1. \[
\begin{array}{cccc}
1 & -2 & 5 & 4 \\
1 & -2 & 0 & 3 \\
0 & 2 & -3 & 0
\end{array}
\]
\[
x_4 = x_4 \\
-x_2 = x_2 \\
\rightarrow\text{max}
\]
\[
\begin{array}{cccc}
1 & -2 & -4 & 9 \\
1 & -1 & -3 & 0 \\
0 & -2 & 0 & 9
\end{array}
\]
\[
x_4 = x_4 \\
\rightarrow\text{min}
\]
\[
\begin{array}{cccc}
1 & 2 & 4 & 9 \\
1 & 1 & 9 & 0 \\
0 & -2 & 0 & 9
\end{array}
\]
\[
x_1 = x_1 \\
\rightarrow\text{min}
\]
Now we have a feasible table, but we can see that \( x_4 \) is a bad column. As such, the problem is unbounded. \( \text{Max} = \infty \)

2. \[
\begin{array}{cccc}
1 & -2 & 3 & 4 \\
1 & 2 & 0 & -1 \\
0 & -2 & 3 & -2
\end{array}
\]
\[
x_4 = x_4 \\
\rightarrow\text{min}
\]
\[
\begin{array}{cccc}
1 & 2 & 8 & 3 \\
2 & 2 & 0 & 0 \\
0 & 2 & -4 & -3
\end{array}
\]
\[
x_4 = x_4 \\
\rightarrow\text{min}
\]
\[
\begin{array}{cccc}
1 & 2 & 8 & 3 \\
2 & 2 & 0 & 0 \\
0 & 2 & -4 & -3
\end{array}
\]
\[
x_5 = x_5 \\
\rightarrow\text{standard feasible form.}
\]
\[
\begin{array}{cccc}
1 & 2 & 8 & 3 \\
2 & 2 & 0 & 0 \\
0 & 2 & -4 & -3
\end{array}
\]
\[
x_4 = x_4 \\
\rightarrow\text{min}
\]
We see \( x_4 \) is a bad column. \( z_0 \) unbounded. \( \text{Min} = -\infty \)
The # of selected entries is $M+n-1 = 12$

Calculation of potentials is unnecessary, as all columns have products only shipped at their lowest cost.

\[ \text{Min Cost of this System is:} \]

\[ 6 \cdot 1 + 1 \cdot 1 + 6 \cdot 1 + 1 \cdot 1 + (2+2+2) \cdot 1 + 1 \cdot 1 + 6 \cdot 1 + 2 \cdot 1 + 1 \cdot 6 = 35 \]
The Columns have been labeled A-I.

Notice that Columns G and I only have a single position of Cost 1, shared in the same row.

These 1 cost positions should be filled first, to eliminate the 8 demand. Next, Columns A and H both have Cost 0, which would ideally be filled.

All positions/Columns have supply in their lowest price, except for in Column I. The remaining amount of 4, is put in the next lowest cost box.

As such, this is a feasible and optimal solution.

\[
\text{min Cost} = 6 \cdot 0 + 1 \cdot 1 + 6 \cdot 1 + 1 \cdot 1 + 4 \cdot 1 + 2 \cdot 1 + 1 \cdot 1 + 6 \cdot 1 + 0 \cdot 1 + 1 \cdot 2 + 4 \cdot 2
\]

\[
= 31
\]
we use the Hungarian Method to reduce the system.

Continuing with the Hungarian Method.

we are able to find the optimal sum of 0's, marking them with asterisks. Inputting this into the original problem, we find the minimal price is `1+0+1+1+2 = 5`