

代数学幾何学 (A/B) 計算演習 [問題] (2009/10/22)

問. 次の行列の行列式を求めなさい

Q.1

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

Q.6

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

Q.2

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

Q.7

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

Q.3

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

Q.8

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

Q.4

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

Q.9

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

Q.5

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

Q.10

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

代数学幾何学 (A/B) 計算演習 [解答] (2009/10/22)

A.1

$$\begin{vmatrix} 0 & -2 & 4 & -3 \\ 0 & 7 & 0 & 1 \\ 4 & -3 & -9 & 7 \\ 0 & 1 & 0 & 0 \end{vmatrix} = 16$$

A.2

$$\begin{vmatrix} 5 & 3 & 0 & 6 \\ -5 & 3 & 3 & -2 \\ 0 & 0 & 0 & 4 \\ 2 & 0 & 0 & -3 \end{vmatrix} = -72$$

A.3

$$\begin{vmatrix} -1 & 0 & 0 & 0 & 2 \\ -6 & 3 & 0 & 0 & 5 \\ 0 & 2 & 2 & 0 & 3 \\ -6 & 1 & 0 & 2 & 0 \\ 2 & 0 & 0 & 0 & 0 \end{vmatrix} = -48$$

A.4

$$\begin{vmatrix} 0 & 8 & 6 & 1 & -4 & -8 \\ 0 & -2 & -7 & 0 & -9 & 1 \\ 1 & -9 & 4 & 6 & 3 & -6 \\ 0 & 2 & -6 & 0 & 0 & 0 \\ 0 & 7 & 2 & 0 & 2 & 0 \\ 0 & 0 & 3 & 0 & 0 & 0 \end{vmatrix} = 12$$

A.5

$$\begin{vmatrix} 6 & 8 & -5 & 4 \\ 0 & 1 & 8 & 0 \\ 0 & 0 & 1 & 0 \\ 3 & 6 & 0 & 0 \end{vmatrix} = -12$$

A.6

$$\begin{vmatrix} 0 & 1 & 7 & -7 & 3 \\ 1 & 0 & 4 & 6 & 6 \\ 0 & 2 & 0 & 0 & 0 \\ 0 & -8 & 0 & 2 & 0 \\ 0 & -7 & 1 & 2 & 0 \end{vmatrix} = -12$$

A.7

$$\begin{vmatrix} -6 & 0 & 5 & 4 & -1 & 0 \\ 2 & 0 & 0 & 0 & 0 & 0 \\ -8 & 4 & 8 & 2 & 7 & -8 \\ 2 & 0 & 4 & 0 & 0 & 0 \\ -1 & 0 & 0 & 0 & 1 & 0 \\ 4 & 0 & -7 & -7 & 9 & 2 \end{vmatrix} = -256$$

A.8

$$\begin{vmatrix} 8 & 5 & 2 & 0 & 0 \\ -8 & -1 & 8 & 2 & 4 \\ -8 & 3 & 8 & 0 & 2 \\ 4 & 0 & 0 & 0 & 0 \\ 4 & 4 & 0 & 0 & 0 \end{vmatrix} = 128$$

A.9

$$\begin{vmatrix} 0 & 0 & -3 & 0 & 3 \\ 0 & 5 & -2 & 1 & -4 \\ 0 & 2 & -6 & 0 & 3 \\ 1 & -5 & -3 & -1 & 9 \\ 0 & 0 & 2 & 0 & 0 \end{vmatrix} = 12$$

A.10

$$\begin{vmatrix} 2 & 0 & -4 & 0 \\ 0 & 0 & 4 & 0 \\ -3 & 3 & -1 & 0 \\ -3 & -4 & -1 & 2 \end{vmatrix} = -48$$