$$P \qquad\qquad A$$

$R_1 \quad R_2$
$R_2 \leadsto R_3$
$R_3 \quad R_1$
$$\begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 1 & 0 & 0 \end{bmatrix} \qquad \begin{bmatrix} 2 & 1 & 1 \\ -1 & 2 & 0 \\ -1 & 0 & 1 \end{bmatrix}$$

$R_2 + \frac{1}{2}R_1$
$$\begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 1 & 0 & 0 \end{bmatrix} \qquad \begin{bmatrix} 2 & 1 & 1 \\ -\frac{1}{2} & 5/2 & 1/2 \\ -1 & 0 & 1 \end{bmatrix}$$

$R_3 + \frac{1}{2}R_1$
$$\begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 1 & 0 & 0 \end{bmatrix} \qquad \begin{bmatrix} 2 & 1 & 1 \\ -\frac{1}{2} & 5/2 & 1/2 \\ -\frac{1}{2} & 1/2 & 3/2 \end{bmatrix}$$

$R_3 - \frac{1}{5}R_2$
$$\begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 1 & 0 & 0 \end{bmatrix} \qquad \begin{bmatrix} 2 & 1 & 1 \\ -\frac{1}{2} & 5/2 & 1/2 \\ -\frac{1}{2} & \frac{1}{5} & 7/5 \end{bmatrix}$$

$$P \qquad\qquad L \qquad\qquad U$$
$$\begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 1 & 0 & 0 \end{bmatrix} \quad \begin{bmatrix} 1 & 0 & 0 \\ -1/2 & 1 & 0 \\ -1/2 & \frac{1}{5} & 1 \end{bmatrix} \quad \begin{bmatrix} 2 & 1 & 1 \\ 0 & 5/2 & 1/2 \\ 0 & 0 & 7/5 \end{bmatrix}$$

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1. $Lc = Pb$

$$\begin{bmatrix} 1 & 0 & 0 \\ -1/2 & 1 & 0 \\ -1/2 & 1/5 & 1 \end{bmatrix}\begin{bmatrix} c_1 \\ c_2 \\ c_3 \end{bmatrix} = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 1 & 0 & 0 \end{bmatrix}\begin{bmatrix} -2 \\ 17 \\ 3 \end{bmatrix} = \begin{bmatrix} 17 \\ 3 \\ -2 \end{bmatrix}$$

$c_1 = 17$

$-1/2(17) + c_2 = 3 \Rightarrow c_2 = 3 + \frac{17}{2} \Rightarrow c_2 = \frac{23}{2}$

$-1/2(17) + 1/5\left(\frac{23}{2}\right) + c_3 = -2 \Rightarrow c_3 = 21/5$

2. $Ux = c$

$$\begin{bmatrix} 2 & 1 & 1 \\ 0 & 5/2 & 1/2 \\ 0 & 0 & 7/5 \end{bmatrix}\begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} 17 \\ 23/2 \\ 21/5 \end{bmatrix}$$

$7/5 \, x_3 = 21/5 \qquad\qquad \Rightarrow x_3 = 3$

$5/2 \, x_2 + 1/2(3) = 23/2 \qquad \Rightarrow x_2 = 4$

$2x_1 + 4 + 3 = 17 \qquad\qquad \Rightarrow x_1 = 5$

Suo lausnin er $[5, 4, 3]$