

行列式 解答

1

$$(1) \begin{vmatrix} 0 & 2 \\ 5 & 0 \end{vmatrix} = 0 - 2 \times 5 = -10$$

$$(2) \begin{vmatrix} 4 & 5 \\ 0 & 3 \end{vmatrix} = 4 \times 3 - 0 = 12$$

$$(3) \begin{vmatrix} 2 & 7 \\ 7 & -1 \end{vmatrix} = 2 \times (-1) - 7 \times 7 = -51$$

$$(4) \begin{vmatrix} -1 & -2 \\ -4 & -1 \end{vmatrix} = (-1) \times (-1) - (-4) \times (-2) = -7$$

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

$$(6) \begin{vmatrix} 5 & 0 \\ 4 & 2 \end{vmatrix} = 10$$

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

$$(8) \begin{vmatrix} -1 & 2 \\ -3 & 2 \end{vmatrix} = 4$$

$$(9) \begin{vmatrix} 4 & 5 \\ 8 & 10 \end{vmatrix} = 0$$

$$(10) \begin{vmatrix} 3 & 6 \\ 2 & 4 \end{vmatrix} = 0$$

$$(11) \begin{vmatrix} 2 & 2 \\ 4 & 4 \end{vmatrix} = 0$$

$$(12) \begin{vmatrix} 25 & 45 \\ 27 & 51 \end{vmatrix} = \begin{vmatrix} 25 & 45 \\ 2 & 6 \end{vmatrix} = 5 \times 2 \begin{vmatrix} 5 & 9 \\ 1 & 3 \end{vmatrix} = 10 \begin{vmatrix} 2 & 0 \\ 1 & 3 \end{vmatrix} = 60$$

$$(13) \begin{vmatrix} 73 & 59 \\ 24 & 18 \end{vmatrix} = \begin{vmatrix} 1 & 5 \\ 24 & 18 \end{vmatrix} = 6 \begin{vmatrix} 1 & 5 \\ 4 & 3 \end{vmatrix} = 6(3 - 20) = -102$$

$$(14) \begin{vmatrix} 56 & 48 \\ 49 & 35 \end{vmatrix} = \begin{vmatrix} 7 & 13 \\ 49 & 35 \end{vmatrix} = 7 \begin{vmatrix} 7 & 13 \\ 7 & 5 \end{vmatrix} = 7 \begin{vmatrix} 0 & 8 \\ 7 & 5 \end{vmatrix} = -392$$

2

$$(1) \begin{vmatrix} 2 & 1 & -4 \\ 0 & 2 & 19 \\ 0 & 0 & 3 \end{vmatrix} = 2 \times 2 \times 3 = 12$$

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

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

$$(4) \begin{vmatrix} 12 & 5 & 13 \\ 5 & 7 & 8 \\ 9 & 6 & 8 \end{vmatrix} = \begin{vmatrix} 3 & -1 & 5 \\ 5 & 7 & 8 \\ 4 & -1 & 0 \end{vmatrix} = \begin{vmatrix} -1 & 0 & 5 \\ 1 & 8 & 8 \\ 4 & -1 & 0 \end{vmatrix} = \begin{vmatrix} -1 & 0 & 5 \\ 0 & 8 & 13 \\ 0 & -1 & 20 \end{vmatrix} = - \begin{vmatrix} 8 & 13 \\ -1 & 20 \end{vmatrix} = -173$$

$$(5) \begin{vmatrix} 4 & 2 & 6 \\ 15 & 35 & 20 \\ 8 & 7 & 5 \end{vmatrix} = 10 \begin{vmatrix} 2 & 1 & 3 \\ 3 & 7 & 4 \\ 8 & 7 & 5 \end{vmatrix} = 10 \begin{vmatrix} 2 & 1 & 3 \\ 1 & 6 & 1 \\ 0 & 3 & -7 \end{vmatrix} = 10 \begin{vmatrix} 0 & -11 & 1 \\ 1 & 6 & 1 \\ 0 & 3 & -7 \end{vmatrix} = -10 \begin{vmatrix} -11 & 1 \\ 3 & -7 \end{vmatrix} = -740$$

$$(6) \begin{vmatrix} 14 & 7 & 35 \\ 8 & 4 & 6 \\ 9 & 3 & 3 \end{vmatrix} = 7 \times 2 \times 3 \begin{vmatrix} 2 & 1 & 5 \\ 4 & 2 & 3 \\ 3 & 1 & 1 \end{vmatrix} = 42 \begin{vmatrix} 2 & 1 & 5 \\ 0 & 0 & -7 \\ 1 & 0 & -4 \end{vmatrix} = 42 \times 7 \begin{vmatrix} 2 & 1 \\ 1 & 0 \end{vmatrix} = -294$$

$$(7) \begin{vmatrix} 0 & 8 & 12 \\ 3 & 9 & 2 \\ 5 & 5 & 3 \end{vmatrix} = 4 \begin{vmatrix} 0 & 2 & 3 \\ 3 & 9 & 2 \\ 2 & -4 & 1 \end{vmatrix} = 4 \begin{vmatrix} 0 & 2 & 3 \\ 1 & 13 & 1 \\ 2 & -4 & 1 \end{vmatrix} = 4 \begin{vmatrix} 0 & 2 & 3 \\ 1 & 13 & 1 \\ 0 & -30 & -1 \end{vmatrix} = -4 \begin{vmatrix} 2 & 3 \\ -30 & -1 \end{vmatrix} = -352$$

$$(8) \begin{vmatrix} 5 & 9 & 9 \\ 2 & 6 & 3 \\ 8 & 11 & 6 \end{vmatrix} = \begin{vmatrix} 3 & 3 & 6 \\ 2 & 6 & 3 \\ 4 & -1 & 0 \end{vmatrix} = 3 \begin{vmatrix} 1 & 1 & 2 \\ 2 & 6 & 3 \\ 4 & -1 & 0 \end{vmatrix} = 3 \begin{vmatrix} 1 & 1 & 2 \\ 0 & 4 & -1 \\ 0 & -5 & -8 \end{vmatrix} = 3 \begin{vmatrix} 4 & -1 \\ -5 & -8 \end{vmatrix} = -111$$

$$(9) \begin{vmatrix} 2 & 1 & 4 \\ 3 & 5 & 1 \\ 0 & 7 & -10 \end{vmatrix} = \begin{vmatrix} 2 & 1 & 4 \\ 1 & 4 & -3 \\ 0 & 7 & -10 \end{vmatrix} = \begin{vmatrix} 0 & -7 & 10 \\ 1 & 4 & -3 \\ 0 & 7 & -10 \end{vmatrix} = 0$$

$$(10) \begin{vmatrix} 8 & 2 & 9 \\ 7 & 5 & 3 \\ 4 & 6 & 7 \end{vmatrix} = \begin{vmatrix} 1 & -3 & 6 \\ 3 & -1 & -4 \\ 4 & 6 & 7 \end{vmatrix} = \begin{vmatrix} 1 & -3 & 6 \\ 3 & -1 & -4 \\ 1 & 7 & 11 \end{vmatrix} = \begin{vmatrix} 1 & -3 & 6 \\ 0 & 8 & -22 \\ 0 & 10 & 5 \end{vmatrix} = 10 \begin{vmatrix} 4 & -11 \\ 2 & 1 \end{vmatrix} = 260$$

$$(11) \begin{vmatrix} 2 & 5 & 3 \\ 0 & 9 & 4 \\ 6 & 10 & 3 \end{vmatrix} = 2 \begin{vmatrix} 1 & 5 & 3 \\ 0 & 9 & 4 \\ 3 & 10 & 3 \end{vmatrix} = 2 \begin{vmatrix} 1 & 5 & 3 \\ 0 & 9 & 4 \\ 0 & -5 & -6 \end{vmatrix} = 2 \begin{vmatrix} 9 & 4 \\ -5 & -6 \end{vmatrix} = -68$$

3

$$\begin{aligned}
(1) \quad & \begin{vmatrix} 7 & 0 & 2 & 0 \\ 0 & 8 & 5 & 9 \\ 1 & 3 & 0 & 2 \\ 0 & 4 & 0 & 5 \end{vmatrix} = \begin{vmatrix} 0 & -21 & 2 & -14 \\ 0 & 8 & 5 & 9 \\ 1 & 3 & 0 & 2 \\ 0 & 4 & 0 & 5 \end{vmatrix} = \begin{vmatrix} -21 & 2 & -14 \\ 8 & 5 & 9 \\ 4 & 0 & 5 \end{vmatrix} = \begin{vmatrix} -1 & 2 & 11 \\ 0 & 5 & -1 \\ 4 & 0 & 5 \end{vmatrix} = \begin{vmatrix} -1 & 2 & 11 \\ 0 & 5 & -1 \\ 0 & 8 & 49 \end{vmatrix} \\
& = - \begin{vmatrix} 5 & -1 \\ 8 & 49 \end{vmatrix} = - \begin{vmatrix} 5 & -1 \\ 3 & 50 \end{vmatrix} = -253
\end{aligned}$$

$$\begin{aligned}
(2) \quad & \begin{vmatrix} 3 & 8 & 4 & 2 \\ 6 & 5 & 9 & 1 \\ 7 & 2 & 7 & 8 \\ 5 & 3 & 2 & 2 \end{vmatrix} = \begin{vmatrix} 3 & 8 & 4 & 2 \\ 6 & 5 & 9 & 1 \\ 1 & -3 & -2 & 7 \\ 5 & 3 & 2 & 2 \end{vmatrix} = \begin{vmatrix} 3 & 8 & 4 & 2 \\ 1 & 2 & 7 & -1 \\ 1 & -3 & -2 & 7 \\ 5 & 3 & 2 & 2 \end{vmatrix} = \begin{vmatrix} 3 & 8 & 4 & 2 \\ 1 & 2 & 7 & -1 \\ 1 & -3 & -2 & 7 \\ 2 & -5 & -2 & 0 \end{vmatrix} \\
& = \begin{vmatrix} 1 & 13 & 6 & 2 \\ 0 & 5 & 9 & -8 \\ 1 & -3 & -2 & 7 \\ 0 & 1 & 2 & -14 \end{vmatrix} = \begin{vmatrix} 0 & 16 & 8 & -5 \\ 0 & 5 & 9 & -8 \\ 1 & -3 & -2 & 7 \\ 0 & 1 & 2 & -14 \end{vmatrix} = \begin{vmatrix} 16 & 8 & -5 \\ 5 & 9 & -8 \\ 1 & 2 & -14 \end{vmatrix} = \begin{vmatrix} 1 & -19 & 19 \\ 5 & 9 & -8 \\ 1 & 2 & -14 \end{vmatrix} \\
& = \begin{vmatrix} 0 & -21 & 33 \\ 0 & -1 & 62 \\ 1 & 2 & -14 \end{vmatrix} = 3 \begin{vmatrix} -7 & 11 \\ -1 & 62 \end{vmatrix} = -1269
\end{aligned}$$

$$\begin{aligned}
(3) \quad & \begin{vmatrix} 4 & 5 & 9 & 3 \\ 1 & 2 & 1 & 3 \\ 2 & 2 & 4 & 9 \\ 3 & 0 & 5 & 8 \end{vmatrix} = \begin{vmatrix} 0 & 1 & 1 & -15 \\ 1 & 2 & 1 & 3 \\ 1 & 0 & 3 & 6 \\ 1 & -2 & 1 & -1 \end{vmatrix} = \begin{vmatrix} 0 & 1 & 1 & -15 \\ 1 & 2 & 0 & 2 \\ 1 & 0 & 2 & 5 \\ 1 & -2 & 0 & -2 \end{vmatrix} = \begin{vmatrix} 0 & 1 & 1 & -15 \\ 1 & 2 & 1 & 3 \\ 0 & -2 & 2 & 3 \\ 0 & 4 & 0 & 4 \end{vmatrix} \\
& = -4 \begin{vmatrix} 1 & 1 & -15 \\ -2 & 2 & 3 \\ 1 & 0 & 1 \end{vmatrix} = -4 \begin{vmatrix} 0 & 1 & -16 \\ 0 & 2 & 5 \\ 1 & 0 & 1 \end{vmatrix} = -4 \begin{vmatrix} 1 & -16 \\ 2 & 5 \end{vmatrix} = 148
\end{aligned}$$

$$\begin{aligned}
(4) \quad & \begin{vmatrix} 5 & 2 & 3 & 7 \\ 8 & 9 & 1 & 1 \\ 2 & 6 & 4 & 8 \\ 1 & 5 & 3 & 5 \end{vmatrix} = 2 \begin{vmatrix} 5 & 2 & 3 & 7 \\ 8 & 9 & 1 & 1 \\ 1 & 3 & 2 & 4 \\ 1 & 5 & 3 & 5 \end{vmatrix} = 2 \begin{vmatrix} 5 & 2 & 3 & 7 \\ 3 & 7 & -2 & -6 \\ 1 & 3 & 2 & 4 \\ 1 & 5 & 3 & 5 \end{vmatrix} = 2 \begin{vmatrix} 5 & 2 & 3 & 7 \\ 3 & 7 & -2 & -6 \\ 1 & 3 & 2 & 4 \\ 0 & 2 & 1 & 1 \end{vmatrix} \\
& = 2 \begin{vmatrix} 5 & 0 & 2 & 6 \\ 3 & 3 & -4 & -8 \\ 1 & 1 & 1 & 3 \\ 0 & 2 & 1 & 1 \end{vmatrix} = 2 \begin{vmatrix} 0 & -5 & -3 & -9 \\ 0 & 0 & -7 & -17 \\ 1 & 1 & 1 & 3 \\ 0 & 2 & 1 & 1 \end{vmatrix} = 2 \begin{vmatrix} 5 & 3 & 9 \\ 0 & 7 & 17 \\ 2 & 1 & 1 \end{vmatrix} = 2 \begin{vmatrix} 1 & 1 & 7 \\ 0 & 7 & 17 \\ 2 & 1 & 1 \end{vmatrix} \\
& = 2 \begin{vmatrix} 1 & 1 & 7 \\ 0 & 7 & 17 \\ 0 & -1 & -13 \end{vmatrix} = 2 \begin{vmatrix} 7 & 17 \\ -1 & -13 \end{vmatrix} = 2 \begin{vmatrix} 6 & 4 \\ -1 & -13 \end{vmatrix} = -4 \begin{vmatrix} 3 & 2 \\ 1 & 13 \end{vmatrix} = -148
\end{aligned}$$

$$\begin{aligned}
(5) \quad & \begin{vmatrix} 4 & 7 & 0 & 8 \\ 5 & 1 & 4 & 2 \\ 6 & 6 & 9 & 5 \\ 2 & 4 & 3 & 1 \end{vmatrix} = \begin{vmatrix} 4 & 7 & 0 & 8 \\ 5 & 1 & 4 & 2 \\ 1 & 5 & 5 & 3 \\ 2 & 4 & 3 & 1 \end{vmatrix} = \begin{vmatrix} 4 & 7 & 0 & 8 \\ 1 & -6 & 4 & -6 \\ 1 & 5 & 5 & 3 \\ 1 & -1 & -2 & -2 \end{vmatrix} = \begin{vmatrix} 0 & 11 & 8 & 16 \\ 0 & -5 & 6 & -4 \\ 0 & 6 & 7 & 5 \\ 1 & -1 & -2 & -2 \end{vmatrix} \\
& = - \begin{vmatrix} 11 & 8 & 16 \\ -5 & 6 & -4 \\ 6 & 7 & 5 \end{vmatrix} = - \begin{vmatrix} -1 & -6 & 6 \\ -5 & 6 & -4 \\ 1 & 13 & 1 \end{vmatrix} = - \begin{vmatrix} -1 & -6 & 6 \\ -6 & 0 & 2 \\ 1 & 13 & 1 \end{vmatrix} = 2 \begin{vmatrix} 1 & 6 & -6 \\ -3 & 0 & 1 \\ 1 & 13 & 1 \end{vmatrix} \\
& = 2 \begin{vmatrix} 1 & 6 & -6 \\ 0 & 18 & -17 \\ 0 & 7 & 7 \end{vmatrix} = 14 \begin{vmatrix} 18 & -17 \\ 1 & 1 \end{vmatrix} = 490
\end{aligned}$$