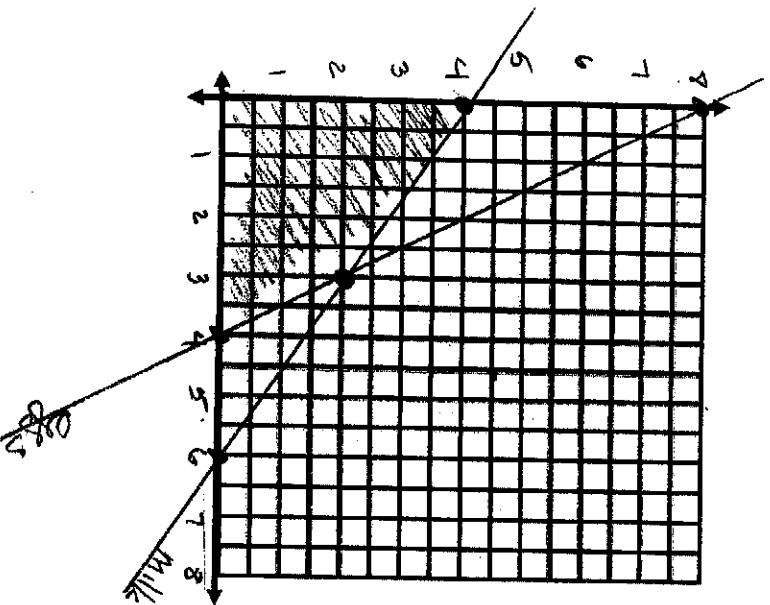


Name Kelly

- 1) Mrs. Doubtfire is baking cakes and pies for a bake sale. Her cake recipe uses 2 eggs and 1 cup of milk, and her pie recipe uses 1 egg and 1 1/2 cups of milk. Mrs. Doubtfire wants to bake as many items (cakes and pies) as possible using the 8 eggs and 6 cups of milk that she has on hand. How many cakes and pies should Mrs. Doubtfire make if she wants to make a profit of \$3 for each cake and \$3 for each pie? What is her profit?

# of (what is being produced?)	cake	pie	Total / Limits	inequality / constraints
bake sale	x	y		
limitation #1 eggs	2	1	8	$2x + y \leq 8$
limitation #2 milk	1	1.5	6	$x + 1.5y \leq 6$
objective function	3	3	MAX	$3x + 3y = P$



$$\begin{aligned} (0,0) &\rightarrow 0 \\ (0,4) &\rightarrow 12 \\ (4,0) &\rightarrow 12 \\ (3,2) &\rightarrow 15 \end{aligned}$$

$$\begin{aligned} 2x + y &= 8 \\ x + 1.5y &= 6 \\ \hline 2x + y &= 8 \\ -2x - 3y &= -12 \\ \hline -2y &= -4 \\ y &= 2 \\ 2x + 2 &= 8 \\ 2x &= 6 \\ x &= 3 \end{aligned}$$

$$(3, 2)$$

3 cakes, 2 pies Profit \$15

2) A carpentry shop makes dinner tables and coffee tables manufactured out of oak and mahogany wood. In order to build a dinner table, the carpenter needs 10 planks of oak and 5 planks of mahogany, while the coffee table needs 4 planks of oak and 7 planks of mahogany. The owner of the carpentry shop wants to make a profit of \$250 for each dinner table and \$120 for each coffee table. If he just received a shipment of 300 oak planks and 420 mahogany planks, how many dinner tables and coffee tables should be made in order to maximize his profit? What is his profit?

# of (what is being produced?)	dinner	coffee	Total / Limits	inequality / constraints
Limitation #1 Furniture	x	y		
Limitation #2 oak	10	4	300	$10x + 4y \leq 300$
Limitation #2 mahogany	5	7	420	$5x + 7y \leq 420$
objective function	250	120	max	$250x + 120y = P$

* can graph with $x=0$ + $y=0$ intercepts
plug in $x=0$ and $y=0$ to find:
 $(0, 75)$ $(30, 0)$
 $(0, 60)$ $(84, 0)$

To find point of intersection:
use Elimination:

$$10x + 4y = 300$$

$$5x + 7y = 420$$

$$10x + 4y = 300$$

$$-10x - 14y = -840$$

$$-10y = -540$$

$$y = 54$$

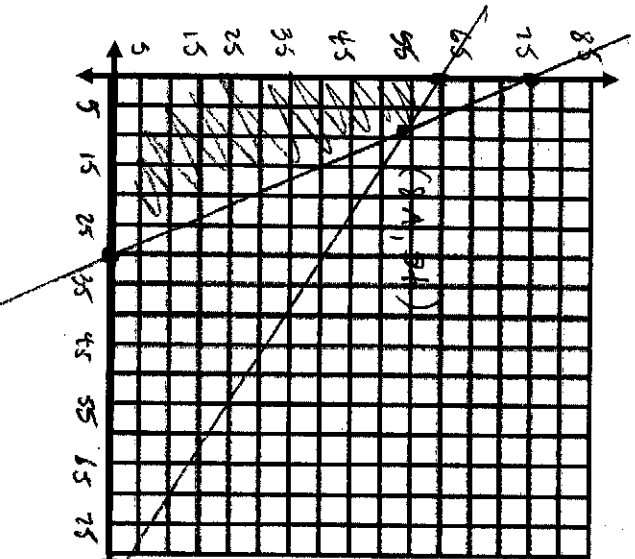
$$10x + 4(54) = 300$$

$$10x = 84$$

$$x = 8.4$$

(round to 8)

can't have .4 of a table



vertices

$$(0, 0) \rightarrow 0$$

$$(0, 60) \rightarrow 7200$$

$$(30, 0) \rightarrow 1250$$

$$(8, 54) \rightarrow 8480$$

* max

plug vertices into

$$P = 250x + 120y$$

to find max

profit

8 dinner tables

54 coffee tables

for a profit of \$8480