

Exercise 1.2.

A furniture manufacturing company wishes to determine how many tables, chairs, desks, and bookcases it should make to optimize the use of its available resources. These products utilize two different types of lumber, and the company has on hand 1500 board-feet of the first type and 1000 board-feet of the second type. There are 800 labor-hours available for the job. Sales forecasts plus back orders require the company to make at least 40 tables, 130 chairs, 30 desks, and no more than 10 bookcases. Each table, chair, desk, and bookcase requires 5; 1; 9, and 12 board-feet, respectively, of the first type of lumber and 2; 3; 4, and 1 board-feet of the second type. A table requires 3 labor-hours to make, a chair 2 hours, a desk 5 hours, and a bookcase 10 hours. The company makes a total of \$12 profit on a table, \$5 on a chair, \$15 on a desk, and \$10 on a bookcase. Write out the linear programming model of this problem in terms of maximizing profit. Modify the problem to impose that four chairs be made for every table.