Math 4630/5630

HOMEWORK 3
(due Wednesday, March 22)

(1) Consider the following Linear Programming Problem

$$\begin{aligned}
\max \quad & x_1 + x_2 \\
\text{s. t.} \quad & x_1 && \leq 5 \\
& x_1 + x_2 && \leq 6 \\
& -\frac{1}{2}x_1 + x_2 && \leq 6 \\
& x_1, x_2 && \geq 0
\end{aligned}$$

Solve it by the Simplex Method (choose x_1 as entering variable in the first tableau). How many optimal solutions are there? How does this reflect in the final simplex tableau? How can you iterate to another optimal basic solution (do it!)?

(2) Apply the Simplex Method to the following problem:

$$\begin{aligned}
\max \quad & 2x_1 + 3x_2 - x_3 \\
\text{s. t.} \quad & 2x_1 + 2x_2 - x_3 && \leq 10 \\
& 3x_1 - 2x_2 + x_3 && \leq 10 \\
& x_1 - 3x_2 + x_3 && \leq 10 \\
& x_1, x_2, x_3 && \geq 0
\end{aligned}$$

What is your conclusion about the linear program? Use the final tableau to construct a feasible solution with an objective function value of at least 1717.