PRE CALCULUS 11
LINEAR PROGRAMING WORKSHEET

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?

3. 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?

4. 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?

5. Farmer Jones is going to plant a combination of corn and tomatoes on 20 acres of land. Corn seed costs $255 per acre and tomato seed costs $320 per acre. A local restriction limits corn production to 15 acres. Furthermore, corn requires 15 hours of labor per acre at $6.20 per hour, while tomatoes will require 12 hours of labor per acre at $7.00 per hour. If the expected income is $725 per acre for corn and $810 per acre for tomatoes, how should the 20 acres be planted to earn the maximum profit? What is the maximum profit?

6. Company ABC makes 2 models of door handles, plain and decorative, each of which must be assembled and packaged. The plain handles require 12 minutes to assemble and 2 minutes to package, while the decorative handles require 18 minutes to assemble but only one minute to package. Each week there are 240 available hours of assembly time and 20 available hours for packaging. If the plain handles sell for $2.20 and the decorative handles sell for $3.50, how many of each type should be made to obtain the maximum weekly income? What is the maximum weekly income?

7. 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 3 hours for weaving. There are 216, 44, and 120 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?

8. The Balfour Tool Company uses 3 machines to manufacture 2 models of power drill, standard and super. The standard drill requires 1 hour on machine A, 2 hours on machine B, and 1.6 hours on machine C. The super drill requires 2 hours on machine A, 1 hour on machine B and 1.6 hours on machine C. Each machine can be used for at most 40 hours per week. If the profit on each standard drill is $7.45 and the profit on each super drill is $8.95, how many of each type should be made each week to maximize profit? What is the maximum profit?

9. Ernesto is about to take a history test consisting of matching questions worth 10 points each and essay questions worth 25 points each. He is required to do at least 3 matching questions, but time restricts doing more than 12. Similarly, he must do at least 4 essays, but time restricts doing more than 15. If Ernesto is required to answer a total of 20 questions, how many of each type should he answer to maximize his score? What is the maximum score?

10. It takes a tailoring company 2 hours of cutting and 4 hours of sewing to make a casual suit. To make a formal suit, it takes 4 hours of cutting and 2 hours of sewing. At most 20 hours per day are available for cutting and at most 16 hours per day are available for sewing. If the profit on a casual suit is $47 and the profit on a formal suit is $61, how many of each type of suit should be made daily to maximize profit? What is the maximum daily profit?

11. Mr. Davidoff owns a car and a motorcycle. He has at most 12 gallons of gasoline to be used between the car and the motorcycle. The car's tank holds 10 gallons and the motorcycle's tank most 3 gallons. If the mileage for the car is 27 mpg and the motorcycle mileage is 98 mpg, how many gallons of gas should each vehicle use if Mr. Davidoff wants to travel as far as possible? What is the maximum number of miles?

12. Anna's farm contains 240 acres available for the planting of corn or oats. Profit per acre in corn production is $40 and in oats, $32. The total number of hours of labor available during the production period is 320. Each acre of land in corn production uses 2 hours of labor while production of oats requires 1 hour of labor per acre. How should the land be divided between corn and oats in order to give maximum profit? What is the maximum profit?

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Answer List

1. 3 women, 7 men; $144.55

2. 9 dinner tables, 21 coffee tables; $4230

3. 35 large, 40 small; $4045

4. 4 pigs, 12 goats; $266

5. 20 acres of tomatoes; $8120

6. 800 decorative handles; $2800

7. 5 blankets, 8 shirts; $304

8. 10 standard, 15 super; $208.75

9. 5 matching, 15 essays; 425 points

10. 2 casual, 4 formal; $338

11. 9 gal in car, 3 gal in motorcycle; 537 miles

12. 80 acres corn, 160 acres oats; $8320

Catalog List

1. TRI FF 1

2. TRI FF 3

3. TRI FF 5

4. TRI FF 7

5. TRI FF 9

6. TRI FF 11

7. TRI FF 13

8. TRI FF 15

9. TRI FF 17

10. TRI FF 19

11. TRI FF 21

12. TRI FF 23