

線形代数学 II 演習問題 (2014 年 6 月 16 日)

問題 1. 以下の行列式の値を求めよ.

[1] $\begin{vmatrix} 3 & 0 & 0 \\ 2 & -1 & 1 \\ -3 & 0 & -3 \end{vmatrix}$	[2] $\begin{vmatrix} 0 & 2 & -1 \\ 2 & 0 & -2 \\ 3 & -2 & -3 \end{vmatrix}$	[3] $\begin{vmatrix} 2 & -2 & 3 \\ 1 & 3 & 3 \\ 0 & 3 & 2 \end{vmatrix}$
[4] $\begin{vmatrix} 3 & -3 & 1 \\ -1 & 1 & -2 \\ 1 & 0 & 2 \end{vmatrix}$	[5] $\begin{vmatrix} 2 & -3 & 2 \\ -2 & -1 & 2 \\ 0 & 1 & -1 \end{vmatrix}$	[6] $\begin{vmatrix} -2 & 2 & -1 \\ 3 & -1 & 2 \\ 1 & -3 & -3 \end{vmatrix}$
[7] $\begin{vmatrix} -1 & -2 & -3 \\ 0 & -1 & 0 \\ -2 & -1 & 2 \end{vmatrix}$	[8] $\begin{vmatrix} -1 & 1 & 1 \\ -3 & 0 & 3 \\ 0 & 0 & -2 \end{vmatrix}$	[9] $\begin{vmatrix} 0 & 0 & 1 \\ 0 & 2 & 2 \\ 1 & 3 & 0 \end{vmatrix}$
[10] $\begin{vmatrix} 0 & 2 & 3 \\ 2 & -3 & -2 \\ 0 & 1 & 2 \end{vmatrix}$	[11] $\begin{vmatrix} -2 & 0 & -2 \\ 2 & 2 & 0 \\ 0 & 0 & 2 \end{vmatrix}$	[12] $\begin{vmatrix} 2 & 2 & 1 \\ -2 & -3 & 3 \\ -3 & -2 & 3 \end{vmatrix}$
[13] $\begin{vmatrix} 2 & 3 & 3 \\ 3 & 1 & 3 \\ 0 & -2 & 1 \end{vmatrix}$	[14] $\begin{vmatrix} 3 & 0 & -2 \\ 1 & 0 & 3 \\ 2 & 1 & 3 \end{vmatrix}$	[15] $\begin{vmatrix} 2 & -3 & 3 \\ 1 & 0 & -1 \\ 3 & -2 & -2 \end{vmatrix}$
[16] $\begin{vmatrix} 0 & -1 & -2 \\ -2 & -3 & 1 \\ 1 & 1 & -2 \end{vmatrix}$	[17] $\begin{vmatrix} -3 & 0 & 2 \\ -2 & -1 & 2 \\ 1 & 1 & 0 \end{vmatrix}$	[18] $\begin{vmatrix} 3 & 1 & 2 \\ 2 & -2 & 0 \\ 0 & 3 & 1 \end{vmatrix}$
[19] $\begin{vmatrix} 3 & 0 & 0 \\ 2 & -1 & 1 \\ -3 & 0 & -3 \end{vmatrix}$	[20] $\begin{vmatrix} 0 & 0 & 1 \\ -1 & 0 & 0 \\ -3 & 2 & 2 \end{vmatrix}$	[21] $\begin{vmatrix} 1 & -1 & -1 \\ 3 & 0 & 3 \\ 0 & 1 & 2 \end{vmatrix}$
[22] $\begin{vmatrix} -1 & 2 & 1 \\ 1 & -3 & -3 \\ -3 & 1 & 1 \end{vmatrix}$	[23] $\begin{vmatrix} 0 & 3 & 3 \\ 2 & 1 & 0 \\ 0 & -2 & -3 \end{vmatrix}$	[24] $\begin{vmatrix} -3 & 1 & -2 \\ -2 & 3 & 1 \\ 2 & -1 & 1 \end{vmatrix}$
[25] $\begin{vmatrix} 1 & 1 & 3 \\ -1 & 1 & 0 \\ 2 & 3 & 2 \end{vmatrix}$	[26] $\begin{vmatrix} 3 & 1 & -3 \\ 2 & -2 & 0 \\ 3 & -2 & -1 \end{vmatrix}$	[27] $\begin{vmatrix} 3 & -2 & 2 \\ 3 & -1 & 2 \\ 1 & 0 & 3 \end{vmatrix}$
[28] $\begin{vmatrix} 3 & 0 & -1 \\ 2 & 0 & -1 \\ 1 & -3 & 1 \end{vmatrix}$	[29] $\begin{vmatrix} 2 & 2 & 1 \\ 3 & 1 & 2 \\ -1 & 3 & -1 \end{vmatrix}$	[30] $\begin{vmatrix} 3 & -1 & 1 \\ 1 & 3 & -3 \\ 0 & -2 & 3 \end{vmatrix}$
[31] $\begin{vmatrix} 1 & 3 & 0 \\ -1 & -2 & -1 \\ -1 & -1 & -3 \end{vmatrix}$	[32] $\begin{vmatrix} -2 & 3 & 2 \\ -3 & 0 & -2 \\ 1 & 1 & 2 \end{vmatrix}$	[33] $\begin{vmatrix} -2 & 2 & 1 \\ -1 & 2 & -3 \\ 3 & -1 & -2 \end{vmatrix}$
[34] $\begin{vmatrix} 1 & 2 & 3 \\ 2 & -1 & 2 \\ 0 & 3 & -1 \end{vmatrix}$	[35] $\begin{vmatrix} 1 & 0 & -1 \\ 0 & 1 & -2 \\ -1 & -1 & 1 \end{vmatrix}$	[36] $\begin{vmatrix} -1 & 0 & 1 \\ 2 & 2 & 3 \\ 0 & 1 & 3 \end{vmatrix}$

$$\begin{array}{l}
[37] \left| \begin{array}{ccc|c} 2 & 2 & -2 & \\ -1 & 2 & 0 & \\ -1 & -1 & 1 & \end{array} \right| \quad [38] \left| \begin{array}{ccc|c} 2 & -1 & -3 & \\ -1 & -1 & 3 & \\ 2 & -2 & -2 & \end{array} \right| \quad [39] \left| \begin{array}{ccc|c} 0 & 1 & 2 & \\ 1 & -2 & 1 & \\ 1 & 1 & 3 & \end{array} \right| \\
[40] \left| \begin{array}{ccc|c} 0 & 3 & -1 & \\ -2 & -1 & 2 & \\ 3 & 2 & 3 & \end{array} \right| \quad [41] \left| \begin{array}{ccc|c} -1 & 0 & -1 & \\ -1 & -3 & 1 & \\ 0 & -1 & 1 & \end{array} \right| \quad [42] \left| \begin{array}{ccc|c} 3 & 2 & -2 & \\ 0 & 3 & -3 & \\ -1 & -2 & 2 & \end{array} \right| \\
[43] \left| \begin{array}{ccc|c} 1 & 1 & 3 & \\ -1 & 1 & 2 & \\ 0 & 1 & -1 & \end{array} \right| \quad [44] \left| \begin{array}{ccc|c} 2 & 1 & 2 & \\ -1 & -1 & 2 & \\ 2 & 2 & -3 & \end{array} \right| \quad [45] \left| \begin{array}{ccc|c} 2 & 2 & 3 & \\ -3 & -1 & -2 & \\ -2 & -1 & 1 & \end{array} \right| \\
[46] \left| \begin{array}{ccc|c} 1 & 0 & -1 & \\ 1 & -1 & 1 & \\ 2 & 1 & 3 & \end{array} \right| \quad [47] \left| \begin{array}{ccc|c} 2 & -1 & -1 & \\ 1 & 0 & -2 & \\ 1 & -3 & 2 & \end{array} \right| \quad [48] \left| \begin{array}{ccc|c} 0 & 1 & 1 & \\ 3 & 2 & -1 & \\ -1 & 0 & 1 & \end{array} \right| \\
[49] \left| \begin{array}{ccc|c} -2 & 1 & -2 & \\ 1 & -1 & 1 & \\ -1 & -1 & 1 & \end{array} \right| \quad [50] \left| \begin{array}{ccc|c} 3 & 1 & 2 & \\ -2 & 1 & 1 & \\ 0 & -3 & 2 & \end{array} \right| \quad [51] \left| \begin{array}{ccc|c} 1 & 0 & -2 & \\ -2 & -2 & 2 & \\ -3 & -3 & 3 & \end{array} \right| \\
[52] \left| \begin{array}{ccc|c} 2 & -2 & -3 & \\ -3 & 1 & 1 & \\ 3 & -2 & -3 & \end{array} \right| \quad [53] \left| \begin{array}{ccc|c} 1 & 0 & -1 & \\ 2 & 1 & -2 & \\ -2 & 3 & 1 & \end{array} \right| \quad [54] \left| \begin{array}{ccc|c} 1 & 1 & 1 & \\ -2 & 3 & 0 & \\ 0 & 3 & 2 & \end{array} \right| \\
[55] \left| \begin{array}{ccc|c} 0 & -1 & 3 & \\ 3 & 1 & 3 & \\ 1 & 1 & -2 & \end{array} \right| \quad [56] \left| \begin{array}{ccc|c} 1 & 0 & -1 & \\ -2 & 1 & 1 & \\ -3 & 0 & 3 & \end{array} \right| \quad [57] \left| \begin{array}{ccc|c} 0 & 0 & -2 & \\ 3 & 0 & -1 & \\ 2 & 1 & 0 & \end{array} \right| \\
[58] \left| \begin{array}{ccc|c} 1 & 1 & 1 & \\ 1 & 2 & 1 & \\ 2 & 2 & -3 & \end{array} \right| \quad [59] \left| \begin{array}{ccc|c} -1 & -1 & 3 & \\ 3 & 2 & -2 & \\ 2 & 2 & 3 & \end{array} \right| \quad [60] \left| \begin{array}{ccc|c} -1 & 1 & -3 & \\ 1 & -1 & 1 & \\ 1 & 0 & -1 & \end{array} \right|
\end{array}$$

以上.

解答

問題 1.

[1] 9	[2] 4	[3] 7	[4] 5	[5] 0
[6] 12	[7] 8	[8] -6	[9] -2	[10] -2
[11] -8	[12] -17	[13] -13	[14] -11	[15] -7
[16] 1	[17] 4	[18] 4	[19] 9	[20] -2
[21] 0	[22] 8	[23] 6	[24] 0	[25] -11
[26] 2	[27] 7	[28] -3	[29] -2	[30] 10
[31] -1	[32] 2	[33] -13	[34] 17	[35] -2
[36] -1	[37] 0	[38] 0	[39] 4	[40] 37
[41] 1	[42] 0	[43] -7	[44] -1	[45] 11
[46] -7	[47] -5	[48] 0	[49] 2	[50] 31
[51] 0	[52] 1	[53] -1	[54] 4	[55] -3
[56] 0	[57] -6	[58] -5	[59] 9	[60] -2