$$-2x_1 - 6x_2 - x_3 = -38$$
$$-3x_1 - 1x_2 + 7x_3 = -34$$
$$-8x_1 + 1x_2 - 2x_3 = -40$$

$$A = \begin{bmatrix} 2 & -6 & -1 \\ -3 & -1 & 7 \\ -8 & 1 & -2 \end{bmatrix}$$

$R_2 + 3/2\, R_1 \rightarrow$

$$\begin{bmatrix} 2 & -6 & -1 \\ 0 & -10 & 11/2 \\ -8 & 1 & -2 \end{bmatrix}$$

$R_3 + 4 R_1 \rightarrow$

$$\begin{bmatrix} 2 & -6 & -1 \\ 0 & -10 & 11/2 \\ 0 & -23 & -6 \end{bmatrix}$$

$R_3 - 23/10\, R_2 \rightarrow$

$$\begin{bmatrix} 2 & -6 & -1 \\ 0 & -10 & 11/2 \\ 0 & 0 & -373/20 \end{bmatrix}$$

$$U = \begin{bmatrix} 2 & -6 & -1 \\ 0 & -10 & 11/2 \\ 0 & 0 & -373/20 \end{bmatrix}$$

$$L = \begin{bmatrix} 1 & 0 & 0 \\ -3/2 & 1 & 0 \\ -4 & 23/10 & 1 \end{bmatrix}$$

solve $L\vec{c} = \vec{b}$

$$\begin{bmatrix} 1 & 0 & 0 \\ -3/2 & 1 & 0 \\ -4 & 23/10 & 1 \end{bmatrix} \begin{bmatrix} u \\ v \\ w \end{bmatrix} = \begin{bmatrix} -38 \\ -34 \\ -40 \end{bmatrix}$$

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & -38 \\ -3/2 & 1 & 0 & -34 \\ -4 & 23/10 & 1 & -40 \end{array}\right]$$

$R_3 \leftrightarrow R_2 \rightarrow$

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & -38 \\ -4 & 23/10 & 1 & -40 \\ -3/2 & 1 & 0 & -34 \end{array}\right]$$

$R_2 + 4R_1 \rightarrow$

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & -38 \\ 0 & 23/10 & 1 & -192 \\ -3/2 & 1 & 0 & -34 \end{array}\right]$$

$R_2 \leftrightarrow R_3 \rightarrow$

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & -38 \\ -3/2 & 1 & 0 & -34 \\ 0 & 23/10 & 1 & -192 \end{array}\right]$$

$R_2 + \frac{3}{2}R_1 \rightarrow$

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & -38 \\ 0 & 1 & 0 & -91 \\ 0 & 23/10 & 1 & -192 \end{array}\right]$$

$R_3 - 23/10 R_2 \rightarrow$

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & -38 \\ 0 & 1 & 0 & -91 \\ 0 & 0 & 1 & 1753/10 \end{array}\right]$$

$$\vec{c} = \begin{bmatrix} -38 \\ -91 \\ 1753/10 \end{bmatrix}$$

Solve $U\vec{x} = \vec{c}$

$$\begin{bmatrix} 2 & -6 & -1 \\ 0 & -10 & 11/2 \\ 0 & 0 & -3773/20 \end{bmatrix}\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} -38 \\ -91 \\ 173/10 \end{bmatrix}$$

$$\left[\begin{array}{ccc|c} 2 & -6 & -1 & -38 \\ 0 & -10 & 11/2 & -91 \\ 0 & 0 & -3773/20 & 173/10 \end{array}\right]$$

$$-3773/20\, z = 173/10$$
$$z = -346/3773$$

$$-10y + 11/2(-346/3773) = -91$$
$$-10y = -32040/3773$$
$$y = 3204/3773$$

$$2x - 6(3204/3773) - (-346/3773) = -38$$

$$2x = 4704/3773$$
$$x = \frac{2352}{3773}$$

$$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 2352/3773 \\ 3204/3773 \\ -346/3773 \end{bmatrix}$$