1. A. x1 <= 1000

   x2 <= 1200

   Let x1 represent the number of collegiate bags.

   Let x2 represent the number of mini bags.

B. Let Z represent the objective function which is the maximum profit where the objective function.

   Z = 32x1 + 24x2

C. The first set of constraints involves the material, nylon, and labor. The total of the two resources needs to be less than or equal to the available amount.

   Nylon : 3x1 + 2x2 <= 5000

   Since labor is measured in hours, the labor for each bag would need to be converted to hours.

   x1 requires 45 minutes of labor which is equivalent to 3/4 hours. So x2 requires 40 minutes of labor, which is equivalent to 2/3 of labor.

   RHS would be total available labor hours for production = 35 labor * 40 hours each labor = 1400 hours

   Labor: (3/4)x1 + (2/3)x2 <= 1400

D. Maximum Z = 32x1 + 24x2

Subject to restriction $x1 <= 1000$

$x2 <= 1200$

$3x1 + 2x2 <= 5000$

$(3/4)x1 + (2/3)x2 <= 1400$

And $x1 > 0, \quad x2 > 0$

2. A. Consider two-dimensional decision variables.

Let L1 represent the number of large units produced by plant 1.

Let M2 represent the number of median units produced by plant 2.

Let S3 represent the number of small units produced by plant 3.

This way we will have 3x3 = 9 decision variables.

Maximize Z where

$Z = 420(L1 + L2 + L3) + 360(M1 + M2 + M3) + 300(S1 + S2 + S3)$

B. $L1 + M1 + S1 <= 750$

$L2 + M2 + S2 <= 900$

$L3 + M3 + S3 <= 450$

$20L1 + 15M1 + 12S1 <= 13000$

$20L2 + 15M2 + 12S2 <= 12000$

$20L3 + 15M3 + 12S3 <= 5000$

$L1 + L2 + L3 <= 900$

$M1 + M2 + M3 <= 1200$

$S1 + S2 + S3 <= 7500$

$L1, L2, L3, M1, M2, M3, S1, S2, S3 >= 0$