

Problem Number #87

	A	B	total
x	x	y	
Cost	10	20	≤ 140
floor area	6	8	≤ 72
Volume	8	12	

a) Identify the variables.

X = # Cabinet A
Y = # Cabinet B

b) What are we trying to maximize/minimize?

Storage capacity, ft^3

c) Objective Function (max/min?)

$$8x + 12y$$

d) List all the Constraints (inequalities)

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

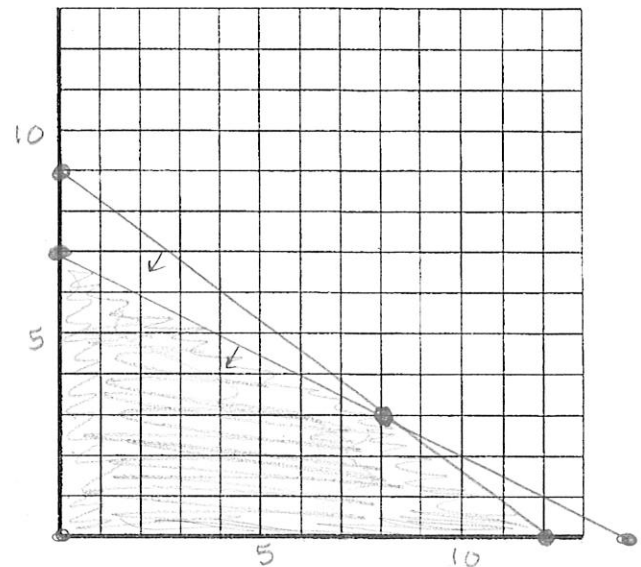
$$10x + 20y \leq 140$$

$$6x + 8y \leq 72$$

$$\begin{array}{r|l} x & y \\ 14 & 0 \\ \hline & 7 \end{array}$$

$$\begin{array}{r|l} x & y \\ 12 & 0 \\ \hline & 9 \end{array}$$

e) Graph all inequalities creating a Feasible Region.



f) List the vertices of the Feasible Region.

(0,0) (12,0) (8,3) (0,7)

Calculator to find intersection.

g) Give the value of the Objective Function at each vertex.

$$(0,0) = 8(0) + 12(0) = 0$$

$$(12,0) = 8(12) + 12(0) = 96$$

$$(8,3) = 8(8) + 12(3) = \boxed{100}$$

$$(0,7) = 8(0) + 12(7) = 84$$

$$(,) =$$

$$\begin{array}{r} 10x + 20y = 140 \\ -10x = -10x \end{array}$$

$$\frac{20y}{20} = \frac{-10x + 140}{20} \quad \frac{-10x}{20}$$

$$y = -\frac{1}{2}x + 7$$

$$\begin{array}{r} 6x + 8y = 72 \\ -6x = -6x \end{array}$$

$$\frac{8y}{8} = \frac{-6x + 72}{8} \quad \frac{-6x}{8}$$

$$y = -\frac{3}{4}x + 9$$

(8,3)

h) Answer the question.

The max storage capacity is 100 ft^3 ,
with 8 Cabinet As and 12 Cabinet B.