

USE THE SIMPLEX METHOD TO SOLVE EACH PROBLEM!

1. **Maximizing Profit** Kelly's Famous Toy Trucks specializes in making four kinds of toy trucks: a delivery truck, a dump truck, a garbage truck, and a gasoline truck. Three machines – a metal casting machine, a paint spray machine, and a packaging machine – are used in the production of these trucks. The delivery truck requires 2 hours in metal casting, 1 hour being paint sprayed, and a half-hour being packaged. The dump truck requires 2.5 hours, 1.5 hours, and a 0.5 hour at the same three machines. The garbage truck and the gasoline truck need 2, 1, 1 and 2, 2, 1 hours respectively. The maximum time available for the metal casting machine is 4000 hours, while the paint spraying and packaging machines are available 1800 and 1000 hours, respectively. The profit for each truck is: delivery, \$0.50; dump, \$1.00; garbage, \$1.50; gasoline, \$2.00. How many of each type truck should be produced to **maximize** profit? Assume that every truck is sold.

2. **Shipping Schedule** An auto manufacturer sends cars from two plants, I and II, to dealerships A and B located in a Midwestern city. Plant I has a total of 28 cars to send, and plant II has 8. Dealer A needs 20 cars and dealer B needs 16. Transportation costs per car, based on the distance of each dealership from each plant, are \$220 from I to A, \$300 from I to B, \$400 from II to A, \$180 from II to B. How many cars should be sent from each plant to each of the two dealerships if the manufacturer wants to **minimize** the cost? What is the minimum cost?

3. **Minimizing Materials** Quality Oak Tables, Inc., has an individual who does all its finishing work, and it wishes to use him in this capacity at least 6 hours a day. The assembly area can be used at most 8 hours each day. The company has three models of oak tables: T1, T2, and T3. The T1 model requires 1 hour assembly, 2 hours for finishing, and 9 board feet of oak. T2 requires 1 hour assembly, 1 hour for finishing, and 9 board feet of oak. T3 requires 2 hours for assembly, 1 hour for finishing, and 3 board feet of oak. If we wish to minimize the board feet of oak used, how many of each model should be made?

4. **Shipping Schedule** A furniture manufacturer must fill orders from two retailers. The first retailer, R1, has ordered 55 rocking chairs, while the second retailer, R2, has ordered 75 rocking chairs. The manufacturer has the rocking chairs stored in two warehouses, W1 and W2. There are 100 rocking chairs in W1 and 120 in W2. The shipping costs per chair are: \$8 from W1 to R1; \$12 from W1 to R2; \$13 from W2 to R1; \$7 from W2 to R2. Find the number of rocking chairs to be shipped from each warehouse to each retailer if the total shipping cost is to be a minimum. What is the minimum cost?