MATH 1310 Matrices for Management and Social Sciences

Assignment 2

[16] 1. Use the corner point method to solve the following linear programming problems.

(a) Find the maximum value of $M = x + 4y$ subject to the following constraints.

$$x \geq 0, \ y \geq 0, \ x + y \geq 4, \ x + 2y \leq 16, \ 3x + y \leq 18.$$

(b) Find the minimum value of $m = 2y - 3x$ subject to the following constraints.

$$x \geq 0, \ y \geq 0, \ x + y \geq 2, \ x + y \leq 6, \ 2x + y \leq 8.$$

[14] 2. The Aqua Marine Company manufactures two types of water craft: canoes and kayaks. The manufacturing of each canoe requires 7 hours in the carpentry shop and 3 hours in the finishing shop. The manufacturing of each kayak requires 5 hours in the carpentry shop and 4 hours in the finishing shop. Each month the company has available 800 hours in the carpentry shop and 600 hours in the finishing shop. The profit on the sale of each canoe is $100 and the profit on the sale of each kayak is $125.

(a) Let x = the number of canoes manufactured each month, y = the number of kayaks manufactured each month and P = monthly profit. Assuming that all craft manufactured in a month can be sold, write out the function giving the monthly profit.

(b) Write out all constraints described or implied in the statement of the problem.

(c) Construct the initial simplex tableau used to maximize the monthly profit P. [Do **not** attempt to solve this problem to find the maximum monthly profit P.]

[20] 3. Use the simplex method to find the maximum value of $p = 2x + 3y + 4z$ subject to the constraints:

$$x + y + z \ \leq \ 30, \ \ 2x + y + 3z \ \leq \ 60, \ \ 3x + 2y + 4z \ \leq \ 84, \ \ x \geq 0, \ \ y \geq 0, \ \ z \geq 0.$$