# MATH 354 HW#17 Section 3.4 #2, 4

(2) Tableau #1

| | | | 5 $X_1$ | 6 $X_2$ | 0 $X_3$ | 0 $X_4$ | 0 $X_5$ | 0 $X_6$ | $\bar{X}_{B_0}$ | |
|---|---|---|---|---|---|---|---|---|---|---|
| | $\bar{C}_{B_0}$ | | | | | | ↓ | | | $X_6 = -1/3$ |
| | 5 | $X_1$ | 1 | 0 | 0 | −1 | 1 | 0 | 4 | so |
| | 6 | $X_2$ | 0 | 1 | 0 | 1 | $-2/3$ | 0 | $10/3$ | Not |
| | 0 | $X_3$ | 0 | 0 | 1 | 7 | −8 | 0 | 2 | feasible |
| ← | 0 | $X_6$ | 0 | 0 | 0 | 0 | $(-1/3)$ | 1 | $-1/3$ | ↙ |
| | | | 0 | 0 | 0 | 1 | 1 | 0 | 40 | |

$$B_1 = \begin{bmatrix} 1 & 0 & 0 & 1 \\ 0 & 1 & 0 & -2/3 \\ 0 & 0 & 1 & -8 \\ 0 & 0 & 0 & -1/3 \end{bmatrix} \qquad B_1^{-1} = \begin{bmatrix} 1 & 0 & 0 & 3 \\ 0 & 1 & 0 & -2 \\ 0 & 0 & 1 & -24 \\ 0 & 0 & 0 & -3 \end{bmatrix}$$

$$\bar{t}_5 = B_1^{-1} t_5 = \begin{bmatrix} 1 & 0 & 0 & 3 \\ 0 & 1 & 0 & -2 \\ 0 & 0 & 1 & -24 \\ 0 & 0 & 0 & -3 \end{bmatrix} \begin{bmatrix} -1 \\ -2/3 \\ -8 \\ -1/3 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \\ 1 \end{bmatrix} \quad \text{etc}$$

$$\bar{X}_{B_1} = B_1^{-1} \bar{X}_{B_0} = \begin{bmatrix} 1 & 0 & 0 & 3 \\ 0 & 1 & 0 & -2 \\ 0 & 0 & 1 & -24 \\ 0 & 0 & 0 & -3 \end{bmatrix} \begin{bmatrix} 4 \\ 10/3 \\ 2 \\ -1/3 \end{bmatrix} = \begin{bmatrix} 3 \\ 4 \\ 10 \\ 1 \end{bmatrix}$$

Tableau #2

| | | | 5 $X_1$ | 6 $X_2$ | 0 $X_3$ | 0 $X_4$ | 0 $X_5$ | 0 $X_6$ | $\bar{X}_{B_1}$ | |
|---|---|---|---|---|---|---|---|---|---|---|
| | $\bar{C}_{B_1}$ | | | | | | | | | |
| | 5 | $X_1$ | 1 | 0 | 0 | −1 | 0 | 3 | 3 | feasible |
| | 6 | $X_2$ | 0 | 1 | 0 | 1 | 0 | −2 | 4 | |
| | 0 | $X_3$ | 0 | 0 | 1 | 7 | 0 | −24 | 10 | |
| | 0 | $X_5$ | 0 | 0 | 0 | 0 | 1 | −3 | 1 | |
| | | | 0 | 0 | 0 | 1 | 0 | 3 | 39 | |

we have a feasible optimal solution

$X_1 = 3,\ X_2 = 4,\ X_3 = 10,\ X_4 = 0,\ X_5 = 1,\ X_6 = 0$

$\underline{X_0 = [3\ 6\ 10\ 0\ 1\ 0]^T,\ Z = 39}$

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| | | 5 | 6 | 0 | 0 | 0 | 0 | | |
|---|---|---|---|---|---|---|---|---|---|
| $C_B$ | | $X_1$ | $X_2$ | $X_3$ | $X_4$ | $X_5$ | $X_6$ | $X_B$ | |
| 5 | $X_1$ | 1 | 0 | 0 | 0 | 1 | 0 | 4 | $X_6 \geq 0$ so not feasible |
| 6 | $X_2$ | 0 | 1 | 0 | $1/3$ | $-2/3$ | 0 | $10/3$ | |
| 0 | $X_3$ | 0 | 0 | 1 | $-1$ | $-8$ | 0 | 2 | |
| ← 0 | $X_6$ | 0 | 0 | 0 | $1/3$ | $2/3$ | 1 | $-1/3$ | ↙ |
| | | 0 | 0 | 0 | 2 | 1 | 0 | 40 | |

Choose $X_6$ as the departing variable However, there are no negative entries in the pivotal row. Therefore, there are no feasible solutions to the problem.