The Johnson's Budget

At the Johnson house they make a budget each month and stick to it!! They like to have fun as a family so their entertainment budget is made up of $240 dollars. For entertainment they go out to dinner, which costs $40, or they go to a movie/museum/small amusement park/zoo/etc, which costs $30. They try to do more than 4 entertainment activities a month and to NEVER spend more than $240.

Write the system of linear inequalities:

$d + a > 4$

$\$40d + \$30a \leq \$240$

Let d (x-axis)= # of dinners

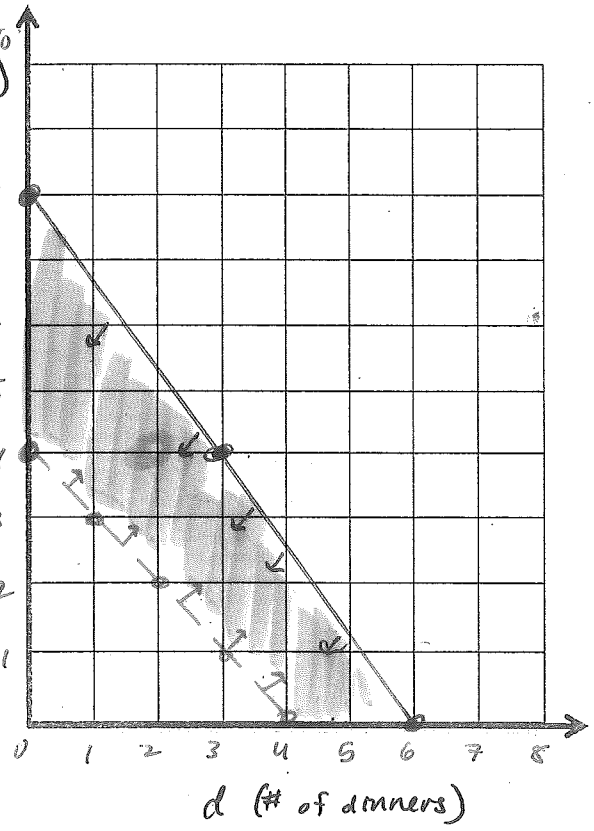
Let a (y-axis)= # of activities

1st linear inequality: $d + a > 4 \rightarrow a > -d + 4$

Interpret the inequality in a sentence:

2nd linear inequality: $\$40d + \$30a \leq \$240 \rightarrow$ $a \leq -\frac{4}{3}d + 8$

Interpret the inequality in a sentence:



Graph the 1st linear inequality

What are three solutions to the 1st inequality: (5,6) (7,8) (1,5)

Graph the 2nd linear inequality

What are three solutions to the 2nd inequality: (2,4) (1,1) (3,4)

Solution for the system of linear inequalities:

AN ORDERED PAIR THAT SATISFIES ALL INEQUALITIES GRAPHICALLY, THE SOLUTIONS ARE IN THE SHARED SHADED REGIONS OF THE INDIVIDUAL INEQUALITIES.

Algebra 1: Unit 8, lesson 4 Notes: Solving Systems of Linear Inequalities Name:

What are three solutions to the system of inequalities:

(3,4) (3,3) (2,4)

What are three non-solutions to the system of inequalities:

(90,41) (2,1) (1,1)

Is (3, 4) a solution? Explain?

d a

$d + a > 4$

$3 + 4 > 4$

$7 > 4$ TRUE

$40d + 30a \leq 240$

$40(3) + 30(4) \leq 240$

$120 + 120 \leq 240$ ✓

* BOTH INEQUALITIES ARE SATISFIED WITH THIS SOLUTION

Is (2, 2) a solution? Explain?

$2 + 2 > 4$

$4 > 4$ ✗

$40(2) + 30(2) \leq 240$

$80 + 60 \leq 240$

$140 \leq 240$ ✓

* ONLY ONE INEQUALITY IS SATISFIED WITH THIS SOLUTION

Solving the system of linear inequalities by graphing:

$\begin{cases} y > -2x + 7 \\ y - 2x \leq 3 \end{cases}$

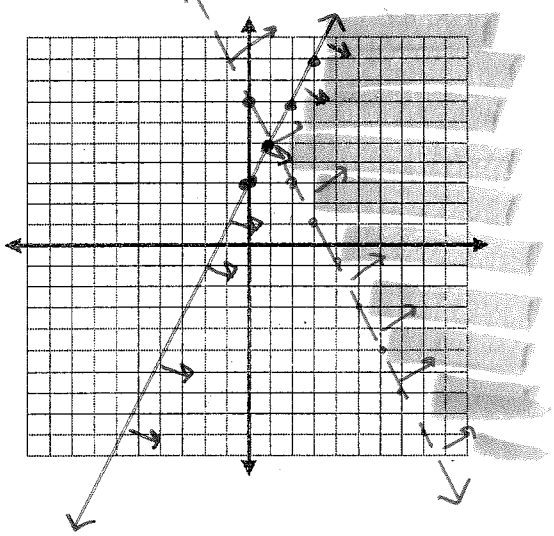
$y > -2x + 7$ ⟸ dashed

SHADE ABOVE

$y - 2x \leq 3$

$+2x \quad +2x$

$y \leq 2x + 3$ ⟸ SOLID



Steps to Solving Systems of Linear Inequalities

* ONE INEQUALITY AT A TIME *

1. ~~For~~ MAKE SURE THE INEQUALITY IS IN FUNCTION FORM ($y = mx + b$)

** IF NOT, ISOLATE y.

•• USE A DASHED LINE, WHEN THERE IS NO "EQUALS TO"; USE SOLID IF IT HAS "EQUALS TO"

** SHADING: SHADE BELOW IF LESS THAN, SHADE ABOVE IF GREATER THAN

2. REPEAT FOR 2ND INEQUALITY.

3. SOLUTION SET IS WHERE THE ARROWS POINT TOWARDS EACH OTHER.

What are **three solutions** to the system of inequalities:

(anything in mutually shaded region) ie.

(3,3) (8,0) (10, -5)

What are **three non-solutions** to the system of inequalities:

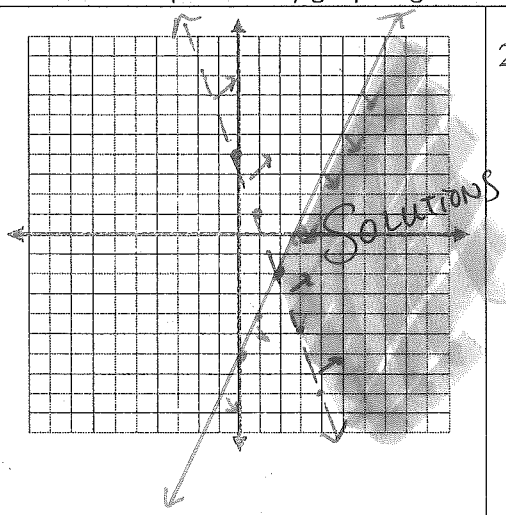
(anything in non-mutually shaded region) ie.

(0,0) (-5, -2) (1,9)

Algebra 1: Unit 8, lesson 4 Notes: Solving Systems of Linear Inequalities Name:

Solve the system of linear inequalities by graphing. Identify three solutions and one non-solution.

1) $\begin{cases} y > -3x + 4 \\ y \leq 2x - 6 \end{cases}$



Identify three solutions:

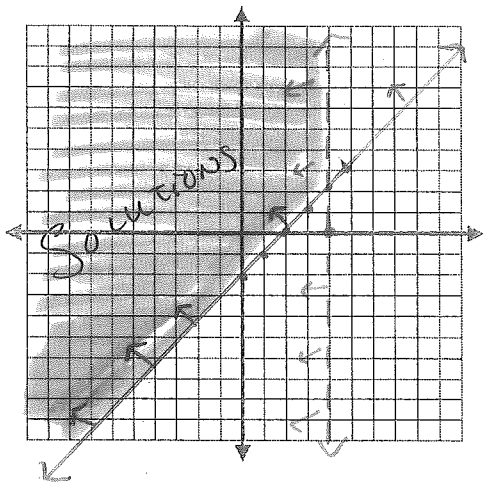
(5, 0) (7, 2) (9, -4)

Identify one non-solution:

(0, 0)

2) $\begin{cases} y \geq x - 2 \\ x < 4 \end{cases}$

$x = 4$



Identify three solutions:

(0, 0) (2, 5) (-7, -3)

Identify one non-solution:

(0, -5)

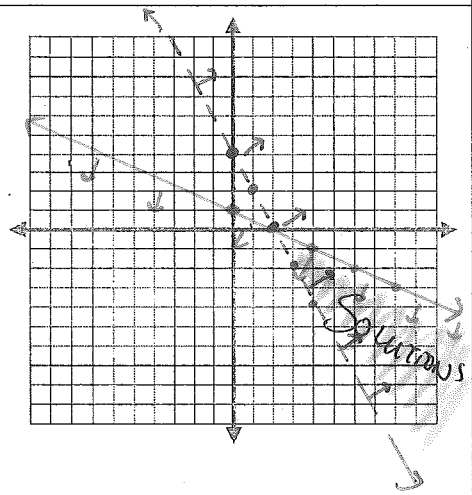
3) $\begin{cases} y > -\frac{1}{2}x + 4 \\ x + 2y \leq 2 \end{cases}$

$x + 2y \leq 2$

$-x \quad -x$

$\frac{2y}{2} \leq \frac{-x}{2} + \frac{2}{2}$

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



Identify three solutions:

(6, -3) (10, -8) (3, -1)

Identify one non-solution:

(0, 0)

4) $\begin{cases} 3y < -x + 6 \\ 2x - y \leq 5 \end{cases}$

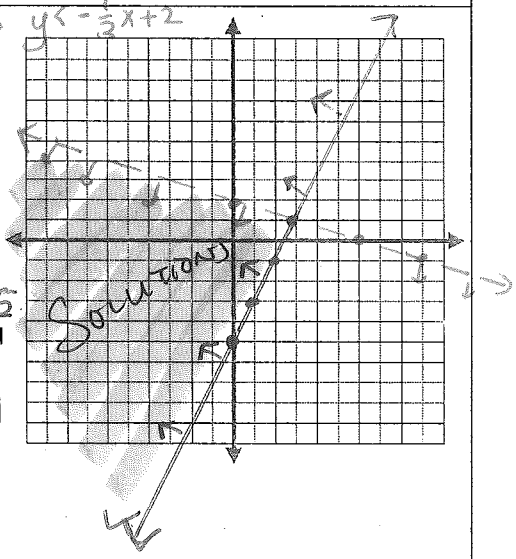
$y < -\frac{1}{3}x + 2$

$2x - y \leq 5$

$-2x \quad -2x$

$\frac{-y}{-1} \leq \frac{-2x}{-1} + \frac{5}{-1}$

$y \geq 2x - 5$



Identify three solutions:

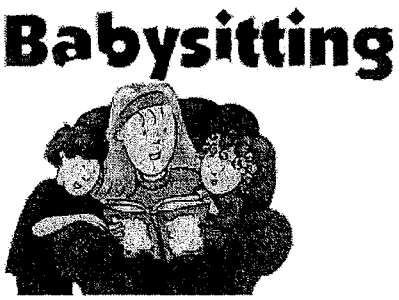
(0, 0) (-10, 4) (-2, -4)

Identify one non-solution:

(5, 5)

Solve the real-world situation by graphing linear inequalities.

Elizabeth makes $10 per hour babysitting and $5 per hour gardening. She wants to make at least $100 a week, but can work no more than 15 hours a week.



a) Identify your variables.

B = hours spent babysitting ← x

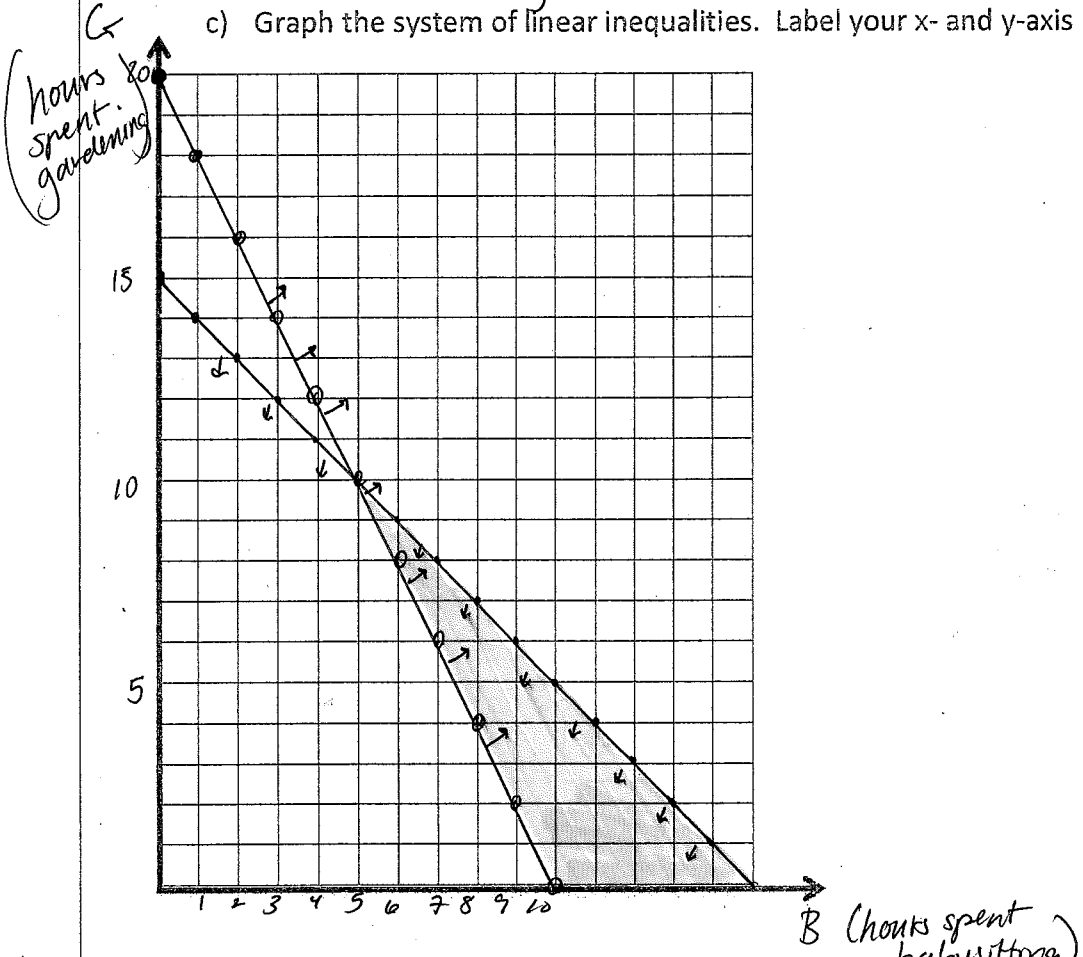
G = hours spent gardening ← y

b) Write the system of linear inequalities that can be used to represent this situation.

$B + G \leq 15$ ⇐ $G \leq -B + 15$

$\$10B + \$5G \geq \$100$ ⇐ $G \geq -2B + 20$

c) Graph the system of linear inequalities. Label your x- and y-axis



d) Describe and list five possible combinations of hours that Elizabeth could work at each job.

(10, 2) Babysitting hours, Gardening hours

(7, 7) Babysitting hours, Gardening hours

(12, 0)

12 Babysitting hours, no gardening hours

Ticket out the Door

If you were Elizabeth what would you plan on doing and why?