

# 代幾 I 計算演習 [問題] (2007/11/27)

問. 次の行列の行列式を求めなさい

Q.1

$$\begin{vmatrix} 3 & -5 & -7 & -3 & 5 & -5 & 8 & 3 & -8 \\ 0 & 2 & -4 & 7 & -1 & -6 & 6 & 1 & 0 \\ 0 & 0 & 3 & 0 & 3 & -4 & 3 & 8 & 9 \\ 0 & 0 & -3 & -2 & 3 & 3 & 2 & -7 & 0 \\ 0 & 0 & 0 & 1 & -1 & -8 & 6 & -6 & 1 \\ 0 & 0 & 0 & 0 & 0 & 0 & -7 & 4 & -9 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 & 2 & -3 \end{vmatrix}$$

Q.4

$$\begin{vmatrix} -2 & -1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 3 & 3 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -9 & -4 & 4 & 3 & -1 & -1 & 0 & 0 & 0 \\ -7 & -2 & -6 & -3 & -2 & 1 & 0 & 0 & 0 \\ -9 & 3 & 2 & 1 & -3 & 3 & 0 & 0 & 0 \\ 3 & 1 & -2 & 1 & -5 & -9 & 5 & 4 & 0 \\ 4 & 5 & -3 & -5 & -1 & 3 & 1 & 4 & 0 \\ -3 & 4 & 3 & -4 & -6 & 8 & 0 & -6 & -10 \end{vmatrix}$$

Q.2

$$\begin{vmatrix} 2 & -3 & 3 & -6 & 1 & -6 & 6 \\ 1 & 1 & 1 & -8 & 7 & -9 & 1 \\ 0 & -1 & -2 & -9 & 9 & 6 & -1 \\ 0 & 0 & 0 & 0 & -5 & -5 & -6 \\ 0 & 0 & 0 & 0 & -8 & 8 & 4 \\ 0 & 0 & 0 & 0 & 0 & -5 & 2 \\ 0 & 0 & 0 & 0 & 0 & -1 & 3 \end{vmatrix}$$

Q.5

$$\begin{vmatrix} -3 & 2 & 2 & -8 & -1 & 1 & -2 \\ 2 & 2 & 2 & -5 & -4 & 0 & -2 \\ 1 & -2 & 0 & 0 & 0 & -8 & 6 \\ 0 & 0 & 0 & 2 & 1 & -2 & -1 \\ 0 & 0 & 0 & 1 & 3 & 2 & 1 \\ 0 & 0 & 0 & 0 & 3 & 1 & 1 \\ 0 & 0 & 0 & 0 & 0 & 0 & -3 \end{vmatrix}$$

Q.3

$$\begin{vmatrix} -1 & -2 & 1 & 0 & 0 & 0 & 0 & 0 \\ -1 & 0 & 2 & 0 & 0 & 0 & 0 & 0 \\ 1 & -3 & -1 & 0 & 0 & 0 & 0 & 0 \\ 2 & 4 & -6 & -10 & 0 & 0 & 0 & 0 \\ 7 & -7 & -2 & -9 & 1 & -1 & -2 & 0 \\ 5 & 8 & 1 & 6 & -3 & 2 & -1 & 0 \\ 0 & -8 & 7 & 2 & 2 & -3 & -3 & 0 \\ -1 & 0 & 0 & 4 & -6 & 8 & -1 & 10 \end{vmatrix}$$

Q.6

$$\begin{vmatrix} 1 & 0 & 0 & 0 & 0 \\ -3 & -4 & 0 & 0 & 0 \\ 7 & -5 & 2 & 3 & 1 \\ 8 & -5 & 3 & -3 & -1 \\ -4 & 8 & 2 & 1 & -3 \end{vmatrix}$$

## 代幾 I 計算演習 [解答] (2007/11/27)

A.1

$$\begin{aligned}\text{与式} &= \begin{vmatrix} 3 & -5 \\ 0 & 2 \end{vmatrix} \times \begin{vmatrix} 3 & 0 & 3 \\ -3 & -2 & 3 \\ 0 & 1 & -1 \end{vmatrix} \times 0 \times \begin{vmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 1 & 2 & -3 \end{vmatrix} \\ &= 6 \times (-12) \times 0 \times 0 \\ &= 0\end{aligned}$$

A.2

$$\begin{aligned}\text{与式} &= \begin{vmatrix} 2 & -3 & 3 \\ 1 & 1 & 1 \\ 0 & -1 & -2 \end{vmatrix} \times 0 \times (-8) \times \begin{vmatrix} -5 & 2 \\ -1 & 3 \end{vmatrix} \\ &= (-11) \times 0 \times (-8) \times (-13) \\ &= 0\end{aligned}$$

A.3

$$\begin{aligned}\text{与式} &= \begin{vmatrix} -1 & -2 & 1 \\ -1 & 0 & 2 \\ 1 & -3 & -1 \end{vmatrix} \times (-10) \times \begin{vmatrix} 1 & -1 & -2 \\ -3 & 2 & -1 \\ 2 & -3 & -3 \end{vmatrix} \times 10 \\ &= (-5) \times (-10) \times (-8) \times 10 \\ &= -4000\end{aligned}$$

A.4

$$\begin{aligned}\text{与式} &= \begin{vmatrix} -2 & -1 & -1 \\ 1 & 0 & 0 \\ 3 & 3 & 0 \end{vmatrix} \times \begin{vmatrix} 3 & -1 & -1 \\ -3 & -2 & 1 \\ 1 & -3 & 3 \end{vmatrix} \times \begin{vmatrix} 5 & 4 \\ 1 & 4 \end{vmatrix} \times (-10) \\ &= (-3) \times (-30) \times 16 \times (-10) \\ &= -14400\end{aligned}$$

A.5

$$\begin{aligned}\text{与式} &= \begin{vmatrix} -3 & 2 & 2 \\ 2 & 2 & 2 \\ 1 & -2 & 0 \end{vmatrix} \times \begin{vmatrix} 2 & 1 & -2 \\ 1 & 3 & 2 \\ 0 & 3 & 1 \end{vmatrix} \times (-3) \\ &= (-20) \times (-13) \times (-3) \\ &= -780\end{aligned}$$

A.6

$$\begin{aligned}\text{与式} &= \begin{vmatrix} 1 & 0 \\ -3 & -4 \end{vmatrix} \times \begin{vmatrix} 2 & 3 & 1 \\ 3 & -3 & -1 \\ 2 & 1 & -3 \end{vmatrix} \\ &= (-4) \times 50 \\ &= -200\end{aligned}$$