

① Use the adjugate - cofactor formula:

For any invertible 3×3 matrix A ,

$$A^{-1} = \frac{1}{\det(A)} \operatorname{adj}(A) = \frac{1}{\det(A)} C^T$$

where the cofactor matrix of A and $\operatorname{adj}(A) = C^T$

② Transpose the given cofactor matrix:

$$C = \begin{pmatrix} -3 & -2 & 7 \\ -4 & 1 & 2 \\ 0 & -2 & 5 \end{pmatrix} \Rightarrow C^T = \begin{pmatrix} -3 & -4 & 0 \\ -2 & 1 & -2 \\ 7 & 2 & 5 \end{pmatrix}$$

③ Scale by $1/\det(A)$:

Given $\det(A) = -\frac{1}{5}$, we have

$$\frac{1}{\det(A)} = -5$$

Therefore

$$A^{-1} = -5C^T = -5 \begin{pmatrix} -3 & -4 & 0 \\ -2 & 1 & -2 \\ 7 & 2 & 5 \end{pmatrix} = \begin{pmatrix} 15 & 20 & 0 \\ 10 & -5 & 10 \\ -35 & -10 & -25 \end{pmatrix}$$

$$\text{Answer: } A^{-1} = \begin{pmatrix} 15 & 20 & 0 \\ 10 & -5 & 10 \\ -35 & -10 & -25 \end{pmatrix}$$