

To Find Corner Points

①

$$x + 2y \leq 90$$

$$x + y \leq 50$$

$$x \leq 30$$

$$x \geq 0 \quad y \geq 0$$

$$2y = -x + 90$$

$$y = -\frac{1}{2}x + 45$$

$$x = 0 \quad y = 45$$

$$y = 0 \quad x = 90$$

$$y = -x + 50$$

$$x = 0 \quad y = 50$$

$$y = 0 \quad x = 50$$

$$-\frac{1}{2}x + 45 = -x + 50$$

$$x = 30$$

$$\frac{1}{2}x = 5$$

$$x = 10$$

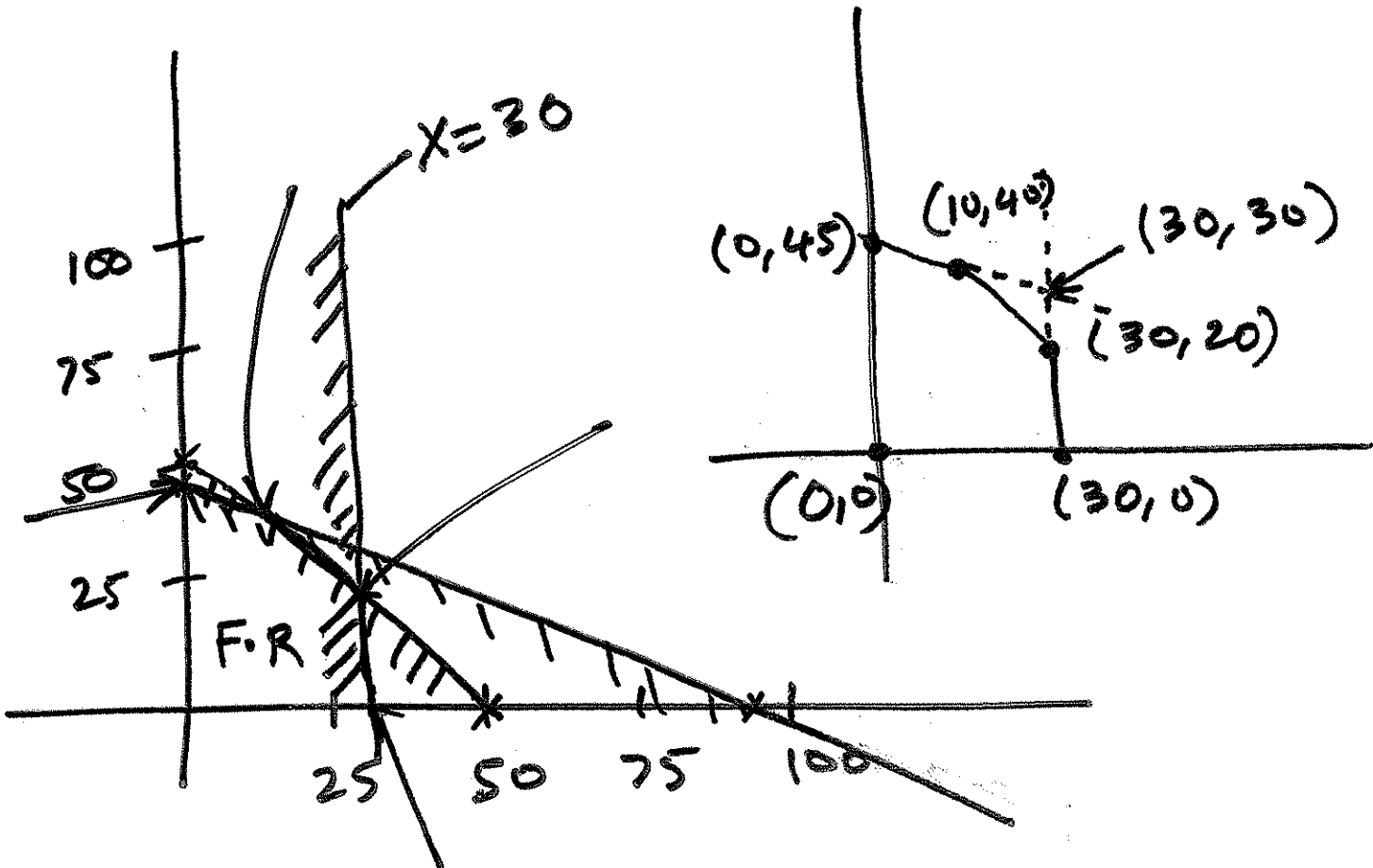
$$y = 40$$

$$y = -\frac{1}{2}(30) + 45$$

$$y = 30$$

$$y = -30 + 50$$

$$y = 20$$



$X = 10$
 $Y = 40$
 $X = 30$
 $Y = 30$
 $X = 30$
 $Y = 20$

corner	$20X + 30Y$
$(0, 45)$	1350
$(10, 40)$	1400
$(30, 20)$	1200
$(30, 0)$	600
$(0, 0)$	0

M.C

O.R.C

X

y Acre

2

3.5 tons/Acr

(2X)

3.5 y total tons

$$2X = 2(3.5y)$$

$$2X = 7y$$

$$\therefore X = 3.5y$$

\$ 240 M.C

\$ 70 O.C

$$(2X) 240 + (3.5y) 70$$

M.C

O.C

2

1

3

	Cargo I	Cargo II	Av
Volume	5	5	400
weight	100	200	10,000
Rev	20	30	
	X	Y	

$$5x + 5y \leq 400$$

$$x + y \leq 80$$

→ ①

$$100x + 200y \leq 10,000$$

$$x + 2y \leq 100 \rightarrow ②$$

$$x \geq 2y \quad \underline{x - 2y} \geq 0 \rightarrow ③$$

$$x \geq 0 \quad y \geq 0$$

$$R = 20x + 30y$$

$$x - 2y \geq 0$$

$$-2y \geq -x$$

$$2y \leq x$$

$$y \leq \frac{x}{2}$$

Note: 3.1 - 2

3.2 - 50

④

$$X + y \leq 80$$

$$y = -x + 80$$

x	y
0	80
80	0

①

$$X + 2y \leq 100$$

$$y = -\frac{1}{2}x + 50$$

x	y
0	50
100	0

②

$$X - 2y \geq 0$$

$$y \leq \frac{1}{2}x$$

$$y = \frac{1}{2}x$$

x	y
0	0

③

① = ②

$$x = 60$$

$$y = 20$$

② = ③

$$x = 50$$

$$y = 25$$

③ = ①

$$x = 160/3$$

$$y = 80/3$$

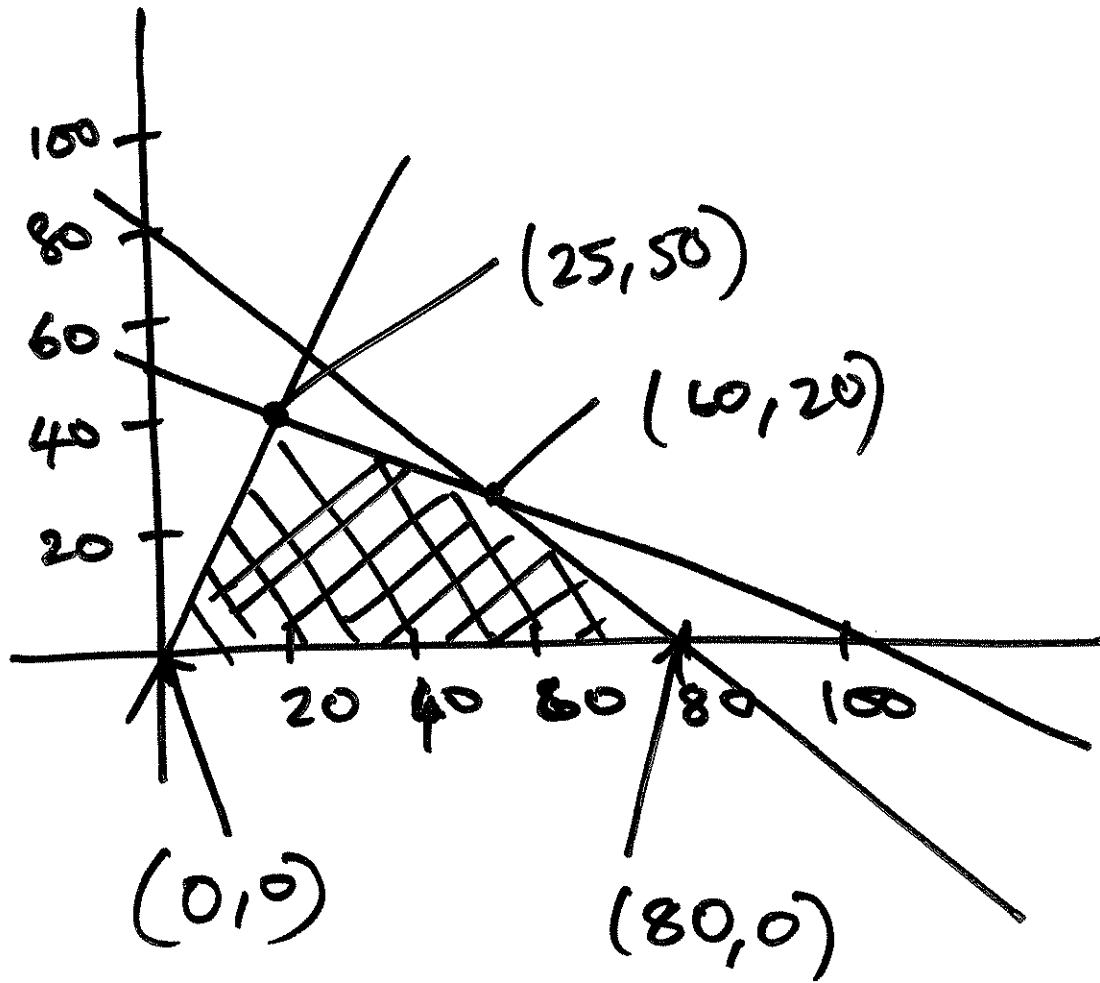
$$-x + 80 = -\frac{1}{2}x + 50$$

$$-\frac{1}{2}x = -30$$

$$x = 60$$

$$y = -60 + 80 = 20$$

5



24

①

	Cargo I	Cargo II	
Volume	5	5	400
Weight	100	200	10,000
Revenue	20	30	

$$Z = 20x + 30y$$

$$5x + 5y \leq 400$$

$$100x + 200y \leq 10,000$$

$$x - 2y \geq 0$$

$$x \geq 0 \quad y \geq 0$$

$$x + y \leq 80$$

$$x + 2y \leq 100$$

$$x - 2y \geq 0$$

Exercise 3.1-2, 3.2 → 50

Corners (0,0) (50,25) (60,20), (80,0)

How to find corner points.

$$y \neq \frac{1}{2}x$$

$$x + y = 80$$

$$x + 2y = 100$$

$$y = -x + 80$$

$$y = -\frac{1}{2}x + 50$$

$$-x + 80 = -\frac{1}{2}x + 50$$

$$\frac{1}{2}x = 30$$

$$x = 60$$

$$y = 20$$

(2)

$$X - 2y = 0$$

$$y = \frac{1}{2}x$$

$$\frac{1}{2}x = -\frac{1}{2}x + 50$$

$$x = 50$$

$$y = 25$$

$$y = \frac{1}{2}x = -x + 80$$

$$\frac{1}{2}x = -x + 80$$

$$\frac{3}{2}x = 80$$

$$x = \frac{160}{3}$$

$$y = \frac{80}{3}$$

$$y = -x + 80$$

$$x=0 \quad y=80$$

$$y=0 \quad x=80$$

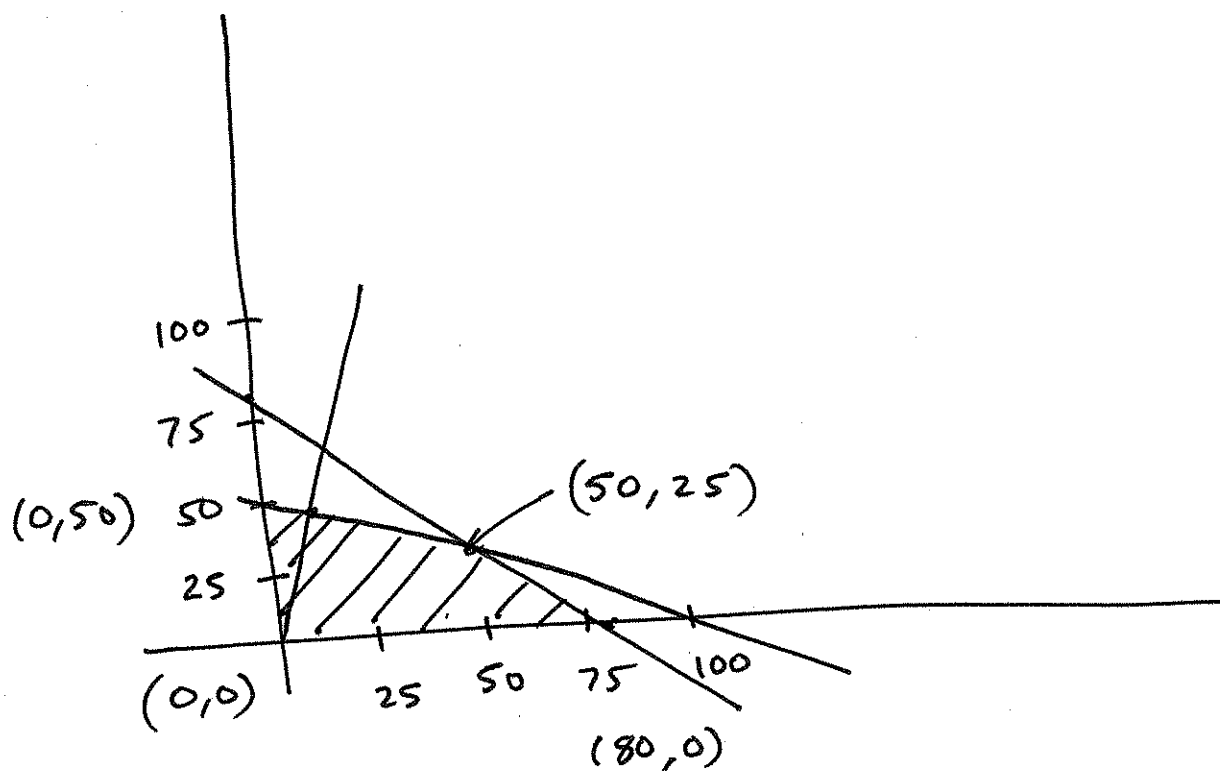
$$y = \frac{1}{2}x$$

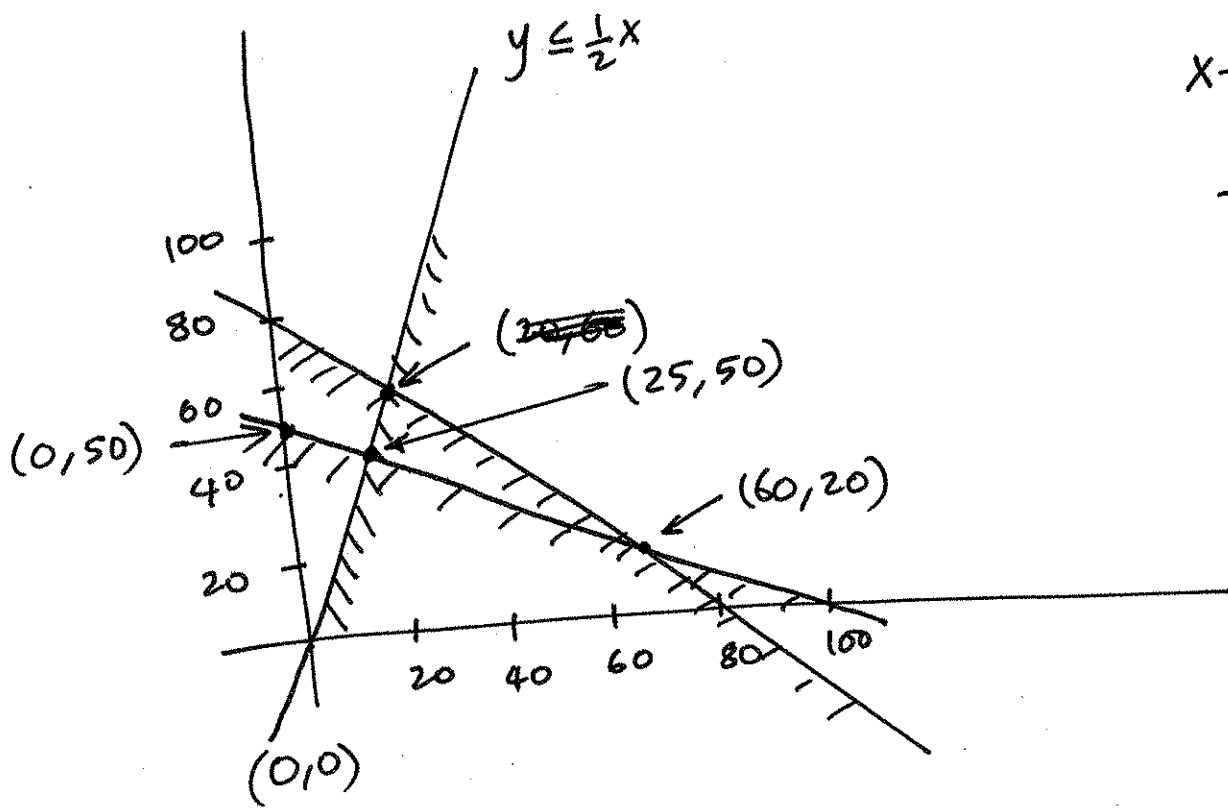
$$x=0 \quad y=0$$

$$y = -\frac{1}{2}x + 50$$

$$x=0 \quad y=50$$

$$y=0 \quad x=100$$





$$x - 2y \geq 0$$

$$-2y \geq -x$$

$$2y \leq x$$

$$y \leq \frac{x}{2}$$

Imp

Review

①

PATS v/s JETS

19

10

L

Problem 3

10

	Type A	Type B	Av	
Volume	5	5	400	} 3pts
Weight	100	200	10,500	
Revenue	20	30		

$\left\{ \begin{array}{l} X - \# \text{ of crates A} \\ Y - \# \text{ of crates B} \end{array} \right\} 2pts$

$$\begin{array}{l} 2pts \left\{ \begin{array}{l} 5X + 5Y \leq 400 \\ 100X + 200Y \leq 10,500 \end{array} \right. \quad \begin{array}{l} X \geq 0 \\ Y \geq 0 \end{array} \left\} 1pt \right. \\ 1pt \left\{ \begin{array}{l} 2Y \leq X \end{array} \right. \quad (1pt) 20X + 30Y = P \end{array}$$

②

Maximize $4x + y$

$$x + y \leq 100$$

$$x \geq 0 \quad y \geq 0$$

$$3x + y \leq 120$$

$$y \geq 50 \rightarrow \textcircled{3}$$

$$x + y \leq 100 \rightarrow \textcircled{1}$$

$$3x + y \leq 120 \rightarrow \textcircled{2}$$

$$y = -x + 100$$

$$y = -3x + 120$$

Intercepts

$$x = 0 \quad y = 100$$

$$y = 0 \quad x = 100$$

$$x = 0 \quad y = 120$$

$$y = 0 \quad x = 40$$

Intersection

$$\textcircled{1} = \textcircled{2}$$

$$-x + 100 = -3x + 120$$

$$2x = 20$$

$$x = 10$$

$$y = -x + 100$$

$$y = 90$$

$$\textcircled{1} = \textcircled{3}$$

$$y = 50$$

$$50 = -x + 100$$

$$x = 50$$

$$\textcircled{2} = \textcircled{3}$$

$$50 = -3x + 120$$

$$x = 70/3$$

③

Intercept

0, 100

100, 0

$X=0$ $Y=120$

40, 0

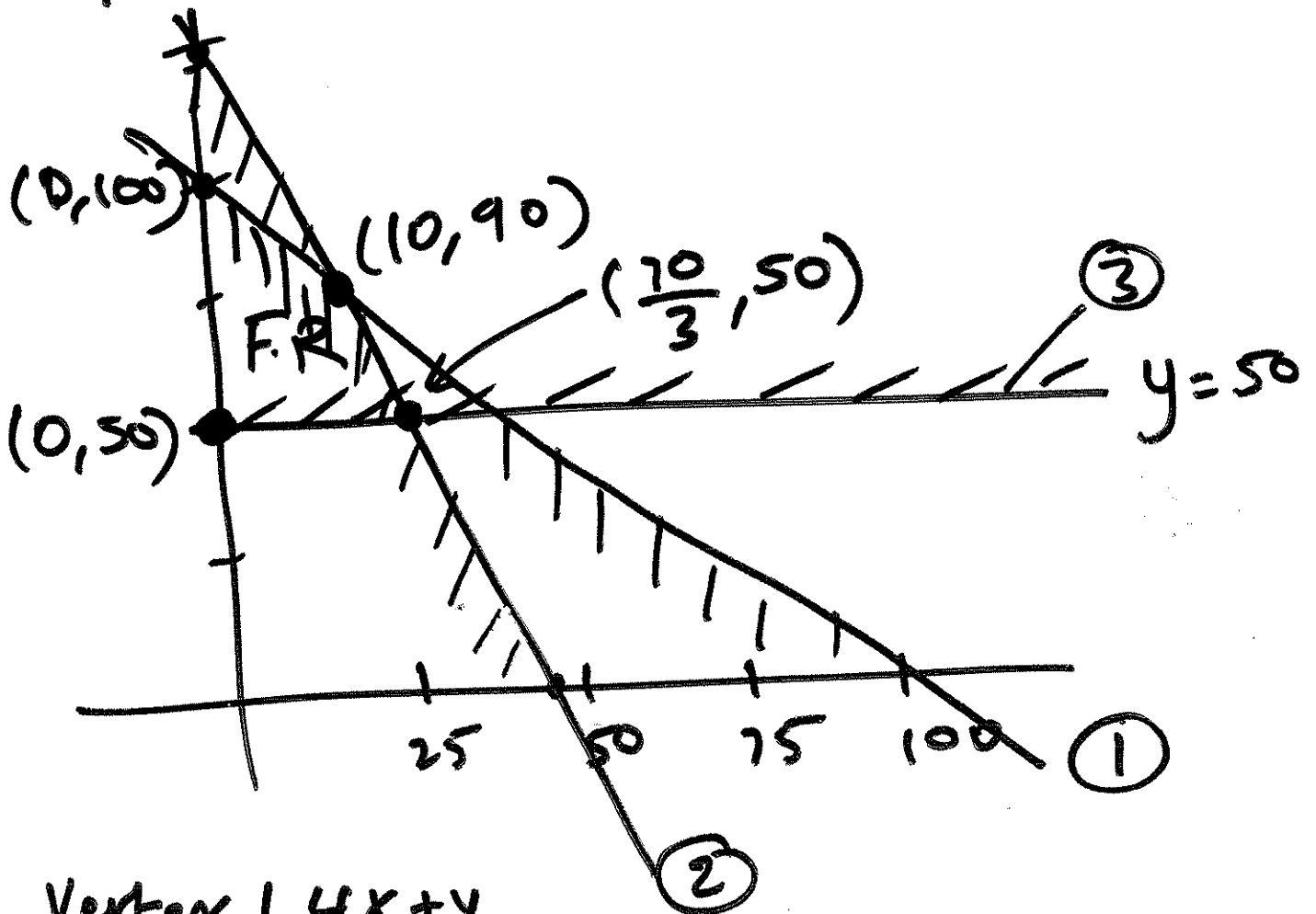
$Y=50$

Intersection

$X=10$, 90 (1, 2)

$X=50$ $Y=50$ (1, 3)

$X=70\frac{2}{3}$ $Y=50$ (2, 3)



Vertex	$4X + Y$
0, 100	
10, 90	
$70\frac{2}{3}, 50$	
0, 50	

④

$$y \leq -x + 100 \rightarrow \textcircled{1}$$

$$y \leq -3x + 120 \rightarrow \textcircled{2}$$

$$y \geq 50 \rightarrow \textcircled{3}$$

