

Gifted & High Ability: Groups 1 and 2

Linear Programming Group 1

A travel agent is organizing 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?

<u>Objective Function</u>	<u>Variables</u>	<u>Constraints</u>
_____	x = _____	_____
	y = _____	_____

Linear Programming Group 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?

<u>Objective Function</u>	<u>Variables</u>	<u>Constraints</u>
_____	x = _____	_____
	y = _____	_____

Linear Programming Group 3

A theater contains 500 seats. For an upcoming talent show, the theater manager plans to sell \$4 and \$5 tickets. He must sell at least 200 \$4 tickets and 100 \$5 tickets for the show to be produced, and he must bring in at least \$2000 to break even. How many tickets at each price should be sold to maximize income? What is the maximum income?

<u>Objective Function</u>	<u>Variables</u>	<u>Constraints</u>
? _____?	x = # \$4 tickets	? _____ ?
	y = # \$5 tickets	y ≥ 100
		? _____ ?
		4x + 5y ≥ 2000

Linear Programming Group 4

Mrs. Smith grows peaches and apples. At least 500 peaches and 700 apples must be picked daily to meet minimum demands from the buyers. The workers can pick no more than 1200 apples and 1400 peaches daily. The combined number of peaches and apples that the packaging department can handle is 2300 per day. If Mrs. Smith sells her apples at \$.25 each and peaches at \$.20 each, how many of each should be picked daily for maximum income? What is her maximum income?

<u>Objective Function</u>	<u>Variables</u>	<u>Constraints</u>
? _____?	x = # peaches	x ≥ 500 , _____
	y = # apples	y ≥ 700 , _____
		? _____ ?

Linear Programming Group 5

Mr. Benson 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 numbers 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. Benson can spend only \$50/day on the animals. If Mr. Benson can make a profit of \$17.50 per goat and \$14 per pig, how many of each should he raise to maximize his profit? What is his maximum profit?

<u>Objective Function</u>	<u>Variables</u>	<u>Constraints</u>
? _____ ?	x = # pigs	? _____ ?
	y = # goats	y ≤ 12
		? _____ ?
		5x + 2y ≤ 50

Linear Programming Group 6

A machine can produce either nuts or bolts, but not both at the same time. The machine can be used at most 8 hours a day. Furthermore, at most 6 hours a day can be used for making nuts and at most 5 hours a day can be used for making bolts. There is a \$2 profit for each hour the machine makes nuts and a \$3 profit for each hour the machine makes bolts. How many hours per day should the machine make each item in order to maximize profit? What is the maximum profit?

<u>Objective Function</u>	<u>Variables</u>	<u>Constraints</u>
? _____ ?	x = nut hours	y ≤ 5
	y = bolt hours	x ≤ 6
		? _____ ?

Linear Programming Group 7

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 him from doing more than 12. Similarly, he must do at least 4 essays, but time restricts him from 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?

<u>Objective Function</u>	<u>Variables</u>	<u>Constraints</u>
? _____ ?	x = matching	x ≥ 3 , x ≤ 12
	y = essay	y ≥ 4 , y ≤ 15
		? _____ ?