Linear Optimization (Spring 2023): Homework 2

- The total points (given in parentheses) add up to 125. You will be graded for 120 points (with the possibility of getting up to 5 points as extra credit).

- BT-ILO stands for the text (Bertsimas and Tsitsiklis: Introduction to Linear Optimization).

- **You must email your submission as a PDF file to kbala@wsu.edu**. You are welcome to write answers by hand, and scan the writings **into a PDF file**.

- **Your file name should identify you in this manner. If you are Liane Cartman, you should name your submission LianeCartman_Hw2.pdf. If you want to add more bits to the title, e.g., Math464, you could name it LianeCartman_Math464_Hw2.pdf, for instance. But you should start the file name with LianeCartman; NOT "Liane Cartman" or "Liane_Cartman" or ...**

- **Begin the SUBJECT of your email submission with the same `FirstnameLastname`, e.g., "LianeCartman Hw2 submission".**

- **This homework is due by 4:59 PM on Thursday, January 26**.

1. (20)   Convert the following LP to standard form.

$$\begin{aligned}
\min \quad & 3x_1 + x_3 \\
\text{s.t.} \quad & x_2 - 4x_3 && \geq && 4 \\
& x_1 + 5x_2 && \leq && 2 + x_3 \\
& x_1 \geq 0, x_2 \leq 0
\end{aligned}$$

When presenting LP formulations, make sure you

- clearly specify/declare **all** decision variables (for instance, "let x_1 = process 1" will not get you full credit; you want to say " let x_1 = # hours of process 1" instead);

- clearly specify the objective function (do not forget the max/min), and constraints, **along with the brief interpretations in parentheses**; and

- clearly specify any sign restrictions, along with the **interpretations for the same**, e.g., "(nonnegativity)".

Also, it is **not** necessary to write the formulations in standard form.

2. (20)   BT-ILO Problem 1.14 (a) from Page 36–37.

3. (25)   BT-ILO Problem 1.15 (a) from Page 37.

4. (25)   BT-ILO Problem 1.16 from Page 37–38.

5. (35)   BT-ILO Problem 1.9 from Page 35.