

141 Lecture Notes for Section 3.2

Linear Programming Problems

Objective Function: The function being optimized (minimized or maximized)

Linear Programming Problems: problems which use objective functions and restraints ($\leq, \geq, <, >, \dots$)

Example...(#4 pg. 185):

Madison Finance has a total of \$20 million earmarked for homeowner and auto loans. On the average, homeowner loans have a 10 percent annual rate of return, whereas auto loans yield a 12 percent annual rate of return. Management has also stipulated that the total amount of homeowner loans should be greater than or equal to four times the total amount of automobile loans. Determine the total amount of loans of each type Madison should extend to each category in order to maximize its returns.

Example...(#32 pg. 198):

Bata Aerobics manufactures two models of steppers used for aerobic exercises. To manufacture each luxury model requires 10 lb of plastic and 10 min of labor. To manufacture each standard model requires 16 lb of plastic and 8 min of labor. The profit for each luxury models is \$40, and the profit for each standard model is \$30. If 6000 lb of plastic and 60 labor-hours are available for the production of the steppers per day, how many steppers of each model should Bata produce each day in order to maximize its profits? What is the optimal profit?

Mark is trying to allocate his study time this weekend. He can spend time working with either his math tutor or his accounting tutor to prepare for exams in both classes the following Monday. His math tutor charges \$35/hour and his accounting tutor charges \$20/hour. He has \$190 to spend on tutoring. Each hour that he spends working with his math tutor requires 3 aspirin and 2 hours of sleep to recover, while each hour he spends with his accounting tutor requires 1 aspirin and 4 hours of sleep. He only has 16 aspirin left, and he can only afford 12 hours of sleep this weekend. He expects that each hour with his math tutor will increase his score on the math exam by 8 points, while each hour spent with the accounting tutor will increase his score on the accounting exam by 5 points. JUST SET UP the linear programming problem showing how many hours he should spend with each tutor in order to maximize the number of points he will get on the two tests combined?