

The specifications for Golding-Grow are as follows: (1) E-11 must constitute at least 15% of the blend; (2) C-92 and C-30 must together constitute at least 45% of the blend; (3) D-21 and C-92 can together constitute no more than 30% of the blend; and (4) Golding-Grow is packaged and sold in 50-pound bags.

(a) Formulate an LP problem to determine what blend of the four chemicals will allow Golding to minimize the cost of a 50-pound bag of the fertilizer.

(b) Solve using a computer to find the best solution.



7-45 Raptor Fuels produces three grades of gasoline—Regular, Premium, and Super. All of these are produced by blending two types of crude oil—Crude A and Crude B. The two types of crude contain specific ingredients which help in determining the octane rating of gasoline. The important ingredients and the costs are contained in the following table:

	CRUDE A	CRUDE B
Cost per gallon	\$0.42	\$0.47
Ingredient 1	40%	52%
Other ingredients	60%	48%

In order to achieve the desired octane ratings, at least 41% of Regular gasoline should be Ingredient 1; at least 44% of Premium gasoline must be Ingredient 1, and at least 48% of Super gasoline must be Ingredient 1. Due to current contract commitments, Raptor Fuels must produce at least 20,000 gallons of Regular, at least 15,000 gallons of Premium, and at least 10,000 gallons of Super. Formulate a linear program that could be used to determine how much of Crude A and Crude B should be used in each of the gasolines to meet the demands at the minimum cost. What is the minimum cost? How much of Crude A and Crude B are used in each gallon of the different types of gasoline?



### Internet Homework Problems

See our Internet home page, at [www.pearsonhighered.com/render](http://www.pearsonhighered.com/render), for additional homework problems, Problems 7-46 to 7-50.

## Case Study

### Mexicana Wire Works



Ron Garcia felt good about his first week as a management trainee at Mexicana Wire Winding, Inc. He had not yet developed any technical knowledge about the manufacturing process, but he had toured the entire facility, located in the suburbs of Mexico City, and had met many people in various areas of the operation.

Mexicana, a subsidiary of Westover Wire Works, a Texas firm, is a medium-sized producer of wire windings used in making electrical transformers. Carlos Alvarez, the production control manager, described the windings to Garcia as being of standardized design. Garcia's tour of the plant, laid out by process type (see Figure 7.20), followed the manufacturing sequence for the windings: drawing, extrusion, winding, inspection, and packaging. After inspection, good product is packaged and sent to finished product storage; defective product is stored separately until it can be reworked.

On March 8, Vivian Espania, Mexicana's general manager, stopped by Garcia's office and asked him to attend a staff meeting at 1:00 P.M.

"Let's get started with the business at hand," Vivian said, opening the meeting. "You all have met Ron Garcia, our new

management trainee. Ron studied operations management in his MBA program in southern California, so I think he is competent to help us with a problem we have been discussing for a long time without resolution. I'm sure that each of you on my staff will give Ron your full cooperation."

Vivian turned to José Arroyo, production control manager. "José, why don't you describe the problem we are facing?"

"Well," José said, "business is very good right now. We are booking more orders than we can fill. We will have some new equipment on line within the next several months, which will take care of our capacity problems, but that won't help us in April. I have located some retired employees who used to work in the drawing department, and I am planning to bring them in as temporary employees in April to increase capacity there. Because we are planning to refinance some of our long-term debt, Vivian wants our profits to look as good as possible in April. I'm having a hard time figuring out which orders to run and which to back order so that I can make the bottom line look as good as possible. Can you help me with this?"

Garcia was surprised and apprehensive to receive such an important, high-profile assignment so early in his career.