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≤5000(Nylon material)

Hours

(45/60) C+(40/60) M≤ (40*35) 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

profit on large = $420(P1L+P2L+P3L)$

profit on medium = $360(P1M+P2M+P3M)$

profit on small = $450(P1S+P2S+P3S)$

$Z=420(P1L+P2L+P3L) +360 (P1M+P2M+P3M)+300(P1S+P2S+P3S)$

constraints

production

plant1-----$p1(L+M+S) \leq 450$

plant2------$p2(L+M+S) \leq 900$

plant3------$p3(L+M+S) \leq 450$

Sales of each plant as per sizes

20L(P1+P2+P3) ≤900
15M(P1+P2+P3) ≤1200

12S(P1+P2+P3) ≤750

storage limitation

plant1-----p1(20L+15M+12S) ≤13000

plant2------p2(20L+15M+12S) ≤12000

plant3------p3(20L+15M+12S) ≤5000

capacity limitation

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

$$\left(\frac{p1L+p1M+p1S}{750}\right) * 100 = 0$$

plant---P2----(p1L+p1M+p1S)/900 which is equal to 100%

$$\left(\frac{p2L + p2M + p3S}{900}\right) * 100 = 0$$

Plant---P3----(p3L+p3M+p3S)/450 which is equal to 100%

$$\left(\frac{p3L + p3M + p3S}{450}\right) * 100 = 0$$

The capacity of all plants e

$$\left(\frac{p1L+p1M+p1S}{750}\right) * 100 = \left(\frac{p2L+p2M+p3S}{900}\right) * 100 = \left(\frac{p3L+p3M+p3S}{450}\right) ** 100$$