

Determinant

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

$$= \begin{vmatrix} 3 & 2 & 3 & -1 & 1 \\ 0 & -2 & 0 & 1 & 2 \\ 0 & 3 & 3 & 1 & 0 \\ 0 & 0 & 0 & 4 & 0 \\ 0 & 2 & 0 & 0 & 0 \end{vmatrix} = \begin{vmatrix} 3 & 2 & 3 & -1 & 1 \\ 0 & -2 & 0 & 1 & 2 \\ 0 & 3 & 3 & 1 & 0 \\ 0 & 0 & 0 & 4 & 0 \\ 0 & 0 & 0 & 1 & 2 \end{vmatrix} = \frac{-1}{3 \cdot 2 \cdot 4} \begin{vmatrix} 3 & 2 & 3 & -1 & 1 \\ 0 & -6 & 0 & 3 & 6 \\ 0 & 6 & 6 & 2 & 0 \\ 0 & 0 & 0 & 4 & 0 \\ 0 & 0 & 0 & -4 & -8 \end{vmatrix} =$$

$$= \frac{-1}{24} \begin{vmatrix} 3 & 2 & 3 & -1 & 1 \\ 0 & -6 & 0 & 3 & 6 \\ 0 & 0 & 6 & 5 & 6 \\ 0 & 0 & 0 & 4 & 0 \\ 0 & 0 & 0 & 0 & -8 \end{vmatrix} = -\frac{1}{24} \cdot [3 \cdot (-6) \cdot 6 \cdot 4 \cdot (-8)] = \frac{-1}{24} \cdot 3456 =$$

$$= \underline{\underline{-144}}$$