rewritten for clarity
just for the augmented matrix

Matrix	ERO leading to next stage	Comment about ERO
$\begin{pmatrix} 1 & 1 & 0 & \mid & 1 \\ 2 & 1 & 1 & \mid & 2 \\ -1 & 0 & 2 & \mid & -4 \end{pmatrix}$	$R_2 - 2R_1 \to R_2$ $R_3 + R_1 \to R_3$	Getting rid of x_1 in E_2, E_3 of the l.s.

$\Downarrow$

$\begin{pmatrix} 1 & 1 & 0 & \mid & 1 \\ 0 & -1 & 1 & \mid & 0 \\ 0 & 1 & 2 & \mid & -3 \end{pmatrix}$	$R_2 \leftrightarrow R_3$	1) From this point on, do not use R_1 until you get EF. 2) Obtain "1" as the leading coefficient of R_2.

$\Downarrow$

$\begin{pmatrix} 1 & 1 & 0 & \mid & 1 \\ 0 & 1 & 2 & \mid & -3 \\ 0 & -1 & 1 & \mid & 0 \end{pmatrix}$	$R_2 + R_3 \to R_3$	Eliminating x_2 from E_3

$\Downarrow$

$\begin{pmatrix} 1 & 1 & 0 & \mid & 1 \\ 0 & 1 & 2 & \mid & -3 \\ 0 & 0 & 3 & \mid & -3 \end{pmatrix}$	$\frac{1}{3} R_3 \to R_3$	1) From this point on, do not use R_2 until you get EF. 2) Obtain "1" as leading coefficient of R_3.

$$\begin{pmatrix} 1 & 1 & 0 & | & 1 \\ 0 & 1 & 2 & | & -3 \\ 0 & 0 & 1 & | & -1 \end{pmatrix}$$

$R_2 - 2R_3 \to R_2$

1) You've arrived at the EF!

2) Use R_3 to eliminate x_3 from E_2 & E_1 (in this Example, E_1 does not have x_3, so no work for E_1 is needed).

3) Do (NOT) use R_2 (or R_1) until done eliminating x_3.

$$\begin{pmatrix} 1 & 1 & 0 & | & 1 \\ 0 & 1 & 0 & | & -1 \\ 0 & 0 & 1 & | & -1 \end{pmatrix}$$

$R_1 - R_2 \to R_1$

Use R_2 to eliminate x_2 in R_1.

$$\begin{pmatrix} 1 & 0 & 0 & | & 2 \\ 0 & 1 & 0 & | & -1 \\ 0 & 0 & 1 & | & -1 \end{pmatrix}$$

This is REF. Deduce the solution to l.s.:

$x_1 = 2$
$x_2 = -1$
$x_3 = -1$.

DONE!