Name: _____

MATH 108

Fall 2022

HW 20: Due 12/13

We should forget about small efficiencies, say about 97% of the time: premature optimization is the root of all evil.

−Donald Knuth

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

$$\min z = 5.3x_1 - 3.4x_2 + 6.8x_3 + 8.1x_4$$
$$1.1x_1 - 2.2x_2 + 3.3x_3 - 4.4x_4 \geq 15.6$$
$$8.4x_1 + 5.9x_2 + 17.8x_4 \geq 78.4$$
$$9.9x_1 - x_1 + 6.7x_3 \geq 100.5$$
$$x_1, x_2, x_3, x_4 \geq 0$$

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Problem 2. (10pt) Find the dual problem for the following minimization problem:

$$\min z = 5x_1 + 4x_2$$
$$x_1 + x_2 \geq 4$$
$$x_1 + 7x_2 \geq 8$$
$$x_1 + 5x_2 \geq 9$$
$$x_1, x_2 \geq 0$$

Problem 3. (10pt) Write down the initial simplex tableau for the following optimization problem:

$$\max z = 2x_1 + x_2 - 3x_3$$
$$x_1 + 2x_2 + 3x_3 \leq 90$$
$$x_1 + x_2 \geq 10$$
$$x_1 - x_2 - x_3 \leq -20$$
$$x_1, x_2, x_3 \geq 0$$