

# HOMWORK QUESTIONS???

p. 236: #7 - 10

**NOTE:** Each question requires a graph to get possible solutions!

8. Trish is setting up her social networking page:

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

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

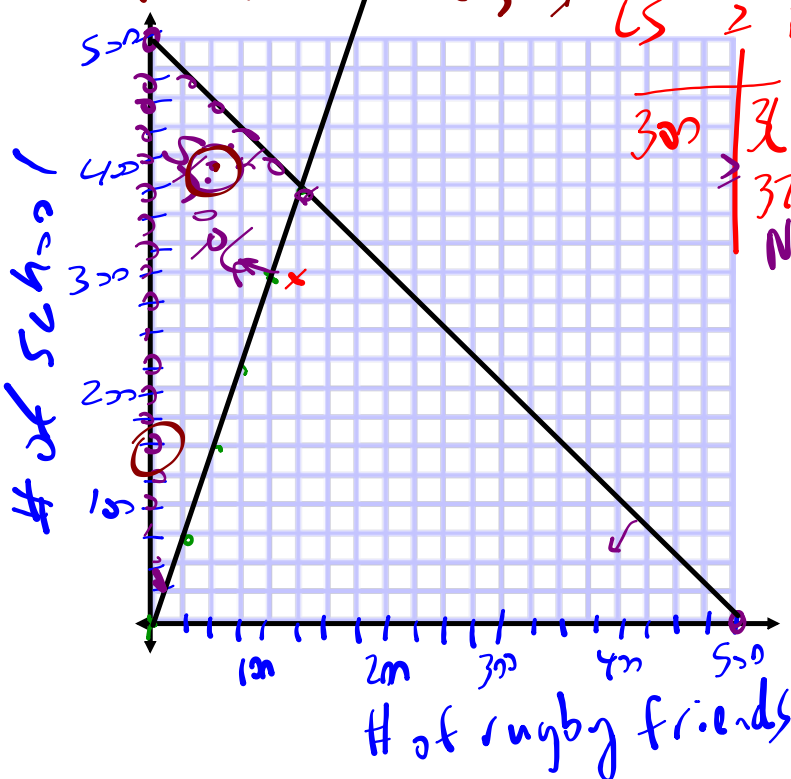
- Define the variables and write a system of inequalities that models this situation.
- Describe the restrictions on the domain and range of the variables.
- Graph the solution set to determine two possible combinations of school friends and rugby friends she could have.

$x \rightarrow$  # of rugby friends  
 $y \rightarrow$  # of school friends

$x \in \mathbb{W}$     $y \in \mathbb{W}$

$$\begin{cases} x + y \leq 500 \\ y \geq 3x \end{cases}$$

$(50, 450)$  OR  $(0, 150)$  Test  $(45, 30)$   
 $LS \geq RS$



$300 \begin{cases} 3(125) \\ 375 \\ \text{No} \end{cases}$   
 $x + y = 500$   
 $x_{int} (500, 0)$   
 $y_{int} (0, 500)$

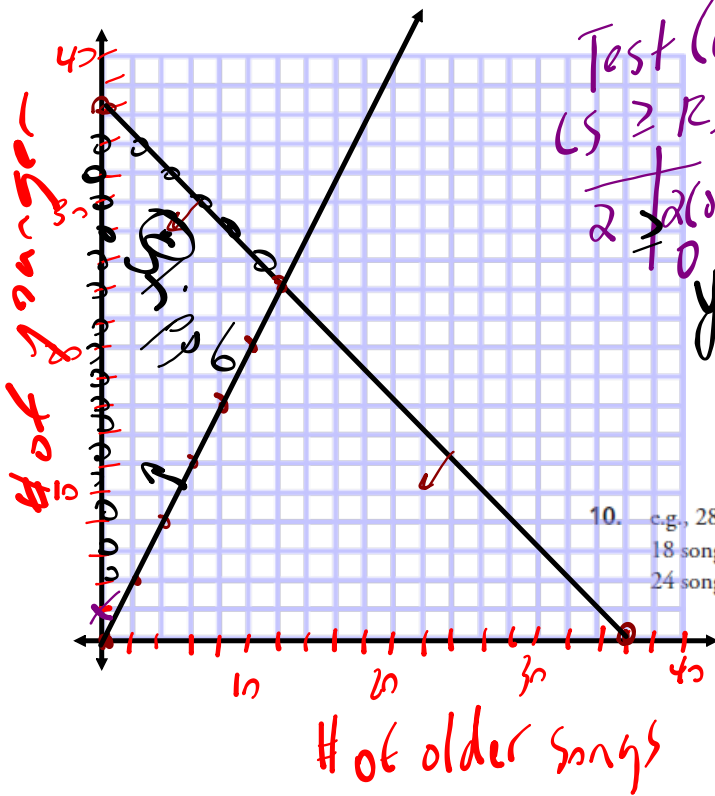
$$y = 3x$$

10. Spence, a disc jockey, is often hired to play weddings.

- His contract states that he will play no longer than 3 h, with no more than 12 songs each hour. **TOTAL  $\rightarrow 3 \times 12$**
- He likes to play two or more songs for young listeners for every one song he plays for older listeners.

Determine three possible combinations of numbers of songs he could play.

$x \rightarrow$  # of older  
 $y \rightarrow$  # of young songs



Test  $(0, 2)$   $x \in W$   $y \in W$   
 $LS \geq RS$   
 $2 \geq 2(0)$   
 $2 \geq 0$   
 Yes

$$\begin{aligned} x + y &\leq 36 \\ \rightarrow y &\geq 2x \end{aligned}$$

$x + y = 36$   
 $x \text{ int } (36, 0)$   
 $y \text{ int } (0, 36)$

$$y = 2x$$

10. e.g., 28 songs for young listeners and 4 songs for older listeners;  
 18 songs for young listeners and 8 songs for older listeners;  
 24 songs for young listeners and 6 songs for older listeners

5.4

Notes - Optimization Problems.pdf

Optimization Problems I: Creating the Model

**optimization problem**  
A problem where a quantity must be maximized or minimized following a set of guidelines or conditions.

**constraint**  
A limiting condition of the optimization problem being modelled, represented by a linear inequality.

**objective function**  
In an optimization problem, the equation that represents the relationship between the two variables in the system of linear inequalities and the quantity to be optimized.

**feasible region**  
The solution region for a system of linear inequalities that is modelling an optimization problem.

inequation

equation

overlap

Need to Know

- You can create a model for an optimization problem by following these steps:

**NEW** **GRAPH**  
**Step 1.** Identify the quantity that must be optimized. Look for key words, such as *maximize* or *minimize*, *largest* or *smallest*, and *greatest* or *least*.

**Step 2.** Define the variables that affect the quantity to be optimized. Identify any restrictions on these variables.

**Step 3.** Write a system of linear inequalities to describe all the constraints of the problem. Graph the system.

**NEW**  
**Step 4.** Write an objective function to represent the relationship between the variables and the quantity to be optimized.

# QUIZ

## Attachments

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