

**For problems 1-6, complete each of the following items:**

- a. Define the variables**
- b. Write a system of inequalities**
- c. Graph the inequalities**
- d. Write the profit function**
- e. Find the best solution for the function**

1. A travel agent is organizing a trip for a local ski club. She can make arrangements for a maximum of 10 people, and there must be at least 4 men and 3 women in the group. Her profit is \$12.25 for each woman and \$15.40 for each man. How many men and how many women will give her the maximum profit? What is the maximum profit?

2. A carpentry shop makes dinner tables and coffee tables. Each week the shop must complete at least 9 dinner tables and 13 coffee tables to be shipped to furniture stores. The shop can produce at most 30 dinner tables and coffee tables combined each week. If the shop sells dinner tables for \$120 and coffee tables for \$150, how many of each item should be produced for a maximum weekly income? What is the maximum weekly income?

Topic 3.5 and 3.6  
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3. Mr. Beauregard raises only pigs and goats, and this year he intends to raise 16 animals. There is plenty of room in the pigpen, but a lack of space limits the number of goats to 12. One other limitation is money: it costs \$5/day to raise a pig and \$2/day to raise a goat, and Mr. Beauregard can spend only \$50/day on the animals. If Mr. Beauregard can make a profit of \$17.50 per goat and \$14.00 per pig, how many of each should he raise to maximize his profit? What is his maximum profit?

4. Wally's woodworking shop produces 2 sizes of bookcases: large and small. Each week, his staff must produce at least 23 large bookcases and 40 small bookcases to meet demand. The combined total is limited to 75 bookcases because of a shortage of materials. The cost to produce a small bookcase is \$72, while the cost to produce a large bookcase is \$104. If the selling price for the small size is \$125 and the selling price for the large size is \$159, how many of each type should Wally produce each week to maximize his profit? What is his maximum profit?

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5. A shoe manufacturer makes outdoor and indoor soccer shoes. There is a two-step manufacturing process for both kinds of shoes. Each pair of outdoor shoes requires 2 hours of processing in step one and 1 hour in step two. Indoor shoes require 1 hour of processing in step one, and 3 hours in step two. The company has only 40 hours of labor available for step one and 60 hours available for step two. Also, outdoor shoes make a profit of \$20 per pair and indoor shoes make a profit of \$15 per pair. How many pairs of each shoe should be made to maximize profit? What is the maximum profit?

6. In Santa Fe, an Indian Cultural Center makes woven blankets and shirts. Each blanket requires 24 hours for spinning the yarn, 4 hours for dyeing, and 15 hours for weaving. Shirts require 12 hours for spinning, 3 hours for dyeing, and 9 hours for weaving. There are 216, 44 and 147 hours available for spinning dyeing, and weaving respectively. The cost to make each blanket is \$73 and its selling price is \$105. The cost to make each shirt is \$29 and its selling price is \$47. How many of each item should be made to maximize profit? What is the maximum profit?