrow 0 \leq 5$$

$$-2(-1) + 4 \geq 4 \rightarrow 6 \geq 4$$

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3.
$$\begin{cases} y \geq x + 1 \\ y \geq 2x \end{cases}$$

We have to graph each of the linear function that compound the system. One easy way to graph each linear function is to find its intercepts with the axes.

- $y = x + 1$

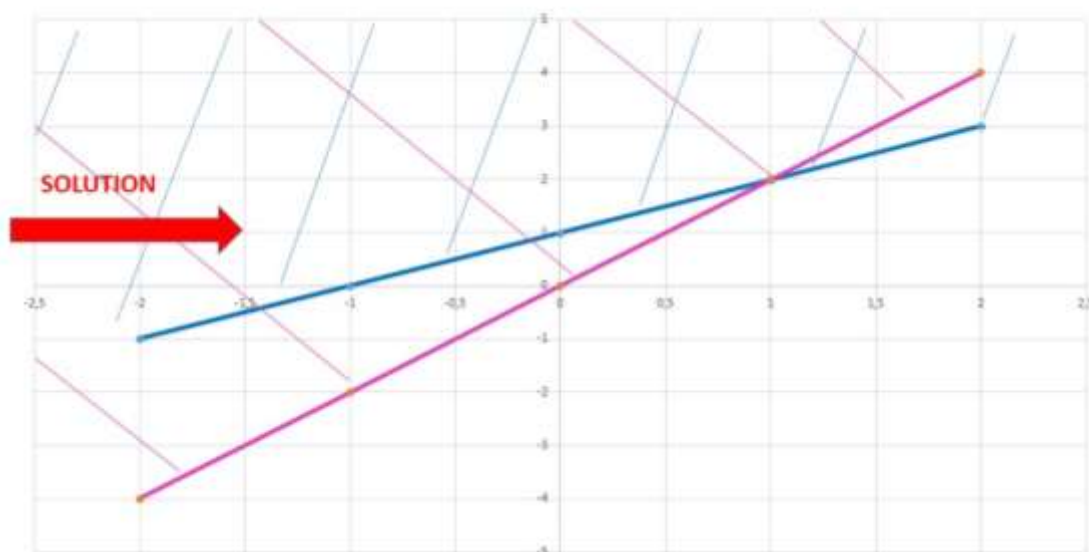
$$x = 0 \rightarrow y = 1 \rightarrow (0,1)$$

$$y = 0 \rightarrow x = -1 \rightarrow (-1,0)$$

- $y = 2x$

$$x = 0 \rightarrow y = 0 \rightarrow (0,0)$$

$$y = 4 \rightarrow x = 2 \rightarrow (2,4)$$



Proving with the point $(-1,2)$ that belongs to the solution region to verify if it satisfies the inequalities:

$$y \geq x + 1 \rightarrow 2 \geq -1 + 1 \rightarrow 2 \geq 0$$

$$y \geq 2x \rightarrow 2 \geq 2(-1) \rightarrow 2 \geq -2$$

Solve the following word problem:

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4. Adam works half a day as a waiter for \$5 per hour. He also works by night as a bartender for \$10. He is allowed to work 15 hours per week and he wants to make at most \$100. Write and graph a system of linear inequalities.

SOLUTION

Let's define the variables that represent the system:

X= Hours worked as bartender

Y= Hours worked as waiter

- The statement says he wants to earn at most \$100 :

$$10x + 5y \leq 100 \rightarrow \text{simplifying} \rightarrow 2x + y \leq 20$$

- Hours worked, so:

$$x + y \leq 15$$

We have to graph each of the linear function that compound the system. One easy way to graph each linear function is to find its intercepts with the axes.

- $y = -2x + 20$

$$x = 0 \rightarrow y = 20 \rightarrow (0, 20)$$

$$y = 0 \rightarrow x = 10 \rightarrow (10, 0)$$

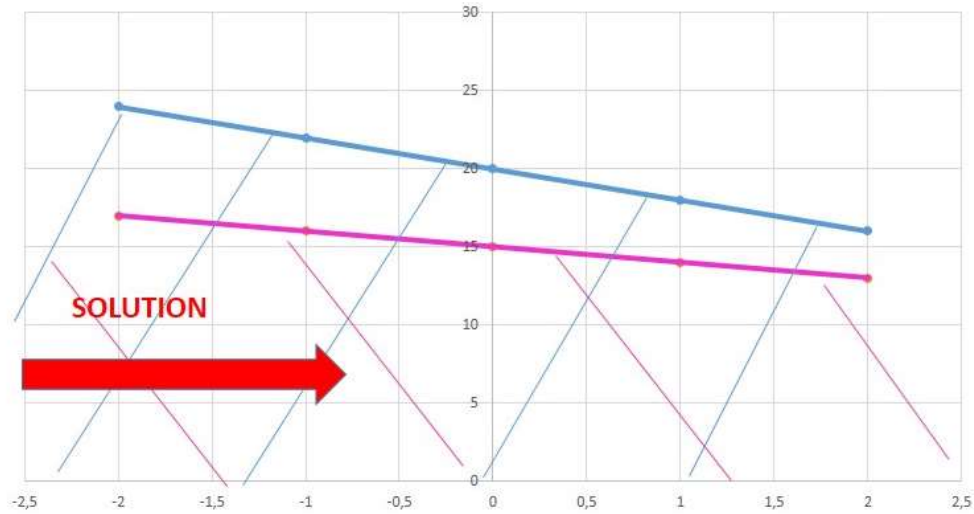
- $y = -x + 15$

$$x = 0 \rightarrow y = 15 \rightarrow (0, 15)$$

$$y = 0 \rightarrow x = 15 \rightarrow (15, 0)$$

Graphing:

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Proving with the point (1, 10) that belongs to the solution region to verify if it satisfies the inequalities:

$$2x + y \leq 20 \rightarrow 2(1) + 10 \leq 20 \rightarrow 12 < 20$$

$$x + y \leq 15 \rightarrow 1 + 10 \leq 15 \rightarrow 11 < 15$$