Section 2.2: Applications of Linear Programming

Example 1: The Soundex Company produces two models of mp3 players. Model A requires 15 min of work on assembly line I and 10 min of work on assembly line II. Model B requires 10 min of work on assembly line I and 12 min of work on assembly line II. At most, 23 hr of assembly time on line I and 22 hr of assembly time on line II are available per Soundex's work day. It is anticipated that Soundex will realize a profit of $12 on Model A and $10 on Model B. How many mp3 players of each model should be produced per day in order to maximize Soundex's profit?

a. Define your variables.

b. Construct and fill in a table.

c. State the Linear Programming Problem. Do Not Solve.

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Example 2: A patient in a hospital is required to have at least 84 units of drug D1 and at least 120 units of drug D2 each day (assume that an overdose of either drug is harmless). Two substances, M and N, contain each of these drugs; however, in addition, both contain an undesirable drug D3 . Each gram of substance M contains 10 units of drug D1 , 8 units of drug D2 and 3 units of drug D3 . Each gram of substance N contains 2 units of drug D1 , 4 units of drug D2 and 1 unit of drug D3 . How many grams of substances M and N should be mixed to meet the minimum daily requirements and at the same time minimize the intake of drug D3 ?

a. Define your variables.

b. Construct and fill in a table.

c. State the Linear Programming Problem. Do Not Solve.

Example 3: The officers of a high school senior class are planning to rent buses and vans for a class trip. Each bus can transport 40 students, requires 3 chaperones, and costs $1,200 to rent. Each van can transport 8 students, requires 1 chaperone, and cost $100 to rent. The officers must plan to accommodate at least 400 students. Since only 36 parents have volunteered to serve as chaperones, the officers must plan to use at most 36 chaperones. How many vehicles of each type should the officers rent in order to minimize the transportation costs? What are the minimal transportation costs?

a. Define your variables.

b. Construct and fill in a table.

c. State the Linear Programming Problem. Do Not Solve.

Example 4: A 4-H member raises only geese and pigs. She wants to raise no more than 16 animals. It costs her $ 500 to raise a goose and $ 1500 to raise a pig. And she has $ 18,000 available for the project. The 4-H member wishes to maximize her profit. Each goose produces $ 600 in the profit and each pig $ 2000 profit. How many of each animal should she raise to maximize her profit?

a. Define your variables.

b. Construct and fill in a table.

c. State the Linear Programming Problem and Solve