

$$\begin{aligned}
\left(\begin{array}{ccc|c} 1 & 2 & -4 & -6 \\ 1 & -4 & 2 & -12 \\ -3 & 1 & 1 & -3 \end{array} \right) &= \begin{array}{c} W_1 \\ W_2 - W_1 \\ 3W_1 + W_3 \end{array} \left(\begin{array}{ccc|c} 1 & 2 & -4 & -6 \\ 0 & -6 & 6 & -6 \\ 0 & 7 & -11 & -21 \end{array} \right) \\
&= \begin{array}{c} W_1 + 1/3 W_2 \\ -1/6 W_2 \\ 7/6 W_2 + W_3 \end{array} \left(\begin{array}{ccc|c} 1 & 0 & -2 & -8 \\ 0 & 1 & -1 & 1 \\ 0 & 0 & -4 & -28 \end{array} \right) \\
&= \begin{array}{c} W_1 + -1/2 W_3 \\ W_2 + -1/4 W_3 \\ -1/4 W_3 \end{array} \left(\begin{array}{ccc|c} 1 & 0 & 0 & 6 \\ 0 & 1 & 0 & 8 \\ 0 & 0 & 1 & 7 \end{array} \right)
\end{aligned}$$

$$\begin{aligned}
&\left(\begin{array}{ccc|ccc} 1 & 2 & -4 & 1 & 0 & 0 \\ 1 & -4 & 2 & 0 & 1 & 0 \\ -3 & 1 & 1 & 0 & 0 & 1 \end{array} \right) \\
&= \begin{array}{c} W_1 \\ W_2 - W_1 \\ 3W_1 + W_3 \end{array} \left(\begin{array}{ccc|ccc} 1 & 2 & -4 & 1 & 0 & 0 \\ 0 & -6 & 6 & -1 & 1 & 0 \\ 0 & 7 & -11 & 3 & 0 & 1 \end{array} \right) \\
&= \begin{array}{c} W_1 + 1/3 W_2 \\ -1/6 W_2 \\ 7/6 W_2 + W_3 \end{array} \left(\begin{array}{ccc|ccc} 1 & 0 & -2 & 2/3 & 1/3 & 0 \\ 0 & 1 & -1 & 1/6 & -1/6 & 0 \\ 0 & 0 & -4 & 11/6 & 7/6 & 1 \end{array} \right) \\
&= \begin{array}{c} W_1 + -1/2 W_3 \\ W_2 + -1/4 W_3 \\ -1/4 W_3 \end{array} \left(\begin{array}{ccc|ccc} 1 & 0 & 0 & -1/4 & -1/4 & -1/2 \\ 0 & 1 & 0 & -7/24 & -11/24 & -1/4 \\ 0 & 0 & 1 & -11/24 & -7/24 & -1/4 \end{array} \right)
\end{aligned}$$

$$\left(\begin{array}{ccc} -1/4 & -1/4 & -1/2 \\ -7/24 & -11/24 & -1/4 \\ -11/24 & -7/24 & -1/4 \end{array} \right) \cdot \left(\begin{array}{ccc} 1 & 2 & -4 \\ 1 & -4 & 2 \\ -3 & 1 & 1 \end{array} \right) = \left(\begin{array}{ccc} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{array} \right)$$