skalinof_2.ext

Assignment Instructions: Module 2 - The LP Model

Steven Kalinoff

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1.) Back Savers
    a. A Decision variables
        i. How many of each backpack to produce per week to maximize profit
    b. Object function
        i. To maximize profit where profit = Z
           Given Cb(Z) = $32, Mb(Z) = $24
    c. Constrains
        i. $X_1 \geq 5000ft^2$ (material)
        ii. $X_2 \geq 1400$hrs (Manpower)
        iii. Collegiate (Cb) ≤ 1000 units
        iv. Mini (Mb) ≤ 1200 units
    d. LP formula
        i. Max Profit Z; $Z = C_1X_1 + C_2X_2$ Subject to:

$$0 \leq X_1 \leq 5000$$
$$0 \leq X_2 \leq 1400$$
$$5000 \geq 3Cb + 2Mb$$
$$1400 \geq (3/4)Cb + (4/6)Mb$$
$$Z = 32Cb + 24Mb$$

2.) Weigelt Corp.

a. Decision Variables

i. How many of each size unit should be produced at each plant to maximize profit by reducing excess capacity:

'Plant 1

1. Lg @ P1 = X_1
2. md @ P1 = X_2
3. sm @ P1 = X_3

'Plant 2

4. Lg @ P2 = X_4
5. Md @ P2 = X_5
6. sm @ P2 = X_6

'Plant 3

7. Lg @ P3 = X_7
8. md @ P3 = X_8
9. sm @ P3 = X_9

ii. Max profit (Z)

$Z = 420X_1 + 360X_2 + 300X_3 + 420X_4 + 360X_5 + 300X_6 + 420X_7 + 360X_8 + 300X_9$ Subject to:

'sales volume

i. $X_1 + X_4 + X_7 \leq 750$
ii. $X_2 + X_5 + X_8 \leq 1{,}200$
iii. $X_3 + X_6 + X_9 \leq 900$

'Plant square footage for use

iv. $20X_1 + 15X_2 + 12X_3 \leq 13{,}000$
v. $20X_4 + 15X_5 + 12X_6 \leq 12{,}000$
vi. $20X_7 + 15X_8 + 12X_9 \leq 5{,}000$

'Excess Capacity

vii. $X_1 + X_2 + X_3 \leq 750$ '-plant 1
viii. $X_4 + X_5 + X_6 \leq 900$ '- plant 2
ix. $X_7 + X_8 + X_9 \leq 450$ – 'plant 3

'% of Capacity

x. $(1/750)(X_1 + X_2 + X_3) – (1/900)(\ )(X_4 + X_5 + X_6) = 0$
And
xi. $(1/750)(X_1 + X_2 + X_3) – (1/450)(\ )(X_7 + X_8 + X_9) = 0$
Or
xii. $(1/900)(X_4 + X_5 + X_6) – (1/450)(\ )(X_7 + X_8 + X_9) = 0$

Where

$X_{(1\text{-}9)} \geq 0$