Scenario 1:

a. The decision variables:
   a. How many of each backpacks should be produced per week?
b. The objective performance:
   a. The profit (Z) of Back Savers
      i. $Z = 32x_1 + 24x_2$
c. Constraints (1 = collegiate, 2 = minis)
   a. The amount of overall fabric (f) available
      i. $3f_1 + 2f_2 \leq 5000$
   b. The amount of labor (l) available
      i. $.75l_1 + .67l_2 \leq 1400$
   c. Sales forecast (s)
      i. $x_1 \leq 1000$
      ii. $x_2 \leq 1200$
   d. Non-negative
      i. $x_1 \geq 0$
      ii. $x_2 \geq 0$
d. Mathematical formula:
   a. $Z = 32x_1 + 24x_2 + 3f_1 + 2f_2 + .75l_1 + .67l_2$

Scenario 2:

a. Decision Variables
   a. How many of each size should be produced?
   b. Where should these sizes be produced?
      i. 1 = Plant 1
      ii. 2 = Plant 2
      iii. 3 = Plant 3
      iv. L = large
      v. M = medium
      vi. S = small
b. $Z = 420L_1 + 360M_1 + 300S_1 + 420L_2 + 360M_2 + 300S_2 + 420L_3 + 360M_3 + 300S_3$