Name: _____

MATH 108
Fall 2021
HW 7: Due 11/04

"I like long walks, especially when they are taken by people that annoy me."
–Fred Allen

Problem 1. (10pt) Write down the tableau associated to the following linear programming problem:

$$\begin{aligned} \max z = 3x_1 + x_2 \\ 2x_1 + 3x_2 \leq 6 \\ 4x_1 + 2x_2 \leq 8 \\ -3x_1 + 4x_2 \geq 2 \\ x_1, x_2 \geq 0 \end{aligned}$$

Problem 2. (10pt) Assume the following is a tableau associated to a standard maximization problem. Write down the function being maximization and the system of constraints.

$$\begin{array}{cccccc|c} 1 & 2 & 1 & 1 & 0 & 0 & 100 \\ 2 & 8 & 2 & 0 & 1 & 0 & 150 \\ 1 & 1 & 1 & 0 & 0 & 1 & 200 \\ \hline -5 & -4 & -5 & 0 & 0 & 0 & 0 \end{array}$$

Problem 3. (10pt) Solve the following linear programming problem:

$$\begin{aligned} \max z = x_1 + 6x_2 + 3x_3 \\ x_1 + x_2 + 2x_3 \leq 4 \\ x_1 + 2x_2 + x_3 \leq 4 \\ x_1, x_2, x_3 \geq 0 \end{aligned}$$

Problem 4. (10pt) Find the dual problem to...

$$\begin{aligned} \min z = 5x_1 + 4x_2 \\ x_1 + 7x_2 \geq 7 \\ x_1 + 3x_2 \geq 9 \\ x_1, x_2 \geq 0 \end{aligned}$$

Problem 5. (10pt) Solve the following linear programming problem:

$$\begin{aligned} \min\ z &= 2x_1 + 3x_2 \\ 2x_1 + x_2 &\geq 1 \\ x_1 + 3x_2 &\geq 1 \\ x_1, x_2 &\geq 0 \end{aligned}$$