Linear Inequalities Lesson 2 (With text assignment)

*remember! the goal of systems of inequalities is to find where all shaded areas overlap. Coordinates inside this area will work for ALL inequalities in the system.

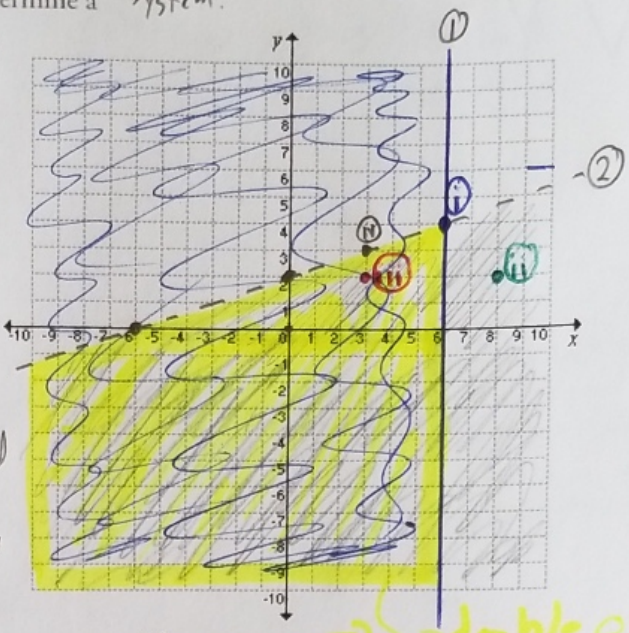
2. a) Graph the solution set for this system of inequalities. Determine a solution. Check its validity. Describe the solution region.

① $x \leq 6$ — (less than or = to 6 is everything before 6, no need to test).

② $3y - x < 6$ —

b) Determine if each point is in the solution region.

i) (6, 4) ii) (8, 2) iii) (3, 2) iv) (3, 3)



x int: $3(0) - x < 6$; $-x < 6$; $x > -6$; 0, 0

y int: $3y - (0) < 6$; $3y < 6$; $y < 2$; 0, 2

Test (0,0): $3(0) - (0) < 6$; $3 < 6$ ✓

b) (i) No, dotted line is NOT part of double shaded area as dotted lines are NOT included.

(ii) NO, only in inequality #2's shaded area (pencil)

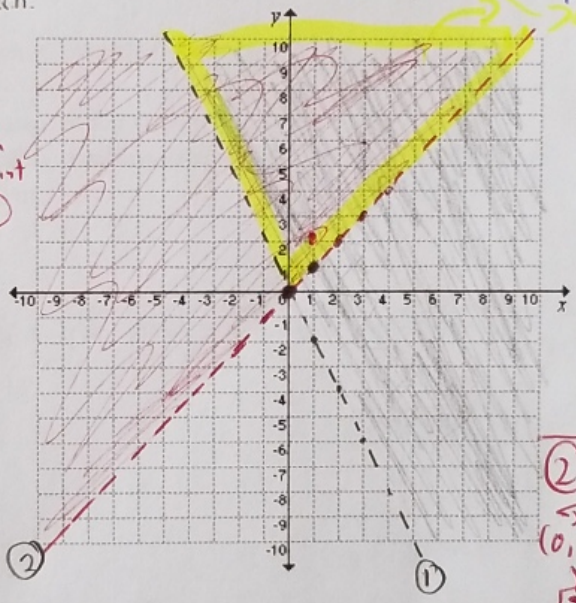
(iii) Yes, in pencil and pen shaded area (double shaded).

(iv) No, this is in the pen area but is on the pencil dashed lines.

4. Graph each system. Determine a solution for each.

b) ① $\{(x, y) \mid 2x + y > 0, x \in W, y \in W\}$ —

② $\{(x, y) \mid y > \frac{1}{1}x, x \in W, y \in W\}$ —



double overlap area

① x int: $2x + (0) > 0$; $\frac{2x}{2} > \frac{0}{2}$; $x > 0$; 0, 0

y int: $2(0) + y > 0$; $y > 0$; 0, 0

both x & y intercepts are 0. ∴ we must use slope-int form to graph.

$2x + y > 0 - 2x$; $-2x$

$y > -\frac{2}{1}x$ (+0) b (y int)

② $y > \frac{1}{1}x$ (+0) y int

① Test (1, 1) ↳ can't use (0,0) as line goes through it

$2x + y > 0$; $2(1) + 1 > 0$; $2 + 1 > 0$; $3 > 0$ ✓

② Test (1, 2) ↳ line goes through (0,0) and (1,1).

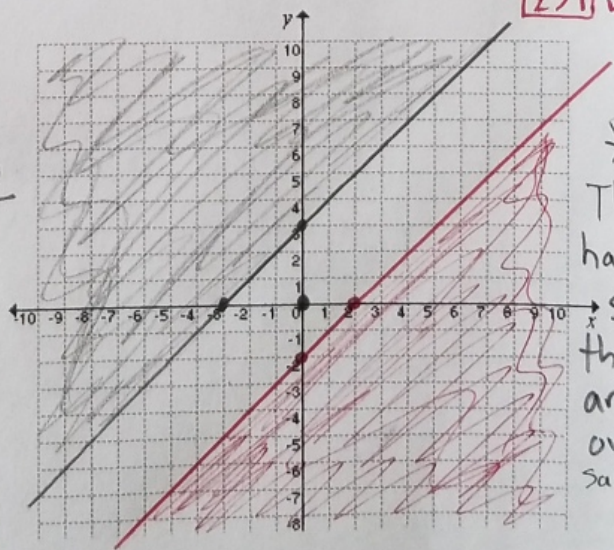
$y > x$; $2 > 1$ ✓

4. Graph each system. Determine a solution for each.

① x-int: $(0) - x \geq 3$; $-x \geq 3$; $x \leq -3$; (−3, 0)

y-int: $y - (0) \geq 3$; $y \geq 3$; 0, 3

Test (0,0): $(0) - (0) \geq 3$; $0 \geq 3$ X



** This system has NO solutions as the shaded areas will NEVER overlap (due to same slope of $\frac{1}{1}$)

d) ① $\{(x, y) \mid y - x \geq 3, x \in R, y \in R\}$ —

② $\{(x, y) \mid y + 2 \leq x, x \in R, y \in R\}$ —

② x int: $(0) + 2 \leq x$; $2 \leq x$; (2, 0)

y int: $y + 2 \leq (0)$; $y \leq -2$; 0, −2

Test (0,0): $(0) + 2 \leq 0$; $2 \leq 0$ X

Linear Inequalities Lesson 2 (With text assignment)

a) Step 1

Define variables: X - school friends
Y - rugby friends

① (200, 50) → 200 school 50 rugby

② (400, 100) → 400 school 100 rugby

Step 2

Create 2 or more inequalities

① $X + Y \leq 500$

② $X \geq 3Y$
↳ the # of school friends (x) is greater or equal to 3 times # of rugby friends

* these can be confusing and are usually opposite of how you would expect them to go.

8. Trish is setting up her social networking page:

① • She wants to have no more than 500 friends on her new social networking page.

② • She also wants to have at least three school friends for every rugby friend.

a) Define the variables and write a system of inequalities that models this situation.

b) Describe the restrictions on the domain and range of the variables.

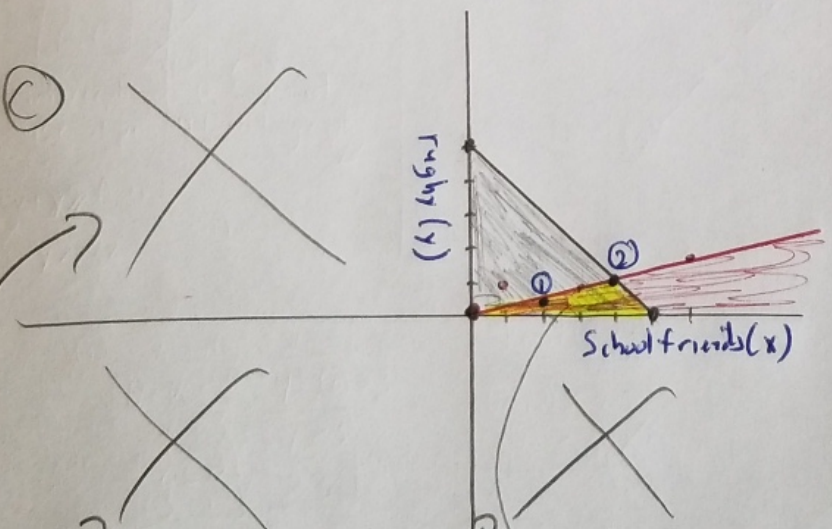
c) Graph the solution set to determine two possible combinations of school friends and rugby friends she could have.

* at top of page.

b) $\{x \mid 0 \leq x \leq 500, x \in I\}$

$\{y \mid 0 \leq y \leq 125, y \in I\}$ → $3 \times 125 = 375$ and $375 + 125 = 500$ (this satisfies to 3x school [x] needed)

c)



can't have negative # of friends.

This double shaded area represents the area where her friends will be 500 or less but also have 3 times as many school friends.

① $x + y \leq 500$

x int and y int will be 500 if x + y are made to equal "0"

(500, 0) and (0, 500)

Test (0, 0)

$(0) + (0) \leq 500$

$0 \leq 500$ ✓

② $x \geq 3y$

* need to use $y = mx + b$ as both x and y int will be (0, 0).

$x \geq 3y$

$\frac{3}{3}y \leq \frac{1}{3}x$

$y \leq \frac{1}{3}x$ (+0) y int...

↳ $m = \frac{1}{3}$ or $\frac{100}{300}$

Test (100, 100)

$100 \geq 3(100)$

$100 \geq 300$ ✗