§6.2 (PART 1): SOME IMPORTANT FORMULAS

1.] REDDY MIKKS COMPANY: Recall the Reddy Mikks company once again (Worksheet 4.5 Part 1). Below the LP is in standard form along with its optimal tableau.

Maximize: $z = 5x_1 + 4x_2$

Subject to:
$$\begin{aligned}
6x_1 + 4x_2 + s_1 &= 24\\
x_1 + 2x_2 + s_2 &= 6\\
-x_1 + x_2 + s_3 &= 1\\
x_2 + s_4 &= 2\\
x_1, x_2, s_1, s_2, s_3, s_4 &\geq 0
\end{aligned}$$

Row	Basic	z	x_1	x_2	s_1	s_2	s_3	s_4	RHS
0	z	1	0	0	$\frac{3}{4}$	$\frac{1}{2}$	0	0	21
1	x_1	0	1	0	$\frac{1}{4}$	$-\frac{1}{2}$	0	0	3
2	x_2	0	0	1	$-\frac{1}{8}$	$\frac{3}{4}$	0	0	$\frac{3}{2}$
3	s_3	0	0	0	$\frac{9}{24}$	$-\frac{5}{4}$	1	0	$\frac{5}{2}$
4	s_4	0	0	0	$\frac{1}{8}$	$-\frac{3}{4}$	0	1	$\frac{1}{2}$

Write down the matrix A and the vectors $\boldsymbol{x}$, $\boldsymbol{c}$, and $\boldsymbol{b}$. Construct the vectors $\boldsymbol{x}_{BV}$, $\boldsymbol{x}_{NBV}$, $\boldsymbol{c}_{BV}$, $\boldsymbol{c}_{NBV}$ and the matrices B and N using the set of basic variables that yield the optimal solution. Write the system in the alternative form.

2.] Find B^{-1} and confirm that $\boldsymbol{x}_{BV} + B^{-1}N\boldsymbol{x}_{NBV} = B^{-1}\boldsymbol{b}$ represents the optimal tableau.

3.] Confirm that Row 0 of the optimal tableau can be written as $z+\left(\boldsymbol{c}_{BV}^{T}B^{-1}N - \boldsymbol{c}_{NBV}^{T}\right)\boldsymbol{x}_{NBV} = \boldsymbol{c}_{BV}^{T}B^{-1}\boldsymbol{b}$.