Question 1:

A. Decision Variables
   a. X1 = number of Collegiate bags
   b. X2 = number of Mini bags
   c. Z = total profit of sales
B. Objective Function: to maximize Z the total profit of sales from the
   a. $Z = 32X1 + 24X2$

C. Constraints:
   a. $X1 \leq 1000$ - sales forecast constraint collegiate bags
   b. $X2 \leq 1200$ - sales forecast constraint mini bags
   c. $3X1 + 2X2 \leq 5000$ - nylon constraint
   d. $45X1 + .40X2 \leq 84,000 \quad <- (35 * 40 * 45)$ - labor time constraints
   e. $X1 \geq 0, X2 \geq 0$

D.

Question 2:

A. Decision Variables
   a. X1 = large products
   b. X2 = Medium Products
   c. X3 = small products
   d. Z = profit that maximizes sales
B. Objective Function:
   a. To maximize profit and product Mix
   b. (420X1 + 420 X2 + 420 X3) + (360 X1 + 360X2 + 360X1) + (300X1 +300 X2 + 300X3)

C. Constraints

   a. Plant Excess Capacity Constraints
      i. $X1 + X2 + X3 \leq 750$
      ii. $X1 + X2 + X3 \leq 900$
      iii. $X1 + X2 + X3 \leq 450$
   b. Sales Forecast Constraints
      i. $X1 + X2 + X3 \leq 900$
      ii. $X1 + X2 + X3 \leq 1200$
      iii. $X1 + X2 + X3 \leq 750$
   c. Plant Storage Constraints
      i. $20X1 + 15X2 + 12X3 \leq 13,000$
      ii. $20X1 + 15X2 + 12X3 \leq 12,000$
      iii. $20X1 + 15X2 + 12X3 \leq 5,000$

   d. $X1, X2, X3 \leq 0$