Assignment : module 2 -LP Model

1A)

To form a linear equation, we need to derive the variables from the given data, what are the other constraints, linear function we want to maximize. Our goal is to maximize profits.

A) Here, C, M are our decision variables. This helps in deciding the result of how many of each type of backpacks are to be produced to maximize the profit.

Collegiate© = number of Collegiates to produce
M= number of Minis to produce

B) Objective Function:

To maximize total profit we need to get,
P (C, M) = 32C + 24M
We can’t make negative backpacks so, both C and M must be greater than or equal to zero, while both have sales limits:
0 <= C <_ 1000.
0<= M <= 1200

C) Constraints
The constraints are nothing but the restrictions or limitations on the total backpacks that need to be produced.
The amount of nylon Back Savers receive in total each week is <u>5000 sq ft</u>
In the problem, Nylon (N) = 5000
and Labor-hours(H) are the constraints that influence the production of backpacks.

D) Mathematical Formulation
Subject to
Nylon (N) : 3C + 2M <= 3* 1000+ 2*1200
Labor-hours (LH) : (3/4)C + (2/3) M <= 35*40

Nylon: 3C + 2M <= 5400
Labor-hours: 3/4 C +2/3M <= 1400.

2 A)

Here, the problem the decision variables are the ones which influence the production i.e.;
The quantity of size of units produced per day at Plant 1, Plant 2 , Plant 3 respectively.

They can be represented as ;
aP1L = the quantity of large units required per day at Plant 1

aP1M = the quantity of medium units required per day at Plant 1
aP1S = the quantity of small large units required per day at Plant 1
bP2L = the quantity of large units required per day at Plant 1
bP2M = the quantity of medium units required per day at Plant 1
bP2S = the quantity of small units required per day at Plant 1
cP3L = the quantity of large units required per day at Plant 1
cP3M = the quantity of medium units required per day at Plant 1
cP3S = the quantity of small units required per day at Plant 1

In the given problem the total maximum profit we need to get , can be
Maximize P = 420 aP1L + 360bP1M + 300 cP1S + 420 aP2L + 360 bP2M + 300cP2S + 420 aP3L + 360 bP3M + 300 cP3S

B) Mathematical Formulation
Subject to
The linear programming model for this problem is given that,

aP1L + aP1M + a P1S = 750
aP2L + aP2M +a P2S = 900
aP3L + aP3M + aP3 S = 450
Also,
20 aP1L + 15 aP1M + 12 aP1S = 13000
20 aP2L + 15 aP2M + 12 aP2S = 12000
20 aP3L + 15 aP3M + 12 aP3S = 5000

aP1L + aP2L +a P3L= 900
aP1M + aP2M + aP3M = 1200
aP1S + aP2S + a P3S = 750

(aP1L + aP1M+ aP1S)(aP2L +aP2M + aP2S) = 0
(aP1L + aP1M + aP1S) (aP3L + aP3M + aP3S) = 0

Also, (aP2L + aP2M + aP2S) – 1 (aP3L + aP3M + aP3S)
= 0
Given, to consider any one of them is reduced and subtracted.