MATH 1310 Assignment 2

[20]   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:
$-x + 2y \leq 40$, $\quad x + 4y \geq 54$, $\quad 3x + y \leq 63$, $\quad x \geq 0$, $\quad y \geq 0$

(b) Find the minimum value of $Z = 5x + 3y$ subject to the following constraints:
$3x + y \geq 30$, $\quad 4x + 3y \geq 60$, $\quad x + 2y \geq 20$, $\quad x \geq 0$, $\quad y \geq 0$

[10]   2. A trucker is asked to deliver 2 kinds of desks to a furniture store. The standard desk weighs 50 kilos and the deluxe desk weighs 75 kilos. The truck has a capacity of at most 30 desks. In addition, weight restrictions only allow for the truck to carry at most 1800 kilos. If the trucker receives $15 for each standard desk and $20 for each deluxe desk that he delivers, how many desks of each type should he carry in order to maximize his income?

[15]   3. Use the simplex method to maximize p = 5x + 4y + 3z subject to the constraints:

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

[15]   4. Use the simplex method to find the maximum value of p = 10x + 5y + 12z subject to   the constraints.
$x + 3y + 2z \leq 60$, $\quad 2x + y + 3z \leq 60$, $\quad 2x + y + 2z \leq 42$, $\quad x \geq 0$, $\quad y \geq 0$, $\quad z \geq 0$.