

N3.50

$$\begin{vmatrix} 1 & 0 & 2 \\ 0 & 2 & 0 \\ 2 & 0 & 3 \end{vmatrix} \begin{vmatrix} 10 \\ 02 \\ 20 \end{vmatrix} = 6 + 0 + 0 - 8 - 0 - 0 = -2$$

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

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

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

N 3.57

$$\begin{vmatrix} -1 & 5 & 2 \\ 0 & 7 & 0 \\ 1 & 2 & 0 \end{vmatrix} \begin{matrix} -15 \\ 07 \\ 12 \end{matrix} = 0 + 0 + 0 - 14 - 0 - 0 = -14$$

$$\begin{vmatrix} -1 & 5 & 2 \\ 0 & 7 & 0 \\ 1 & 2 & 0 \end{vmatrix} = -5 \cdot \begin{vmatrix} 0 & 0 \\ 1 & 0 \end{vmatrix} + 7 \begin{vmatrix} -1 & 2 \\ 1 & 0 \end{vmatrix} - 2 \begin{vmatrix} -1 & 2 \\ 0 & 0 \end{vmatrix} =$$

$$= 0 - 14 - 0 = -14$$

$$\begin{vmatrix} -1 & 5 & 2 \\ 0 & 7 & 0 \\ 1 & 2 & 0 \end{vmatrix} = - \begin{vmatrix} 7 & 0 \\ 2 & 0 \end{vmatrix} - 5 \begin{vmatrix} 0 & 0 \\ 1 & 0 \end{vmatrix} + 2 \begin{vmatrix} 0 & 7 \\ 1 & 2 \end{vmatrix} =$$

$$= 0 - 0 - 14 = -14$$

$$\begin{vmatrix} -1 & 5 & 2 \\ 0 & 7 & 0 \\ 1 & 2 & 0 \end{vmatrix} = \begin{vmatrix} 0 & 7 & 2 \\ 0 & 7 & 0 \\ 1 & 2 & 0 \end{vmatrix} = \begin{vmatrix} 7 & 2 \\ 7 & 0 \end{vmatrix} = -14$$

n3.53

$$\begin{vmatrix} 9 & 10 & 11 \\ 1 & 1 & 1 \\ 2 & 3 & 4 \end{vmatrix} \begin{vmatrix} 9 & 10 \\ 1 & 1 \\ 2 & 3 \end{vmatrix} = 36 + 20 + 33 - 22 - 27 - 40 =$$

$$= 0$$

$$\begin{vmatrix} 9 & 10 & 11 \\ 1 & 1 & 1 \\ 2 & 3 & 4 \end{vmatrix} = -10 \begin{vmatrix} 1 & 1 \\ 2 & 4 \end{vmatrix} + \begin{vmatrix} 9 & 11 \\ 2 & 4 \end{vmatrix} - 3 \begin{vmatrix} 9 & 11 \\ 1 & 1 \end{vmatrix} =$$

$$= -20 + 14 + 6 = 0$$

$$\begin{vmatrix} 9 & 10 & 11 \\ 1 & 1 & 1 \\ 2 & 3 & 4 \end{vmatrix} = 9 \begin{vmatrix} 1 & 1 \\ 3 & 4 \end{vmatrix} - 10 \begin{vmatrix} 1 & 1 \\ 2 & 4 \end{vmatrix} + 11 \begin{vmatrix} 1 & 1 \\ 2 & 3 \end{vmatrix} =$$

$$= 9 - 20 + 11 = 0$$

$$\begin{vmatrix} 9 & 10 & 11 \\ 1 & 1 & 1 \\ 2 & 3 & 4 \end{vmatrix} = \begin{vmatrix} 9 & 10 & 1 \\ 1 & 1 & 0 \\ 2 & 3 & 1 \end{vmatrix} = \begin{vmatrix} 9 & 1 & 1 \\ 1 & 0 & 0 \\ 2 & 3 & 1 \end{vmatrix} = \begin{vmatrix} 1 & 1 \\ 1 & 1 \end{vmatrix} = 0$$

N 3. 56

BIG DATA

$$\begin{vmatrix} 2 & 3 & -3 & 4 \\ 2 & 7 & -7 & 2 \\ 6 & 2 & 7 & 0 \\ 2 & 3 & 0 & -5 \end{vmatrix} = 6 \begin{vmatrix} 3 & -3 & 4 \\ 1 & -7 & 2 \\ 3 & 0 & -5 \end{vmatrix} - 2 \begin{vmatrix} 2 & -3 & 4 \\ 2 & -7 & 2 \\ 2 & 0 & -5 \end{vmatrix} + \begin{vmatrix} 2 & 3 & 4 \\ 2 & 7 & 2 \\ 2 & 3 & -5 \end{vmatrix} -$$

$$= 6(3 \begin{vmatrix} -3 & 4 \\ -7 & 2 \end{vmatrix} - 5 \begin{vmatrix} 3 & -3 \\ 1 & -1 \end{vmatrix}) - 2(2 \begin{vmatrix} -3 & 4 \\ -7 & 2 \end{vmatrix} - 5 \begin{vmatrix} 2 & -3 \\ 2 & -1 \end{vmatrix}) +$$

$$+ 2 \begin{vmatrix} 3 & 4 \\ 7 & 2 \end{vmatrix} - 3 \begin{vmatrix} 2 & 4 \\ 2 & 2 \end{vmatrix} - 5 \begin{vmatrix} 2 & 3 \\ 2 & 7 \end{vmatrix} = 6(-6 + 10) -$$

$$- 2(-4 - 20) + 4 + 12 + 20 = -36 + 48 + 36 = 48$$

$$\begin{vmatrix} 2 & 3 & -3 & 4 \\ 2 & 7 & -7 & 2 \\ 6 & 2 & 7 & 0 \\ 2 & 3 & 0 & -5 \end{vmatrix} = -3 \begin{vmatrix} 2 & -7 & 2 \\ 6 & 7 & 0 \\ 2 & 0 & -5 \end{vmatrix} + \begin{vmatrix} 2 & -3 & 4 \\ 6 & 7 & 0 \\ 2 & 0 & -5 \end{vmatrix} - 2 \begin{vmatrix} 2 & -3 & 4 \\ 2 & -7 & 2 \\ 2 & 0 & -5 \end{vmatrix} + 3 \begin{vmatrix} 2 & -3 & 4 \\ 2 & -7 & 2 \\ 6 & 7 & 0 \end{vmatrix} =$$

$$= -3(-6 \begin{vmatrix} -7 & 2 \\ 0 & -5 \end{vmatrix} + \begin{vmatrix} 2 & 2 \\ 2 & -5 \end{vmatrix}) - 6 \begin{vmatrix} -3 & 4 \\ 0 & -5 \end{vmatrix} + \begin{vmatrix} 2 & 4 \\ 2 & -5 \end{vmatrix} -$$

$$- 2(2 \begin{vmatrix} -3 & 4 \\ -7 & 2 \end{vmatrix} - 5 \begin{vmatrix} 2 & -3 \\ 2 & -1 \end{vmatrix}) + 3(6 \begin{vmatrix} -3 & 4 \\ -7 & 2 \end{vmatrix} - \begin{vmatrix} 2 & 4 \\ 2 & 2 \end{vmatrix}) =$$

$$= 3 \cdot 44 - 90 - 18 + 2 \cdot 24 - 3 \cdot 8 = 48$$

$$\begin{vmatrix} 2 & 3 & -3 & 4 \\ 2 & 1 & -1 & 2 \\ 6 & 2 & 1 & 0 \\ 2 & 3 & 0 & -5 \end{vmatrix} \xrightarrow{\substack{R_2 - R_1 \\ R_3 - 3R_1 \\ R_4 - R_1}} \begin{vmatrix} 2 & 3 & -3 & 4 \\ 2 & 3 & -1 & 2 \\ 6 & 0 & 1 & 0 \\ 2 & 3 & 0 & -5 \end{vmatrix} \xrightarrow{R_2 - R_1} \begin{vmatrix} 2 & 3 & -3 & 4 \\ 0 & 0 & 2 & -2 \\ 6 & 0 & 1 & 0 \\ 2 & 3 & 0 & -5 \end{vmatrix} =$$

$$= \begin{vmatrix} 20 & 9 & 4 \\ 8 & 3 & 2 \\ 2 & 3 & -5 \end{vmatrix} = 20 \begin{vmatrix} 3 & 2 \\ 3 & -5 \end{vmatrix} - 8 \begin{vmatrix} 9 & 4 \\ 3 & -5 \end{vmatrix} + 2 \begin{vmatrix} 9 & 4 \\ 3 & 2 \end{vmatrix} =$$

$$= -20 \cdot 21 + 8 \cdot 57 + 2 \cdot 6 = 48$$