HOMEWORK...

p. 236: #7 - 10 Hw ???

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

9. Graph the solution set for this system of linear inequalities to determine two valid solutions:

$\{(x, y) \mid 3x + y \leq 2, x \in I, y \in I\}$

$\{(x, y) \mid 2y + 3x > 1, x \in I, y \in I\}$

LS ≤ RS

0	2
yes	

LS > RS

0	1
	no

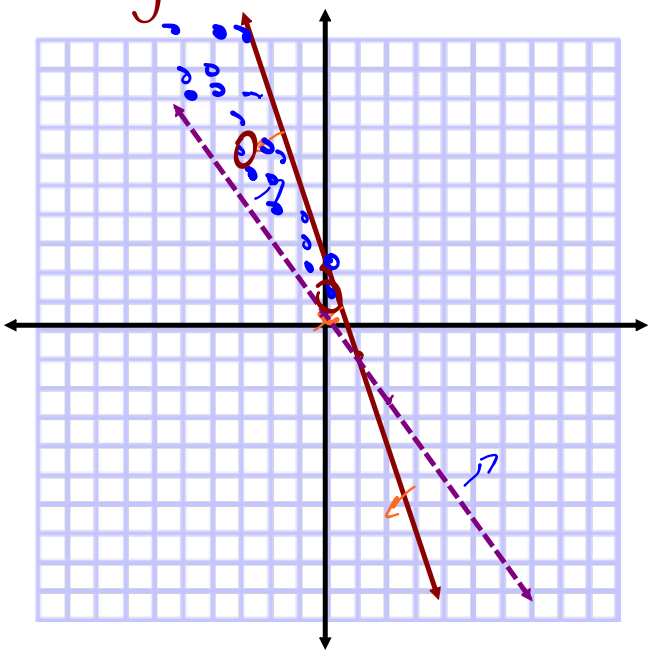
$3x + y = 2$

$y = -3x + 2$

$2y + 3x = 1$

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

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



Solutions...

1) (0, 1)

2) (−3, 6)

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.
- 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.

TOTAL → $12 \times 3 = 36$

young depends on old

$x \rightarrow$ # of older songs $\quad x \in W$

$y \rightarrow$ # of younger songs $\quad y \in W$

$x + y \leq 36$

$y \geq 2x$ ← $y = 2x$

DT Test (10, 0)

$LS \geq RS$

$0 \mid 2(10)$

≥ 20

NO

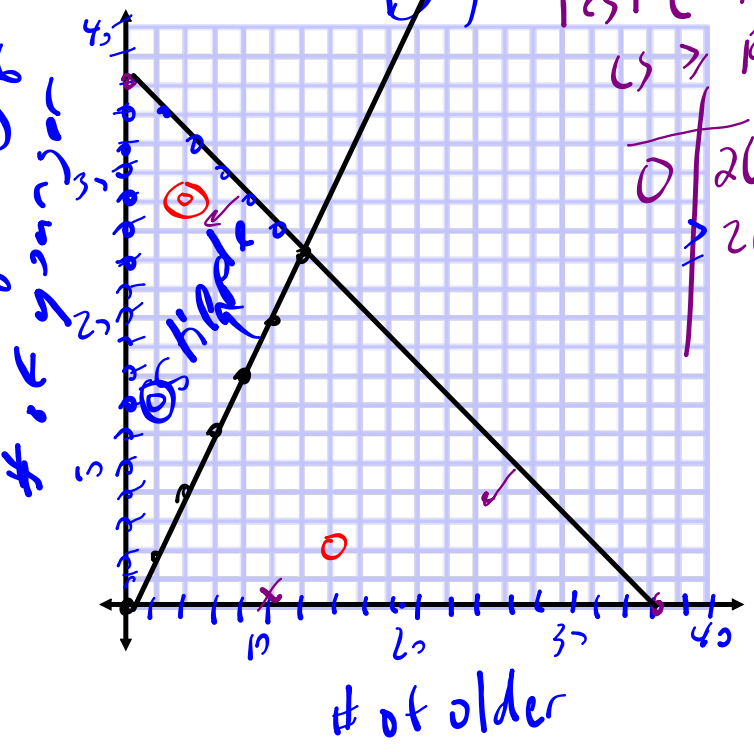
x-int: $x + 0 = 36$

$(36, 0)$

y-int

$0 + y = 36$

$(0, 36)$



Solutions...

$(4, 28)$

~~$(14, 2)$~~

$(2, 14)$

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.

   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.

$x \rightarrow$ # of rugby friends

$y \rightarrow$ # of school friends

$x \in W$

$y \in W$

$x + y \leq 500$ $\quad y \geq 3x$

5.4 Optimization Problems I: Creating the Model

Notes - Optimization Problems.pdf

Application Inequation Equation Overlap

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.

Need to Know

GRAPH

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

NEW

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.

APPLY the Math

p. 245

EXAMPLE 1 Creating a model for an optimization problem with whole-number variables

Three teams are travelling to a basketball tournament in cars and minivans.

- Each team has no more than 2 coaches and 14 athletes.
- Each car can take 4 team members, and each minivan can take 6 team members.
- No more than 4 minivans and 12 cars are available.

The school wants to know the combination of cars and minivans that will require the minimum and maximum number of vehicles. Create a model to represent this situation.

16 players

TOTAL
$16 \times 3 = 48$ players

Juanita's Solution

$x \rightarrow$ # of cars $\quad x \in W$

$y \rightarrow$ # of vans $\quad y \in W$

$4x + 6y \leq 48$

$4x + 6y = 48$

x int

$\frac{4x}{4} + \frac{6y}{4} = \frac{48}{4}$

$x = 12$

$(12, 0)$

y int

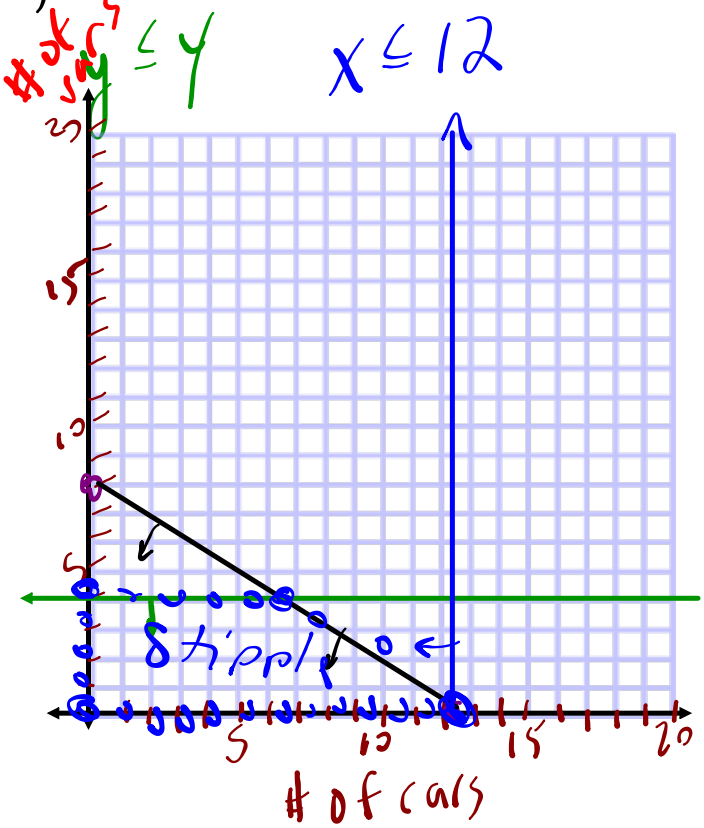
$4(0) + 6y = 48$

$\frac{6y}{6} = \frac{48}{6}$

$y = 8$

$(0, 8)$

$x \leq 12$



HOMEWORK...

Page 248: #1, #2, #3

1. $x \rightarrow$ # of apples $x \geq 5$
$y \rightarrow$ # of oranges $y \geq 6$
$0.20x + 0.35y \leq 7$

NOTE:

Create a model means graph the solution region

Attachments

Notes - Optimization Problems.pdf