11-10-05

$$S \xrightarrow{.001SI} I \xrightarrow{\frac{1}{8}I} R$$

I becomes A C B

p175 $$S \xrightarrow{.0015C} A \xrightarrow{\frac{1}{10}A} C \xrightarrow{\frac{1}{2}C} B \xrightarrow{\frac{1}{8}B} R$$

10 = # days in A

2 = ± ... - C

8 = ... B

X increasing $\leftrightarrow$ $\Delta X > 0$

X at peak $\leftrightarrow$ $\Delta X = 0$

X is decreasing $\leftrightarrow$ $\Delta X < 0$

$$\frac{\Delta I}{\Delta t} = aSI - bI$$

I decreasing? $\Delta I < 0$

or $aSI - bI < 0$

$+bI \quad +bI$

$$\frac{aSI}{aI} < \frac{bI}{aI}$$

$$S < \frac{b}{a}$$

Solve for S

I Peak

$\Delta I = 0$

$aSI - bI = 0$

$\vdots$

$S = \frac{b}{a}$.

Ch 8 HW due 3 PM Fri, outside Cl 312

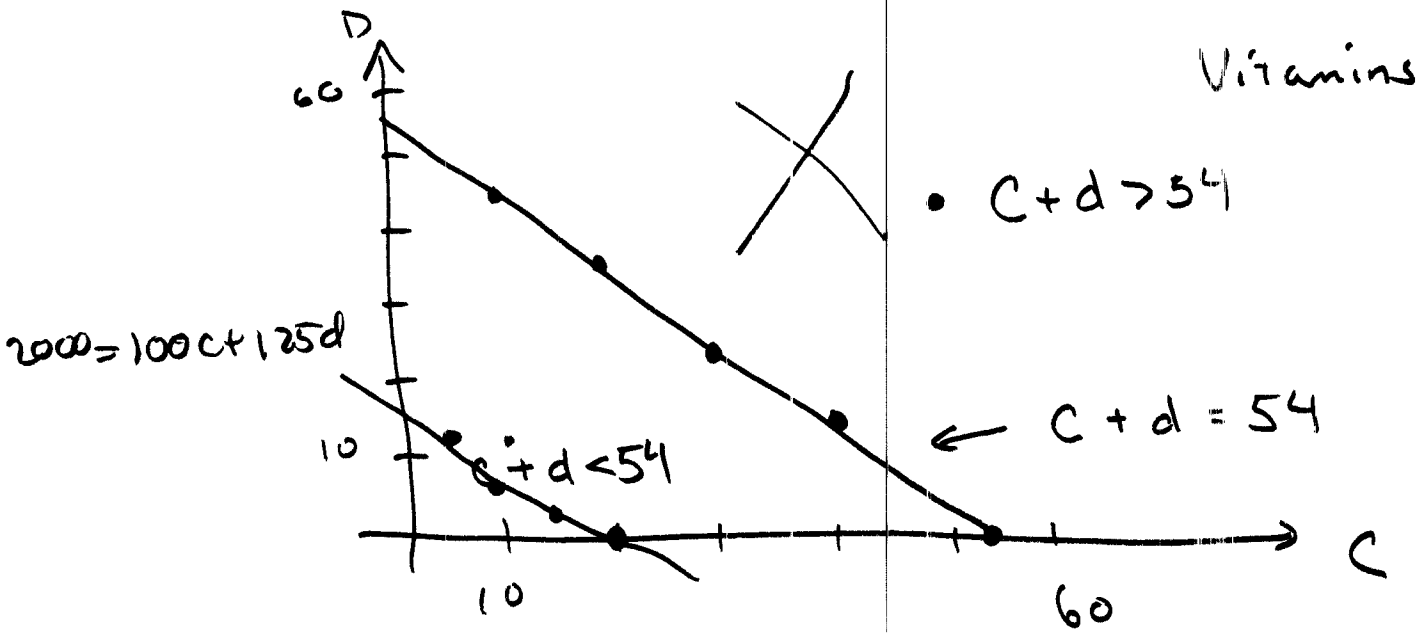
Solve $xY - zW = 0$ for Y

$+zW \quad +zW$

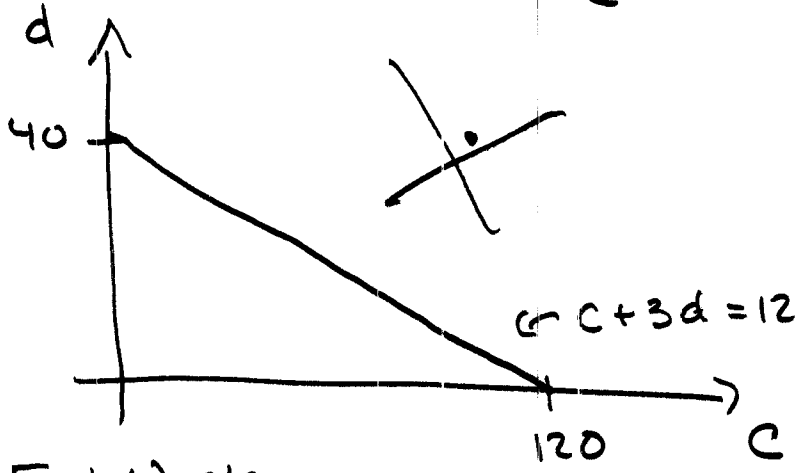
$\frac{xY}{x} = \frac{zW}{x}$

$Y = \frac{zW}{x}$

C	d	FW	MS	V	P
54	0			54	
40	14			54	
30	24			54	
20	34			54	
10	44			54	



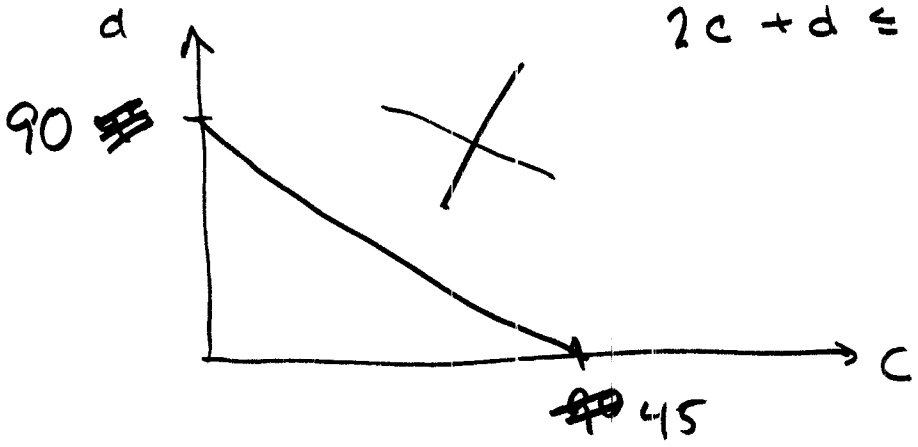
Meat scraps $1\ \frac{lb}{cat} \cdot c + 3 \cdot d \leq 120$



$c + 3d = 120$ intercepts

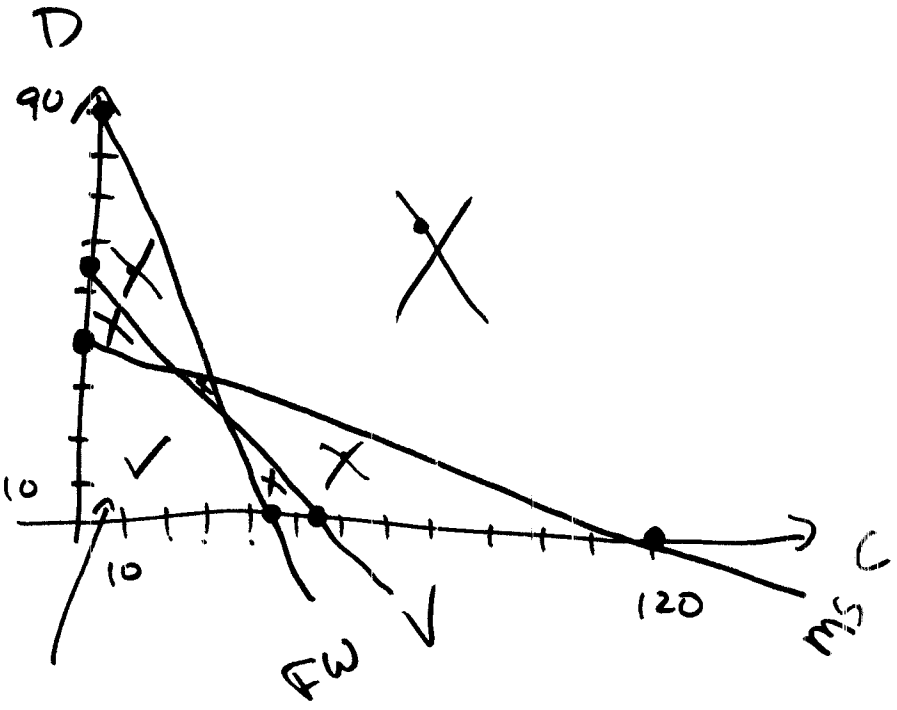
c	d
0	40
120	0

Fish Waste $2c + d \leq 90$



intercepts

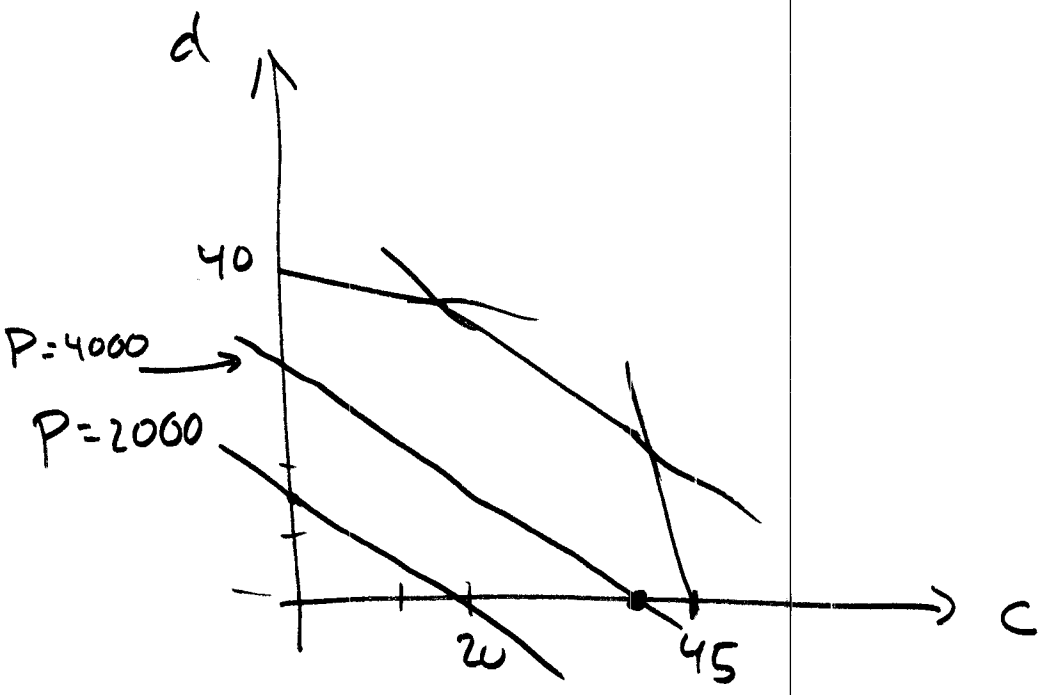
c	d
0	90
45	0



Feasible region

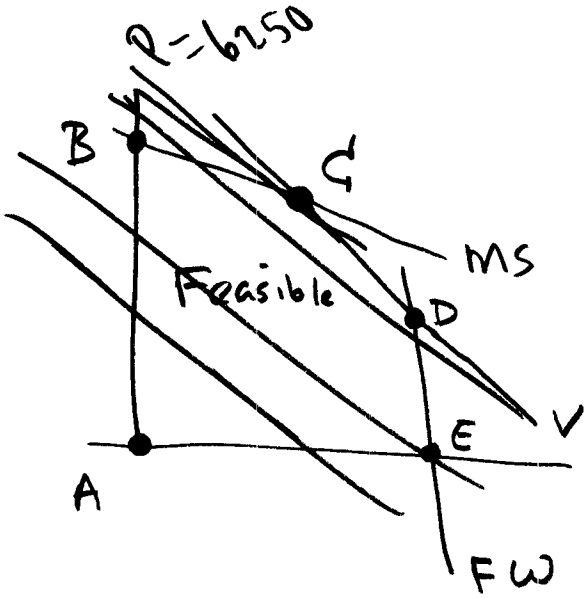
How to make an optimal choice in feasible region.

C	d	P = \$100C + \$125d
5	12	100·5 + 125·12 = 2000
10	8	2000
15	4	2000
20	0	2000
40	0	4000



To Find a solution

- Limit search to feasible region (graph it)
- Push Profit lines to boundary of feasible region
- Best Profit ~~for~~ at a corner point of the boundary. - Use algebra to find corners



$C + 3d = 120$

$C + d = 54$

$2C + d = 90$

A $(0,0)$ B $(0,40)$ E $(45, 0)$

G MS meets V

$$\begin{cases} C + 3d = 120 \\ -\{C + d = 54\} \end{cases}$$

$2d = 66$ → $d = 33$ $C = 54 - d = 54 - 33$

G $(21, 33)$

D FW meets V

$$\begin{cases} 2C + d = 90 \\ -\{C + d = 54\} \end{cases}$$

$C = 36$ D: $(36, 18)$

C	d	P = 100C + 125d	
0	0	0	
0	40	5000	
45	0	4500	
* 21	33	6225	* max Profit.
36	18	5850	

Linear Programming

Look for Choices to be made (variables) ✓

with contraints leading to a feasible region for an optimal value. ✓

Maddash Hatter

Choices # hrs American Plant A

hrs Singapore Plant S

Optimize - Minimize cost.
(max, min)

Cost = 10,000 A + 10,000 S

⋮

Next Time.