Homework for Lecture 11 (Due March 7, 2019) of Linear Optiomization (Math 354), Spring 2019 (Dr. Z.)

Corrected version thanks to Amber Rawson (who won a dollar). [The previous version of problem 2 did not need the big M-method].

1. Solve the following linear programming problem, using the big M method. (No credit for using the graphical, or any other method). Explain everything.

Maximize $x_1 + 5x_2$, subject to the restrictions

$$x_1 + 2x_2 = 3 \quad , \quad 2x_1 - x_2 = 1 \quad , \quad x_1 \geq 0 \quad , \quad x_2 \geq 0 \quad .$$

2. Solve the following linear programming problem, using the bit M method. (No credit for using the graphical, or any other method). Explain everything.

Minimize $x_1 + 3\,x_2$, subject to the restrictions

$$x_1 + 2\,x_2 \geq 6 \quad , \quad 2x_1 + x_2 \geq 6 \quad , \quad x_1 \geq 0 \quad , \quad x_2 \geq 0 \quad .$$

3. Solve the following linear programming problem, using the big M method. (No credit for using the graphical, or any other method). Explain everything.

Maximize $z = x_1 + 10\,x_2$, subject to the restrictions

$$x_1 + x_2 \geq 3 \quad , \quad x_1 + 4\,x_2 \leq 6 \quad , \quad x_1 \geq 0 \quad , \quad x_2 \geq 0 \quad .$$

Ans. 1. $(x_1, x_2) = (1, 1)$, optimal value= 6 ;

2.**(Corrected March 5, 2019, thanks to Madara Dias, who won 5 dollars)** $(x_1, x_2) = (6, 0)$, optimal value= 6 ;

3. $(x_1, x_2) = (2, 1)$, optimal value= 12 .