§4.12: The Big M Method

1.] Consider the following LP:

$$\begin{aligned} \text{Minimize:} \quad & z = 4x_1 + x_2 \\ \text{Subject to:} \quad & 3x_1 + x_2 = 3 \\ & 4x_1 + 3x_2 \geq 6 \\ & x_1 + 2x_2 \leq 4 \\ & x_1, x_2 \geq 0 \end{aligned}$$

a.) Convert this LP to standard form with additional artificial variables.

b.) Construct the initial tableau.

Row	Basic		RHS
0	z		
1			
2			
3			

c.) Choose an appropriate value for M and eliminate the artificial variables from Row 0 by redefining the objective function in terms of the original decision and slack/excess variables. Then, construct the initial tableau again.

Row	Basic		RHS
0	z		
1			
2			
3			

2.] Consider the following LP:

$$\begin{aligned} \text{Minimize:} \quad & z = 4x_1 + 4x_2 + x_3 \\ \text{Subject to:} \quad & x_1 + x_2 \quad + x_3 \leq 2 \\ & 2x_1 + x_2 \qquad\quad \leq 3 \\ & 2x_1 + x_2 + 3x_3 \geq 3 \\ & x_1, x_2, x_3 \geq 0 \end{aligned}$$

a.) Rewrite the problem using the Big M Method. Eliminate all artificial variables from the objective function.

b.) Choose an appropriate value for M and solve the LP.

Row	Basic		RHS
0	z		
1			
2			
3			

Row	Basic		RHS
0'	z		
1'			
2'			
3'			