

4.2 (pg 73 of notes)

Ex 2 minimize  $g = 22x + 17y$

subject to  $\begin{cases} ① 8x + 5y \geq 100 \\ ② 12x + 25y \geq 360 \\ x \geq 0, y \geq 0 \end{cases}$

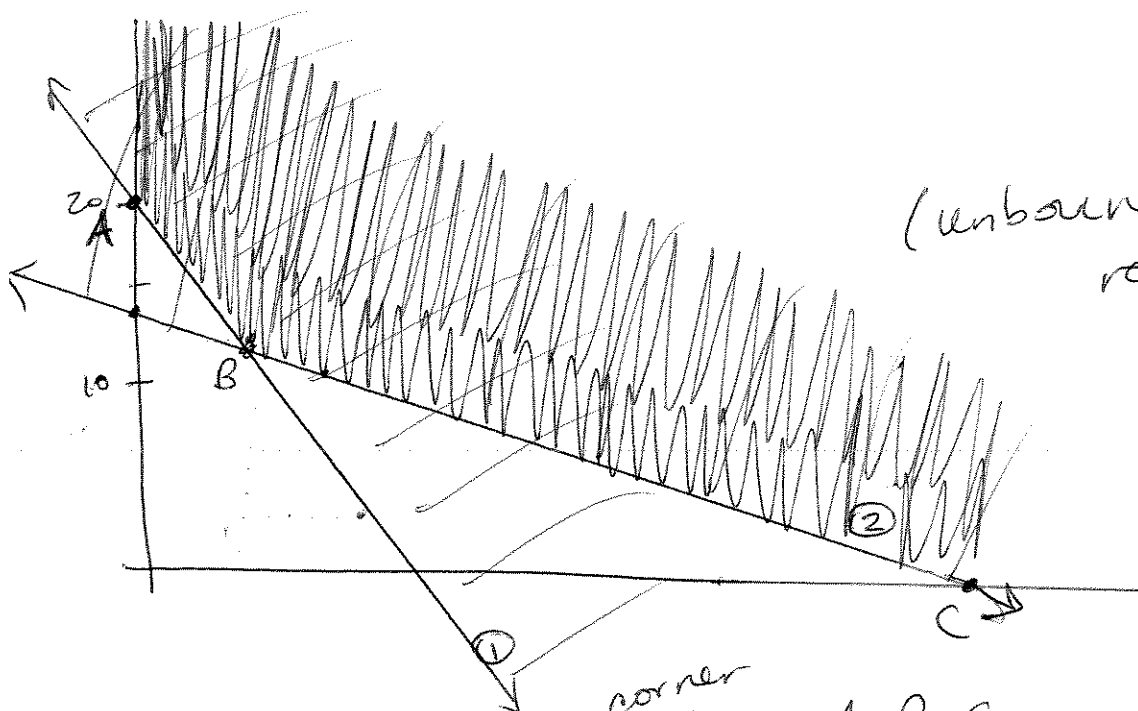
①  $y \geq \frac{8}{5}x + 20$

②  $y \geq \frac{12}{25}x + \frac{72}{5}$

test pt (0,0)

①  $0 \geq 20$  false

②  $0 \geq 7\frac{2}{5}$  false



(unbounded + open region)

We can check  $n$  pts corner A, B, C

A (0, 20)  $g = 22(0) + 17(20) = 340$

C (30, 0)  $g = 22(30) + 17(0) = 660$

B (5, 12)  $g = 22(5) + 17(12) = 314$

[ \* see next page for how I found B + C ]  
 $\Rightarrow$  min val of 314 at (5, 12)

②

C: where line ② crosses x axis

$$y = 0$$

$$\Rightarrow 12x + 0 = 360 \quad (30, 0)$$

$$\frac{12x = 360}{12 \quad 12}$$

$$x = 30$$

B: where ① + ② intersect

$$\begin{aligned} -5(8x + 5y = 100) \\ 12x + 25y = 360 \end{aligned}$$

$$\begin{aligned} \Leftrightarrow \begin{array}{r} -40x - 25y = -500 \\ + 12x + 25y = 360 \\ \hline -28x = -140 \\ \frac{-28}{-28} \quad \frac{-140}{-28} \end{array} \end{aligned}$$

$$x = 5$$

$$8(5) + 5y = 100$$

$$40 + 5y = 100$$

$$5y = 60$$

$$y = 12$$

$$(5, 12)$$

4.2 (pg 74 of notes)

Ex 3

x = # Carolina homes

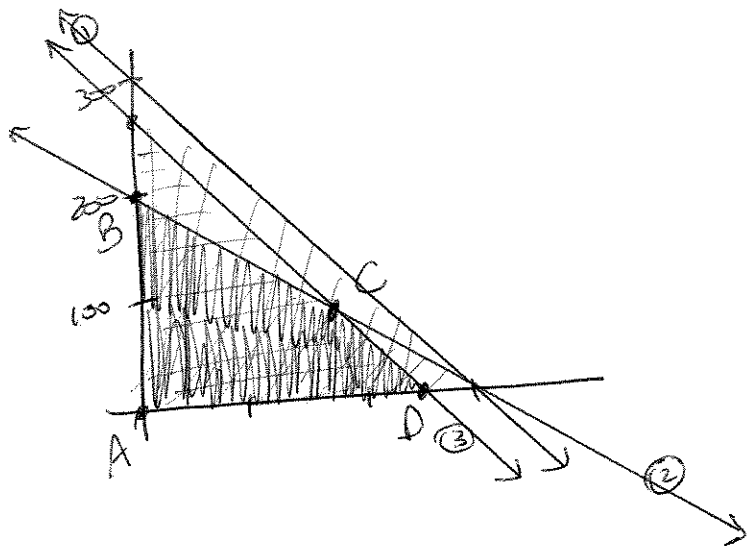
y = # Savannah homes

$$\begin{cases} \textcircled{1} x+y \leq 300 \\ \textcircled{2} 160x+240y \leq 48000 \\ \textcircled{3} 160x+160y \leq 43200 \\ x \geq 0, y \geq 0 \end{cases}$$

maximize

$$P = 40000x + 50000y$$

$$\begin{aligned} \textcircled{1} \quad y &\leq -x + 300 \\ \textcircled{2} \quad y &\leq -\frac{2}{3}x + 200 \\ \textcircled{3} \quad y &\leq -x + 270 \end{aligned}$$



A(0,0) P=0

B(0,200) P=0+50,000(200)=10,000,000

C(210,60) P=40,000(210)+50,000(60)=11,400,000

D(270,0) P(40,000)270+0=10,800,000

=> max of \$11,400,000 profit

at (210,60)

210	Carolina homes
60	Savannah homes

C: int pt of ② + ③

$$-\frac{2}{3}x + 200 = -x + 270$$

$$\frac{1}{3}x = 70$$

$$x = 210$$

$$y = -210 + 270 = 60$$

$$(210, 60)$$

D: x int of ③

$$0 = -x + 270$$

$$x = 270$$

$$(270, 0)$$