From the given scenario, we extract the eqtn.

Max, $Z = 5x_1 - 4x_2 + 3x_3$

Subject to,
$$2x_1 + x_2 - 6x_3 = 20$$
$$6x_1 + 5x_2 + 10x_3 \leq 76$$
$$8x_1 - 3x_2 + 6x_3 \leq 50$$
$$x_1, x_2, x_3 \geq 0$$

Now, we convert the LPP into standard formula.

Max, $Z = 5x_1 - 4x_2 + 3x_3 + 0 \cdot x_5 + 0 x_6$

Subject to,
$$2x_1 + x_2 - 6x_3 + x_4 = 20$$
$$6x_1 + 5x_2 + 10x_3 + x_5 = 76$$
$$8x_1 - 3x_2 + 6x_3 + x_6 = 50$$
$$x_1, x_2, x_3, x_4, x_5, x_6 \geq 0$$

So,

Phase-I

Auxiliary LPP

$$\text{Max, } z^* = 0x_1 + 0x_2 + 0x_3 + 0.x_5 + 0.x_6 - x_4$$

Subject to,

$$2x_1 + x_2 - 6x_3 + x_4 = 20$$
$$6x_1 + 5x_2 + 10x_3 + x_5 = 76$$
$$8x_1 - 3x_2 + 6x_3 + x_6 = 50$$

So, the matrix formula $AX = B$, we get

$$
\begin{pmatrix}
x_1 & x_2 & x_3 & x_4 & x_5 & x_6 \\
2 & 1 & -6 & 1 & 0 & 0 \\
6 & 5 & 10 & 0 & 1 & 0 \\
8 & -3 & 6 & 0 & 0 & 1
\end{pmatrix}
\begin{pmatrix}
x_1 \\ x_2 \\ x_3 \\ x_4 \\ x_5 \\ x_6
\end{pmatrix}
=
\begin{pmatrix}
20 \\ 76 \\ 50
\end{pmatrix}
$$

Identity matrix

C_j		0	0	0	-1	0	0	Solution	Ratio
CB_i	Basic variable	x_1	x_2	x_3	x_4	x_5	x_6	X_B	
-1	x_4	2	1	-6	1	0	0	20	10
0	x_5	6	5	10	0	1	0	76	12.6
0	x_6	8	-3	6	0	0	1	50	6.25
		pivot							
	Z_j	-2	-1	6	-1	0	0	-20	
	$C_j - Z_j$	2↑	1	-6	1	0	0		

C_j		0	0	0	-1	0	0	Solution	Ratio
CB_i	Basic variable	x_1	x_2	x_3	x_4	x_5	x_6	X_B	
-1	x_4	0	$\frac{7}{4}$	$-\frac{15}{4}$	1	0	$-\frac{7}{4}$	$\frac{15}{2}$	4.29
0	x_5	0	$\frac{29}{4}$	$\frac{11}{2}$	0	1	$-\frac{3}{4}$	$\frac{77}{2}$	5.31
0	x_1	1	$-\frac{3}{8}$	$\frac{3}{4}$	0	0	$\frac{1}{8}$	$\frac{25}{4}$	The value is negative.
	Z_j	0	$-\frac{7}{4}$	$\frac{15}{4}$	-1	0	$\frac{1}{4}$	$-\frac{15}{2}$	
	$C_j - Z_j$	0	$\frac{7}{4}$↑	$-\frac{15}{4}$	0	0	$-\frac{1}{4}$		

Formula:

new value = old value $-$ $\dfrac{\text{corr. row} \times \text{corr. column}}{\text{pivot}}$

C_{B_i}	Basic Variable	c_j						Solution	Ratio
		0	0	0	0	-1	0		
		x_1	x_2	x_3	x_4	x_5	x_6	X_B	
0	x_2	0	1	$-\frac{15}{7}$	$\frac{4}{7}$	0	$-\frac{1}{7}$	$\frac{30}{7}$	—
0	x_5	0	0	$\frac{256}{7}$	$-\frac{29}{7}$	1	$\frac{2}{7}$	$\frac{52}{7}$	0
0	x_1	1	0	$-\frac{6}{7}$	$\frac{3}{14}$	0	$\frac{1}{14}$	$\frac{55}{7}$	2
	z_j	0	0	0	0	0	0	$z^* = 0$	
	$c_j - z_j$	0	0	0	-1	0	0		

As, $z^* = 0$ and no artificial variable appear in basis

and $c_j - z_j \leq 0$. So, it has a fessible solution and

we go to phase II.

Phase - II

Consider the final simplex table of phase-I. Consider the actual cost associated with the original variables. Delete the artificial variable x_4 column from the table.

c_B	c_j Basic variable	5 x_1	-4 x_2	3 x_3	0 x_5	0 x_6	Solution x_B	Ratio
-4	x_2	0	1	$-\frac{30}{4}$	0	$-\frac{1}{7}$	$\frac{30}{7}$	
0	x_5	0	0	$\frac{256}{7}$	1	$\frac{2}{7}$	$\frac{52}{7}$	
5	x_1	1	0	$-\frac{6}{7}$	0	$\frac{1}{14}$	$\frac{55}{7}$	
	z_j	5	-4	$\frac{180}{7}$	0	$\frac{13}{14}$	$z^* = \frac{155}{7}$	
	$c_j - z_j$	0	0	$-\frac{159}{7}$	0	$-\frac{13}{14}$		

As, all $c_j - z_j \leq 0$.

So, $x_1 = \frac{55}{7}$, $x_2 = \frac{30}{7}$, $x_3 = 0$

$\therefore$ Max, $z = \left(5 \times \frac{55}{7} - 4 \times \frac{30}{7} + 3 \times 0\right)$

$= \frac{155}{7}$.   Phase-II

(Ans)