12/9/22

Assignment-2

2)

a) Define the decision variables

A) The decision variables are number of products in in large size, No. of products in medium size and no. of products in small size.

b) Formulate linear programming model for this problem.

A)

The objective function is to maximize profit

let the large size be L_1 for plant 1

L_2 for plant 2

L_3 for plant 3

let the Medium size be M_1 for plant 1

M_2 for plant 2

M_3 for plant 3

small size be S_1 for plant 1

S_2 for plant 2

S_3 for plant 2

Large net profit = 420$

Medium net profit = 360$

small net profit = 300$

Maximize,

$420L_1 + 420L_2 + 420L_3 + 360M_1 + 360M_2 + 360M_3 + 300S_1 + 300S_2 + 300S_3$

constraints

$L_1 + M_1 + S_1 \leq 750$ (plant 1 excess capacity)

$L_2 + M_2 + S_2 \leq 900$ (plant 2 excess capacity)

$L_3 + M_3 + S_3 \leq 450$ (plant 3 excess capacity)

$L_1 + L_2 + L_3 \leq 900$ (sales forecast for large)

$M_1 + M_2 + M_3 \leq 1200$ (sales forecast for Medium)

$S_1 + S_2 + S_3 \leq 750$ (sales forecast for small)

$20L_1 + 15M_1 + 12S_1 \leq 13000$ (storage space in 1)

$20L_2 + 15M_2 + 12S_2 \leq 12000$ (storage space in 2)

$20L_3 + 15M_3 + 12S_3 \leq 5000$ (storage space in 3)

I)

a) clearly define the decision variables

A) The decision variables are number of collegiate Backpacks and number of Mini Backpacks.

b) What is the objective function.

A) The objective function is to maximize the profit

Let x be the number of collegiate Backpacks and y be the number of Mini backpacks.

Collegiate generated profit = 32$

Mini generated profit = 24$

Maximize,

$Z = 32x + 24y$

constraints

$3x + 2y \leq 5000$ (Squarefoot shipment of material each week)

$(45x + 40y)$ minutes (Total labour required)

$x \leq 1000$ (collegiates)

$y \leq 1200$ (Minis)