

Determinant

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

$$-\begin{vmatrix} 1 & 0 & 1 & 2 \\ 2 & -1 & 1 & 2 \\ -1 & 1 & 2 & 1 \\ 3 & 1 & 0 & 1 \end{vmatrix} = -\begin{vmatrix} 1 & 0 & 1 & 2 \\ 2 & -1 & 1 & 2 \\ 0 & 1 & 3 & 3 \\ 3 & 1 & 0 & 1 \end{vmatrix} = -\left(-\frac{1}{2}\right) \cdot \begin{vmatrix} -2 & 0 & -2 & -4 \\ 2 & -1 & 1 & 2 \\ 0 & 1 & 3 & 3 \\ 3 & 1 & 0 & 1 \end{vmatrix} =$$

$$= \frac{1}{2} \cdot \begin{vmatrix} -2 & 0 & -2 & -4 \\ 0 & -1 & -1 & -2 \\ 0 & 1 & 3 & 3 \\ 3 & 1 & 0 & 1 \end{vmatrix} = \frac{1}{6} \cdot \begin{vmatrix} -6 & 0 & -6 & -12 \\ 0 & -1 & -1 & -2 \\ 0 & 1 & 3 & 3 \\ 3 & 1 & 0 & 1 \end{vmatrix} = \frac{1}{12} \cdot \begin{vmatrix} -6 & 0 & -6 & -12 \\ 0 & -1 & -1 & -2 \\ 0 & 1 & 3 & 3 \\ 6 & 2 & 0 & 2 \end{vmatrix} =$$

$$= \frac{1}{12} \cdot \begin{vmatrix} -6 & 0 & -6 & -12 \\ 0 & -1 & -1 & -2 \\ 0 & 1 & 3 & 3 \\ 0 & 2 & -6 & -10 \end{vmatrix} = \frac{1}{12} \cdot \begin{vmatrix} -6 & 0 & -6 & -12 \\ 0 & -1 & -1 & -2 \\ 0 & 0 & 2 & 1 \\ 0 & 2 & -6 & -10 \end{vmatrix} = \frac{1}{12 \cdot 2} \cdot \begin{vmatrix} -6 & 0 & -6 & -12 \\ 0 & -2 & -2 & -4 \\ 0 & 0 & 2 & 1 \\ 0 & 2 & -6 & -10 \end{vmatrix} =$$

$$= \frac{1}{12} \cdot \begin{vmatrix} -6 & 0 & -6 & -12 \\ 0 & -2 & -2 & -4 \\ 0 & 0 & 2 & 1 \\ 0 & 0 & -8 & -14 \end{vmatrix} = \frac{1}{24 \cdot 4} \cdot \begin{vmatrix} -6 & 0 & -6 & -12 \\ 0 & -2 & -2 & -4 \\ 0 & 0 & 8 & 4 \\ 0 & 0 & -8 & -14 \end{vmatrix} = \frac{1}{96} \cdot \begin{vmatrix} -6 & 0 & -6 & -12 \\ 0 & -2 & -2 & -4 \\ 0 & 0 & 8 & 4 \\ 0 & 0 & 0 & -10 \end{vmatrix} =$$

$$= \frac{1}{96} \cdot [(-6) \cdot (-2) \cdot 8 \cdot (-10)] = \frac{1}{96} \cdot (-960) = \underline{\underline{-10}}$$

