2. Consider a problem where we two products: Product A (cloth bags) and Product B (leather bags). Each unit of Product A that is sold produces $30 in profit and each unit of Product B that is sold produces $50 in profit. There are three resources involved (cloth, leather, and labor), and different quantities are required for each item:

   Product A requires 1 unit of cloth, 0 units of leather (no leather), and 4 hours of labor.
   Product B requires 0 units of cloth (no cloth), 1 unit of leather, and 2 hours of labor.

   The available resources that you have are 40 units of cloth, 60 units of leather, and 240 hours of time (labor).

   a. How many Product A's and how many Product B's should you make if you want to maximize profit?

   b. What is the marginal value of a unit of cloth?

   c. What is the marginal value of a unit of leather?

7. To manufacture each of three (3) different products (H, J, K), the same three (3) resources (X, Y, Z) are required, but in different quantities. When made/sold, each product contributes a certain amount to the profit line, and of course, the manufacturer wants to make as much profit as possible. Below is a unit matrix that provides all the necessary quantitative information on this manufacturing process.

| | **Prod. H (Qh)** | **Prod. J (Qj)** | **Prod. K(Qk)** | **Total Resources Available** |
|---|---|---|---|---|
| **Resource X** | 4 | 6 | 5 | 1200 |
| **Resource Y** | 3 | 2 | 4 | 600 |
| **Resource Z** | 2 | 2 | 6 | 720 |
| **Profit Contribution** | $34 | $40 | $44 | |

   a. Create a spreadsheet model of this problem.

   b. What is the objective?

   c. What are the constraints?

   d What are the decision variables?

   e. Program the spreadsheet, i.e., annotate it using What'sBest! (or Solver) software, so that the optimal mix of products H, J and K, which best utilizes resources X, Y, and Z could be determined. (On your spreadsheet, indicate all the important What'sBest! (or Solver) information.)

   f. Write the four (4) algebraic equations that could be used to calculate Total Resource X Usage, Total Resource Y Usage, Total Resource Z Usage, and Total Profit.