

Problem1

colligate and mini

material square feet=5000

model	required material	sales	time	profit	labor
Colligate C	3	1000	45	32	34*40
Mini M	2	1200	40	24	

let C be a collegiate model

M be the mini model of backpack

objective function

maximizing the profit $Z = 32C + 24M$

constraints

Here there are labor and material are two constraints

Material

$$3C + 2M \leq 5000 \text{ (Nylon material)}$$

Hours

$$(45/60)C + (40/60)M \leq (40 \cdot 35) \text{ hours}$$

Problem2

Plants	Product size	Profit	Excess Capacity	Storage Capacity	size	sales
P1,P2,P3	LARGE	420	750	13000	20	900
P1,P2,P3	MEDIUM	360	900	12000	15	1200
P1,P2,P3	SMALL	300	450	5000	12	750

objective function

$$P1 \text{ profit} = 420(20L+15M+12S)$$

$$P2 \text{ profit} = 360(20L+15M+12S)$$

$$P3 \text{ profit} = 450(20L+15M+12S)$$

$$Z=420(20L+15M+12S) +360(20L+15M+12L) +300(20L+15M+12S)$$

constraints

production

$$\text{plant1}-----p1(20L+15M+12S) \leq 450$$

$$\text{plant2}-----p2(20L+15M+12S) \leq 900$$

$$\text{plant3}-----p3(20L+15M+12S) \leq 450$$

Sales of each plant as per sizes

$$20L(P1+P2+P3) \leq 900$$

$$15M(P1+P2+P3) \leq 1200$$

$$12S(P1+P2+P3) \leq 750$$

storage limitation

$$\text{plant1} \text{-----} p1(20L+15M+12S) \leq 13000$$

$$\text{plant2} \text{-----} p2(20L+15M+12S) \leq 12000$$

$$\text{plant3} \text{-----} p3(20L+15M+12S) \leq 5000$$

capacity limitation

Plant---P1----()/750 which is equal to 100%

$$\left(\frac{20L+15M+12S}{750} \right) * 100 = 0$$

plant---P2----(20L+15M+12S)/900 which is equal to 100%

$$\left(\frac{20L + 15M + 12S}{900} \right) * 100 = 0$$

Plant---P3----(20L+15M+12S)/450 which is equal to 100%

$$\left(\frac{20L + 15M + 12S}{450} \right) * 100 = 0$$

The capacity of all plants

$$\left(\frac{20L+15M+12S}{750} \right) * 100 = \left(\frac{20L+15M+12S}{900} \right) * 100 = \left(\frac{20L+15M+12S}{450} \right) * 100$$

