

1.] PERFUME PRODUCTION: Rylon Corporation manufactures Brute and Chanelle perfumes. The raw material needed to manufacture each type of perfume can be purchased for \$3/lb. Processing 1 lb of raw material requires 1 hr of laboratory time. Each pound of processed raw material yields 3 oz of Regular Brute Perfume and 4 oz of Regular Chanelle Perfume. Regular Brute can be sold for \$7/oz and Regular Chanelle for \$6/oz. Rylon also has the option of further processing Regular Brute and Regular Chanelle to produce Luxury Brute, sold at \$18/oz and Luxury Chanelle, sold at \$14/oz. Each ounce of Regular Brute processed further requires an additional 3 hrs of laboratory time and \$4 processing cost and yields 1 oz of Luxury Brute. Each ounce of Regular Chanelle processed further requires an additional 2 hrs of laboratory time and \$4 processing cost and yields 1 oz of Luxury Chanelle. Rylon has 6,000 hrs of laboratory time available and can purchase up to 4,000 lb of raw material. Formulate an LP that can be used to determine how Rylon can maximize profits.

2.] MORE PERFUME: Suppose in the previous problem, 1 lb of raw material could be used to produce either 3 oz of Brute *or* 4 oz of Chanelle. How would this change the formulation?

3.] CHEMICAL PRODUCTION: Chemco produces three products: 1, 2, and 3. Each lb of raw material costs \$25. It undergoes processing and yields 3 oz of product 1 and 1 oz of product 2. It costs \$1 and takes 2 hrs of labor to process each pound of raw material. Each ounce of product 1 can be used in one of three ways:

- It can be sold for \$10/oz.
- It can be processed into 1 oz of product 2, which requires 2 hours of labor and costs \$1.
- It can be processed into 0.75 oz of product 3, which requires 3 hours of labor and costs \$2.

Each ounce of product 2 can be used in one of two ways:

- It can be sold for \$20/oz.
- It can be processed into 0.70 oz of product 3, which requires 1 hour of labor and costs \$6.

Product 3 is sold for \$32/oz. The maximum number of ounces of each product is 5,000 oz, 5,000 oz, and 3,000 oz, respectively. A maximum number of 25,000 labor hrs are available. Determine how Chemco can maximize profit.