

Name: \_\_\_\_\_

MATH 108

Fall 2022

HW 18: Due 12/08

*“Linear programming can be viewed as part of a great revolutionary development which has given mankind the ability to state general goals and to lay out a path of detailed decisions to take in order to ‘best’ achieve its goals when faced with practical situations of great complexity.”*

– George Dantzig

**Problem 1.** (10pt) Write down the initial simplex tableau for the following optimization problem:

$$\max z = 4.6x_1 + 3.1x_2 + 7.9x_3$$

$$5.5x_1 - 6x_2 + 1.1x_3 \leq 110.3$$

$$-6.7x_1 - 8.3x_3 \leq 220.1$$

$$x_1 - 7.7x_2 + 4.5x_3 \leq 662.0$$

$$x_1, x_2, x_3 \geq 0$$

**Problem 2.** (10pt) Suppose that the initial simplex tableau below was associated to a standard maximization problem. Write down the function being maximized and the corresponding system of constraints.

2	-1	4	1	0	0		100
6	0	2	0	1	0		80
-4	8	3	0	0	1		220
-3	-1	-5	0	0	0		0

**Problem 3.** (10pt) Suppose that the final simplex tableau associated to a maximization problem was the following:

1	1.1	2	0	0	0.22	0.067	-0.011	0	140
0	2.1	1.5	1	0	-0.021	0.23	-0.037	0	85
0	-1.1	-0.59	0	1	0.008	-0.088	0.16	0	42
0	-6.4	-12	0	0	-0.55	-0.45	0.54	1	270
0	2.3	2.3	0	0	0.2	0.59	0.72	0	760

- (a) How many inequalities were considered?
- (b) How many variables were there in the original inequalities?
- (c) How many slack/surplus variables were introduced?
- (d) What was the solution to this maximization problem?