I (2005/07/07)

1.

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

2.

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

3.

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

4.

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

5.

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

6.

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

7.

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

8.

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

9.

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

10.

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

11.

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

12.

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

1.

$$\begin{vmatrix} -4 & 1 & 4 \\ 3 & 4 & -2 \\ 4 & -4 & -2 \end{vmatrix} = \begin{array}{l} (-4) \times 4 \times (-2) + 1 \times (-2) \times 4 + 4 \times 3 \times (-4) \\ - (-4) \times (-2) \times (-4) - 1 \times 3 \times (-2) - 4 \times 4 \times 4 \end{array}$$
$$= -50$$

2.

$$\begin{vmatrix} 4 & -2 & 5 \\ 2 & 3 & 0 \\ 4 & -4 & 1 \end{vmatrix} = \begin{array}{l} 4 \times 3 \times 1 + (-2) \times 0 \times 4 + 5 \times 2 \times (-4) \\ - 4 \times 0 \times (-4) - (-2) \times 2 \times 1 - 5 \times 3 \times 4 \end{array}$$
$$= -84$$

3.

$$\begin{vmatrix} -1 & 1 & 4 \\ -2 & -5 & -3 \\ 0 & 2 & -4 \end{vmatrix} = \begin{array}{l} (-1) \times (-5) \times (-4) + 1 \times (-3) \times 0 + 4 \times (-2) \times 2 \\ - (-1) \times (-3) \times 2 - 1 \times (-2) \times (-4) - 4 \times (-5) \times 0 \end{array}$$
$$= -50$$

4.

$$\begin{vmatrix} 2 & -5 & 0 \\ -5 & 5 & 4 \\ 2 & 3 & 3 \end{vmatrix} = \begin{array}{l} 2 \times 5 \times 3 + (-5) \times 4 \times 2 + 0 \times (-5) \times 3 \\ - 2 \times 4 \times 3 - (-5) \times (-5) \times 3 - 0 \times 5 \times 2 \end{array}$$
$$= -109$$

5.

$$\begin{vmatrix} 3 & -1 & 2 \\ -4 & -4 & -5 \\ 4 & 1 & 1 \end{vmatrix} = \begin{array}{l} 3 \times (-4) \times 1 + (-1) \times (-5) \times 4 + 2 \times (-4) \times 1 \\ - 3 \times (-5) \times 1 - (-1) \times (-4) \times 1 - 2 \times (-4) \times 4 \end{array}$$
$$= 43$$

6.

$$\begin{vmatrix} -2 & 0 & 3 \\ 5 & 4 & -4 \\ 1 & 5 & -5 \end{vmatrix} = \begin{array}{l} (-2) \times 4 \times (-5) + 0 \times (-4) \times 1 + 3 \times 5 \times 5 \\ - (-2) \times (-4) \times 5 - 0 \times 5 \times (-5) - 3 \times 4 \times 1 \end{array}$$
$$= 63$$

7.

$$\begin{vmatrix} 3 & -1 & 2 \\ 2 & 4 & 1 \\ -4 & 4 & 0 \end{vmatrix} = \begin{matrix} 3 \times 4 \times 0 & + & (-1) \times 1 \times (-4) & + & 2 \times 2 \times 4 \\ - & 3 \times 1 \times 4 & - & (-1) \times 2 \times 0 & - & 2 \times 4 \times (-4) \end{matrix}$$
$$= 40$$

8.

$$\begin{vmatrix} 4 & -2 & -3 \\ -1 & -4 & 0 \\ -5 & -3 & 1 \end{vmatrix} = \begin{matrix} 4 \times (-4) \times 1 & + & (-2) \times 0 \times (-5) & + & (-3) \times (-1) \times (-3) \\ - & 4 \times 0 \times (-3) & - & (-2) \times (-1) \times 1 & - & (-3) \times (-4) \times (-5) \end{matrix}$$
$$= 33$$

9.

$$\begin{vmatrix} 4 & 4 & -4 \\ 0 & 5 & 1 \\ -5 & 2 & -2 \end{vmatrix} = \begin{matrix} 4 \times 5 \times (-2) & + & 4 \times 1 \times (-5) & + & (-4) \times 0 \times 2 \\ - & 4 \times 1 \times 2 & - & 4 \times 0 \times (-2) & - & (-4) \times 5 \times (-5) \end{matrix}$$
$$= -168$$

10.

$$\begin{vmatrix} 5 & -3 & -5 \\ 5 & 5 & 0 \\ 2 & 0 & -4 \end{vmatrix} = \begin{matrix} 5 \times 5 \times (-4) & + & (-3) \times 0 \times 2 & + & (-5) \times 5 \times 0 \\ - & 5 \times 0 \times 0 & - & (-3) \times 5 \times (-4) & - & (-5) \times 5 \times 2 \end{matrix}$$
$$= -110$$

11.

$$\begin{vmatrix} -3 & -1 & -5 \\ 0 & -3 & -2 \\ 1 & -1 & -3 \end{vmatrix} = \begin{matrix} (-3) \times (-3) \times (-3) & + & (-1) \times (-2) \times 1 & + & (-5) \times 0 \times (-1) \\ - & (-3) \times (-2) \times (-1) & - & (-1) \times 0 \times (-3) & - & (-5) \times (-3) \times 1 \end{matrix}$$
$$= -34$$

12.

$$\begin{vmatrix} -5 & -2 & -1 \\ 1 & -4 & -5 \\ 2 & -1 & -5 \end{vmatrix} = \begin{matrix} (-5) \times (-4) \times (-5) & + & (-2) \times (-5) \times 2 & + & (-1) \times 1 \times (-1) \\ - & (-5) \times (-5) \times (-1) & - & (-2) \times 1 \times (-5) & - & (-1) \times (-4) \times 2 \end{matrix}$$
$$= -72$$