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 $Z = 20x + 30y$ subject to the following constraints:

$-x + 2y \le 40, \quad x + 4y \ge 54, \quad 3x + y \le 63, \quad x \ge 0, \quad y \ge 0$

(b) Find the minimum value of $Z = 5x + 3y$ subject to the following constraints:

$3x + y \ge 30, \quad 4x + 3y \ge 60, \quad x + 2y \ge 20, \quad x \ge 0, \quad y \ge 0$

[14] 2. A market gardener has 100 acres of land that he wishes to use to grow corn and/or potatoes. He has 250 pounds of fertilizer and 200 litres of liquid pesticide available. Each acre of corn planted requires 3 pounds of fertilizer and 1 litre of pesticide while each acre of potatoes planted requires 2 pounds of fertilizer and 3 litres of pesticide. If the revenue for each acre of corn grown is $80 and the revenue for each acre of potatoes grown is $75, find the number of acres of each crop that should be planted to maximize the revenue. Use the corner point method to solve this problem.

[20] 3. Use the simplex algorithm to find the maximum value of $p = 5x + 3y + 8z$ subject to the constraints:

$x + 3y + 2z \le 240, \quad 2x + y + 3z \le 60, \quad 3x + 2y + 4z \le 84, \quad x \ge 0, \quad y \ge 0, \quad z \ge 0.$