P.48 1 ただ計算するだけなので省略

P.48 2 やり方は ほとんど同じなので (3)(5)(6)(7)(9)(10) のみ扱う.

(3) $(与式) = 4\times 5 \begin{vmatrix} 3 & 4 & 8 \\ -6 & 13 & 4 \\ 3 & 2 & -4 \end{vmatrix} = 20 \times \begin{vmatrix} 3 & 4 & 8 \\ 0 & 21 & 20 \\ 0 & -2 & -12 \end{vmatrix} = -120 \times \begin{vmatrix} 21 & 20 \\ 1 & 6 \end{vmatrix}$

$= -120 \times \begin{vmatrix} 1 & 20 \\ -5 & 6 \end{vmatrix} = -120 \times (6+100) = -12720$ //

(5) $(与式) = 15 \begin{vmatrix} 0 & -1 & -2 & 5 \\ -2 & 5 & 14 & 4 \\ 1 & -3 & -2 & 5 \\ 3 & 2 & 2 & -1 \end{vmatrix} = 15 \times \begin{vmatrix} 0 & -1 & -2 & 5 \\ 0 & -1 & 10 & 14 \\ 1 & -3 & -2 & 5 \\ 0 & 11 & 8 & -16 \end{vmatrix} = 15 \times \begin{vmatrix} 0 & -1 & -2 & 5 \\ 0 & 0 & 12 & 9 \\ 1 & 0 & 4 & -10 \\ 0 & 0 & -14 & 39 \end{vmatrix}$

$= 15 \times 3 \times \begin{vmatrix} 1 & 0 & 4 & -10 \\ 0 & -1 & -2 & 5 \\ 0 & 0 & 4 & 3 \\ 0 & 0 & -14 & 39 \end{vmatrix} = -45 \times 2 \times 3 \times \begin{vmatrix} 2 & 1 \\ -7 & 13 \end{vmatrix} = -270(26+7) = -8910$ //

(6) $(与式) = \left(\frac{1}{12}\right)^3 \begin{vmatrix} 3 & 2 & 8 \\ 1 & 2 & 3 \\ 3 & 0 & 2 \end{vmatrix} = \left(\frac{1}{12}\right)^3 \times \begin{vmatrix} -5 & 2 & 8 \\ -2 & 2 & 3 \\ 1 & 0 & 2 \end{vmatrix} = \left(\frac{1}{12}\right)^3 \times \begin{vmatrix} 0 & 2 & 18 \\ 0 & 2 & 7 \\ 1 & 0 & 2 \end{vmatrix}$

$= \left(\frac{1}{12}\right)^3 \times 2 \begin{vmatrix} 1 & 0 & 2 \\ 0 & 1 & 18 \\ 0 & 1 & 7 \end{vmatrix} = \frac{1}{6} \times \left(\frac{1}{12}\right)^2 \times (7-18) = -\frac{11}{864}$ //

(7) $(与式) = \begin{vmatrix} 99 & 100 & 101 \\ 1 & -1 & -1 \\ 2 & 1 & -2 \end{vmatrix} = \begin{vmatrix} 99 & 199 & 200 \\ 1 & 0 & 0 \\ 2 & 3 & 0 \end{vmatrix} = -\begin{vmatrix} 1 & 0 & 0 \\ 99 & 199 & 200 \\ 2 & 3 & 0 \end{vmatrix} = 600$ //

(9) $(与式) = \begin{vmatrix} 1 & -1 & -1 & 1 & -1 \\ 0 & 0 & 2 & 0 & 2 \\ 0 & 2 & 0 & 0 & 0 \\ 0 & 0 & 0 & 2 & 0 \\ 0 & 2 & 2 & -2 & 0 \end{vmatrix} = \begin{vmatrix} 0 & 2 & 0 & 2 \\ 2 & 0 & 0 & 0 \\ 0 & 0 & 2 & 0 \\ 0 & 2 & -2 & 0 \end{vmatrix} = -2 \begin{vmatrix} 1 & 0 & 0 & 0 \\ 0 & 2 & 0 & 2 \\ 0 & 0 & 2 & 0 \\ 0 & 2 & -2 & 0 \end{vmatrix}$

$= (-2)(-1) \begin{vmatrix} 2 & 0 & 2 \\ 0 & 2 & 0 \\ 0 & -2 & 2 \end{vmatrix} = 2 \times 2 \begin{vmatrix} 2 & 0 \\ -2 & 2 \end{vmatrix} = 16$ //

(10)

$$(\text{与式}) = (-1)^{n-1}\begin{vmatrix} 1 & 0 & \cdots & 0 & 0 \\ 0 & 0 & \cdots & 0 & 1 \\ & & & & \\ 0 & 0 & \cdots & 0 & 0 \\ 0 & 1 & \cdots & 0 & 0 \end{vmatrix} = (-1)^{n-1}\cdot(-1)^{n-2}\begin{vmatrix} 1 & 0 & \cdots & 0 & 0 \\ 0 & 1 & \cdots & 0 & 0 \\ 0 & 0 & \cdots & 0 & 1 \\ & & & & \\ 0 & 0 & 1 & 0 & 0 \end{vmatrix}$$

$$\cdots = (-1)^{n-1+(n-2)+\cdots+2+1}\,|E_n| = (-1)^{\frac{1}{2}n(n-1)} \text{ //}$$