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| **Assignment -1** | | | | **QMM** | | |
|  |  | | Backsaver’s LP Model Formulation | |  |  |
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|  |  | | | | |  |
|  | a) Decision variables  Let Xi = Backpack  Where i = Model of Backpack (1,2)  Therefore,  X1 = Collegiate Backpack  X2 = Mini Backpack | | | | |  |
|  |  | | | | |  |
|  | b) Objective function  The objective of Back Savers is to maximize the profits, therefore, the equation to maximize profits is:  **Zmax = 32X1 + 24X2** | | | | |  |
|  |  | | | | |  |
|  | c) Constraints  Back Savers receive 5000 square-foot shipment of material each week thus total resources used should be less than or equal to this shipment:    **3X1 + 2X2 < 5000 square feet**  We also have a constraint on number of labor hours (35\*40=1400), therefore:  **(3/4)X1 + (2/3)X2 < 1400 hours**    (45 min = 3/4 h & 40 min = 2/3 h)  They should also not produce more of each backpack than the sales forecast thus:  **X1 < 1000 , X2 < 1200** | | | | |  |
|  |  | | | | |  |
|  |  |



**Zmax = 32X1 + 24X2**

**Subject to the constraints:**

**3X1 + 2X2 < 5000 square feet ----- (1)**

**(3/4)X1 + (2/3)X2 < 1400 hours ----- (2)**

**Where X1 < 1000 , X2 < 1200 & X1 > 0 , X2  > 0**



D) mathematical formulation

**Therefore, the mathematical formulation for this linear programming problem is:**