3.

Non echelon form:

$$
\begin{array}{cccc}
2 & 1 & 0 & 6 \\
6 & 2 & 1 & 8 \\
7 & 0 & 0 & 3
\end{array}
$$

(I)

Echelon but not reduced:

$$
\begin{array}{cccc}
1 & 0 & 0 & 0 \\
2 & 1 & 0 & 0 \\
0 & 0 & 0 & 1
\end{array}
$$

Reduced echelon form:

$$
\begin{array}{cccc}
1 & 0 & 4 & 0 \\
0 & 1 & 2 & 0 \\
0 & 0 & 0 & 1
\end{array}
$$

9/

$x_1 + x_2 + \ldots$

Echelon but not reduced:

$$\begin{bmatrix} 1 & 0 & 9 & 0 \\ 2 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

Reduced echelon form:

$$\begin{bmatrix} 1 & 0 & 4 & 0 \\ 0 & 1 & 2 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

9/

$$x_1 + x_2 + x_3 - x_4 = 3$$

$$3x_1 + 5x_2 - 2x_3 + x_4 = 1$$

$$-3x_1 - 7x_1 + 7x_3 - 5x_4 = 7$$

$$x_1 + 3x_2 - 4x_3 + 5x_4 = -5$$

$$\begin{array}{cccc|c} 1 & 1 & 1 & -7 & 3 \\ 3 & 5 & -2 & 1 & 1 \\ -3 & -7 & 7 & -5 & 7 \\ 1 & 3 & -4 & 3 & -5 \end{array}$$

$\xrightarrow{\substack{(R_2=)\,3x_1+x_2 \\ 3x_1+x_3 \\ -x_1+x_4}}$

$$\begin{array}{cccc|c} 1 & 1 & 1 & -7 & 3 \\ 0 & 2 & -5 & 4 & -8 \\ 0 & -4 & 9 & -8 & 16 \\ 0 & 2 & -5 & 4 & -8 \end{array}$$

$\xrightarrow{\frac{1}{2}x_2}$

$$\begin{array}{cccc|c} 1 & 1 & 1 & -1 & 3 \\ 0 & 1 & \frac{-5}{2} & 2 & -4 \\ 0 & -4 & 9 & -7 & 16 \\ 0 & 2 & -5 & 4 & -7 \end{array}$$

$\xrightarrow{\substack{4x_2+x_3 \\ -2x_2+x_4}}$

$$\begin{array}{cccc|c} 1 & 1 & 1 & -7 & 3 \\ 0 & 1 & \frac{-5}{2} & 2 & -4 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{array}$$

$\xrightarrow{\frac{5}{2}x_3+x_2}$

$$\begin{array}{cccc|c} 1 & 1 & 1 & -7 & 3 \\ 0 & 1 & 0 & 2 & -4 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{array}$$

$\xrightarrow{\substack{-x_3+x_1 \\ (\frac{1}{3}x_1)}}$

$$\begin{array}{cccc|c} 1 & 0 & 1 & -3 & 7 \\ 0 & 1 & 0 & 2 & -4 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{array}$$

$\xrightarrow{-x_2+x_1}$

$$\begin{array}{cccc|c} 1 & 0 & 0 & -3 & 7 \\ 0 & 1 & 0 & 2 & -4 \\ 0 & 0 & 1 & 0 & 0 \end{array}$$

$\Rightarrow$
$$x_3 = 0$$
$$x_2 + 2x_4 = -4$$
$$x_1 - x_4 = 7$$

$\Rightarrow$
$$x_3 = 0$$
$$x_2 = -4$$
$$x_1 = 7$$

$$-3 \quad -7 \quad (1) \quad -5 \quad 7$$
$$1 \quad 3 \quad -4 \quad 3 \quad -5$$

$$\begin{array}{c} 2x_1+x_3 \\ -x_1+x_4 \end{array}$$
$$0 \quad -4 \quad 9 \quad -8 \quad | \quad 16$$
$$0 \quad 2 \quad -5 \quad 4 \quad | \quad -8$$

$$\xrightarrow{\frac{2}{x}x_2}$$
$$1 \quad 1 \quad 1 \quad -1 \quad 3$$
$$0 \quad 1 \quad \frac{-5}{2} \quad 2 \quad -4$$
$$0 \quad -4 \quad 9 \quad -8 \quad 16$$
$$0 \quad 2 \quad -5 \quad 4 \quad -8$$

$$\begin{array}{c} 4x_2+x_3 \\ -2x_2+x_4 \end{array} \longrightarrow$$
$$1 \quad 1 \quad 1 \quad -7 \quad 3$$
$$0 \quad 1 \quad \frac{-5}{2} \quad 2 \quad -4$$
$$0 \quad 0 \quad 1 \quad 0 \quad \cdot 0$$
$$0 \quad 0 \quad 0 \quad 0 \quad 0$$

$$\xrightarrow{\frac{5}{2}x_3+x_2}$$
$$1 \quad 1 \quad 1 \quad -7 \quad 3$$
$$0 \quad 1 \quad 0 \quad 2 \quad -6$$
$$0 \quad 0 \quad 1 \quad 0 \quad 0$$
$$0 \quad 0 \quad 0 \quad 0 \quad 0$$

$$\begin{array}{c} -x_3+x_1 \\ (x_3x) \end{array} \longrightarrow$$
$$1 \quad 0 \quad 1 \quad =3 \quad (?)7$$
$$0 \quad 1 \quad 0 \quad 2 \quad -6$$
$$0 \quad 0 \quad 1 \quad 0 \quad 0$$
$$0 \quad 0 \quad 0 \quad 8 \quad 0$$

$$\xrightarrow{-x_3+x_1}$$
$$1 \quad 0 \quad 0 \quad -3 \quad 7$$
$$0 \quad 1 \quad 0 \quad 2 \quad -6$$
$$0 \quad 0 \quad 1 \quad 0 \quad 0$$
$$0 \quad 0 \quad 0 \quad 0 \quad 0$$

$$\to x_3=0 \qquad \to \quad x_3=0$$
$$x_2+2x_4=-6 \qquad x_2=-6$$
$$x_1-x_4=7 \qquad x_1=7$$
$$x_4=0 \qquad x_4=0$$

So $x_1=7; \; x_2=-6; \; x_3=0; \; x_4=0$