Questions...

p. 252: #1 - 3

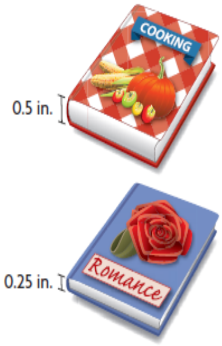
p. 259: #1 - 4

3. Meg is building a bookshelf to display her cookbooks and novels.
   - She has no more than 50 cookbooks and no more than 200 novels.
   - She wants to display at least 2 novels for every cookbook.
   - The cookbook spines are about half an inch wide, and the novel spines are about a quarter of an inch wide.

   Meg wants to know how long to make the bookshelf.

   The following model represents this situation.

   Let c represent the number of cookbooks.
   Let n represent the number of novels.
   Let W represent the width of the bookshelf.

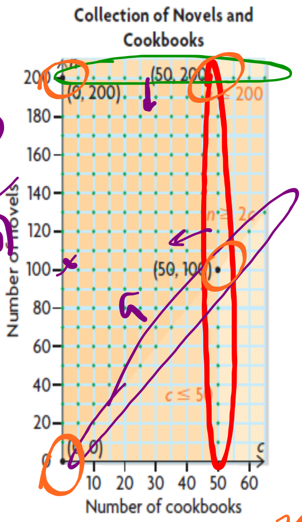


Restrictions:
$c \in W, n \in W$

Constraints:
$c \geq 0$
$n \geq 0$ Quad I
$c \leq 50$
$n \leq 200$
$n \geq 2c$

Test (0,100)
LS ≥ RS
100 ≥ 0
yes

Objective function:
$W = 0.5c + 0.25n$



vertex	$W = 0.5c + 0.25n$
(0, 0)	0
(0, 200)	
(50, 100)	
→ (50, 200)	

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.5(0)+.25(200)
                50
.5(50)+.25(100)
                50
```

```
.5(50)+.25(200)
                75
```

a) Which point in the feasible region represents the greatest number of books (both cookbooks and novels) that Meg could have? Explain how you know. (50, 200)
b) Can she display the same number of cookbooks as novels? Explain. No... need 2x the novels
c) What point represents the most cookbooks and the fewest novels? (50, 100)
d) What point represents the number of cookbooks that would require the longest shelf? How long would the shelf have to be? (50, 200) → W = 75 inches
e) What point represents the number of cookbooks that would require the shortest shelf?

the other two points have a positive difference.

3. a) (50, 200); e.g., farthest point from both axes
b) No. These points are not in the feasible region.
c) (50, 100)
d) (50, 200); 75 in.
e) (0, 0) would require no shelving

2. The following model represents an optimization problem. Determine the maximum solution.

Optimization Model

~~Restrictions:~~

$x \in R$ and $y \in R$

Constraints:

$x \geq 0$

$y \leq 0$] Quad 4

$3y \geq -2x + 3$

$y \geq 2x - 7$

Objective function:

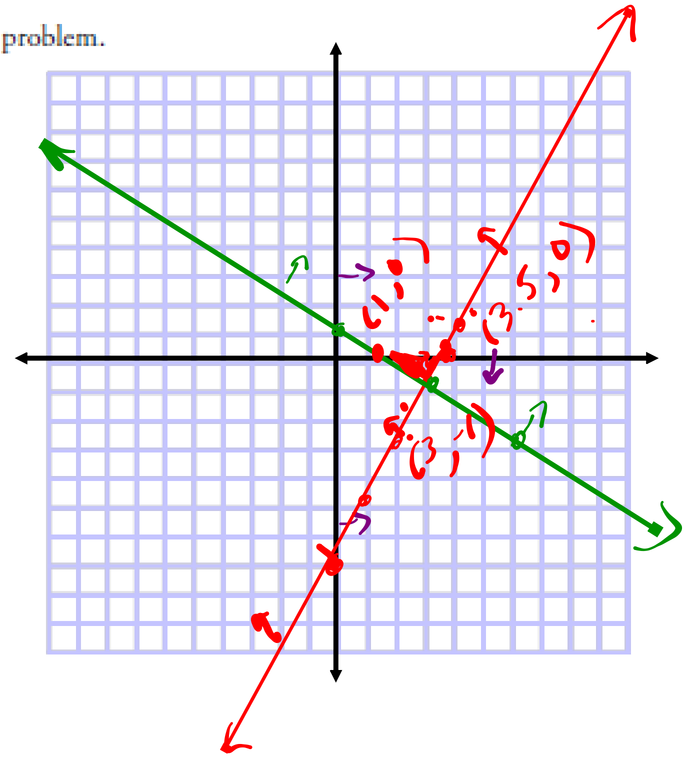
$D = -5x + 3y$

LS	$\geq$ RS
0	$2(0)-7$
	-7
	yes

LS	$\geq$ RS
$3(0)$	$-2(0)+3$
0	3
	No

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

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



Vertex	$D=-5x+3y$
$(1,0)$	$-5(1)+3(0)$ $\boxed{-5}$ MAX
$(3.5,0)$	$-5(3.5)+3(0)$ -17.5
$(3,-1)$	$-5(3)+3(-1)$ -18

ONE MORE...

Malia and Lainey are baking cupcakes (x) and banana mini-loaves (y) to sell at a school fundraiser...

- No more than 60 cupcakes and 35 mini-loaves can be made each day.
- Malia and Lainey can make no more than 80 baked goods, in total, each day. Sub vertices
- It costs \$0.50 to make a cupcake and \$0.75 to make a mini-loaf.

Determine the maximum cost to produce the baked goods. $C = 0.50x + 0.75y$

$x \to$ # of cupcakes $\quad x \in W$

$y \to$ # of loaves $\quad y \in W$

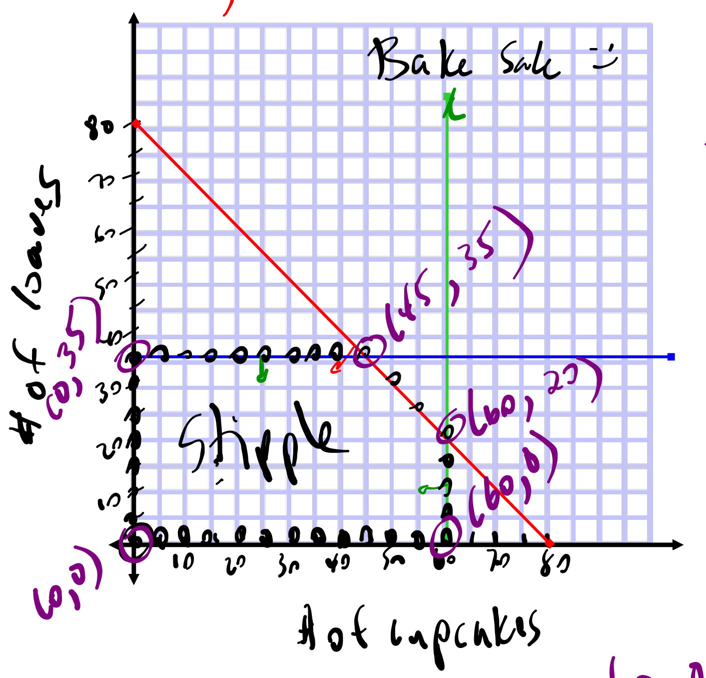
$x \leq 60$ $\quad y \leq 35$ $\quad x + y \leq 80 \leftarrow$ Graphed

$x = 60$ $\quad y = 35$

$x + y = 80$

x-int $(80, 0)$

y-int $(0, 80)$



vertex	$C = 0.5x + 0.75y$
$(45, 35)$	
$(60, 20)$	

```
0.5(45)+.75(35)
               48.75
.5(60)+.75(20)
                  45
```

Max Cost

HOMEWORK: p. 259 #5, 7, 8, 11, 13

Test ⇒ THURSDAY

Multiple Choice ⇒ 10-15

Open Response ⇒ 25-40

#1 → 2 inequations - graph

#2 → Word problem

#3 → optimization (constraints given)

#4 → Word problem