

$$A | I_2 = \left[\begin{array}{cc|cc} -1 & 2 & 1 & 0 \\ 3 & -5 & 0 & 1 \end{array} \right] \quad -1R_1 \rightarrow \left[\begin{array}{cc|cc} 1 & -2 & -1 & 0 \\ 3 & -5 & 0 & 1 \end{array} \right]$$

$$R_2 - 3R_1 \rightarrow \left[\begin{array}{cc|cc} 1 & -2 & -1 & 0 \\ 0 & 1 & 3 & 1 \end{array} \right] \quad R_1 + 2R_2 \rightarrow \left[\begin{array}{cc|cc} 1 & 0 & 5 & 2 \\ 0 & 1 & 3 & 1 \end{array} \right]$$

$$\text{Thus, } A^{-1} = \left[\begin{array}{cc} 5 & 2 \\ 3 & 1 \end{array} \right].$$