

線形代数学 I 演習問題 (2014 年 4 月 21 日)

問題 1. 以下の行列の積を計算せよ.

$$[1] \begin{pmatrix} -5 \\ 2 \end{pmatrix} \begin{pmatrix} 3 \end{pmatrix}$$

$$[2] \begin{pmatrix} 4 \\ -2 \end{pmatrix} \begin{pmatrix} -3 \end{pmatrix}$$

$$[3] \begin{pmatrix} -4 \\ 1 \end{pmatrix} \begin{pmatrix} 2 \end{pmatrix}$$

$$[4] \begin{pmatrix} 0 \\ -3 \end{pmatrix} \begin{pmatrix} -4 \end{pmatrix}$$

$$[5] \begin{pmatrix} -1 \\ 3 \end{pmatrix} \begin{pmatrix} -5 & 1 \end{pmatrix}$$

$$[6] \begin{pmatrix} -4 \\ 3 \end{pmatrix} \begin{pmatrix} -2 & 1 \end{pmatrix}$$

$$[7] \begin{pmatrix} 1 \\ -1 \end{pmatrix} \begin{pmatrix} -1 & 5 \end{pmatrix}$$

$$[8] \begin{pmatrix} -5 \\ 3 \end{pmatrix} \begin{pmatrix} 2 & -5 \end{pmatrix}$$

$$[9] \begin{pmatrix} -5 \\ 1 \end{pmatrix} \begin{pmatrix} 3 & -4 & -1 \end{pmatrix}$$

$$[10] \begin{pmatrix} 1 \\ -4 \end{pmatrix} \begin{pmatrix} 0 & 2 & 1 \end{pmatrix}$$

$$[11] \begin{pmatrix} 2 \\ -1 \end{pmatrix} \begin{pmatrix} 4 & 3 & -4 \end{pmatrix}$$

$$[12] \begin{pmatrix} -2 \\ 1 \end{pmatrix} \begin{pmatrix} 1 & 4 & -3 \end{pmatrix}$$

$$[13] \begin{pmatrix} 1 \\ 2 \\ -1 \end{pmatrix} \begin{pmatrix} 4 & 1 \end{pmatrix}$$

$$[14] \begin{pmatrix} 1 \\ 2 \\ -4 \end{pmatrix} \begin{pmatrix} -1 & 2 \end{pmatrix}$$

$$[15] \begin{pmatrix} 1 \\ 0 \\ -1 \end{pmatrix} \begin{pmatrix} -3 & 2 \end{pmatrix}$$

$$[16] \begin{pmatrix} -3 \\ 1 \\ 2 \end{pmatrix} \begin{pmatrix} -4 & -1 \end{pmatrix}$$

$$[17] \begin{pmatrix} 1 \\ 0 \\ -2 \end{pmatrix} \begin{pmatrix} 3 & -1 & 2 \end{pmatrix}$$

$$[18] \begin{pmatrix} -2 \\ 3 \\ 2 \end{pmatrix} \begin{pmatrix} 3 & -1 & -2 \end{pmatrix}$$

$$[19] \begin{pmatrix} 1 \\ 1 \\ -4 \end{pmatrix} \begin{pmatrix} -1 & 2 & -3 \end{pmatrix}$$

$$[20] \begin{pmatrix} -4 \\ 0 \\ 4 \end{pmatrix} \begin{pmatrix} 0 & -2 & 2 \end{pmatrix}$$

$$[21] \begin{pmatrix} 3 & 0 \end{pmatrix} \begin{pmatrix} 1 \\ 4 \end{pmatrix}$$

$$[22] \begin{pmatrix} 4 & 2 \end{pmatrix} \begin{pmatrix} -5 \\ 2 \end{pmatrix}$$

$$[23] \begin{pmatrix} 1 & 2 \end{pmatrix} \begin{pmatrix} -4 \\ 5 \end{pmatrix}$$

$$[24] \begin{pmatrix} 3 & 2 \end{pmatrix} \begin{pmatrix} -3 \\ 4 \end{pmatrix}$$

$$[25] \begin{pmatrix} 1 & -1 \end{pmatrix} \begin{pmatrix} 1 & 1 \\ 2 & -2 \end{pmatrix}$$

$$[26] \begin{pmatrix} 1 & -2 \end{pmatrix} \begin{pmatrix} -5 & 3 \\ 2 & -1 \end{pmatrix}$$

$$[27] \begin{pmatrix} 3 & 4 \end{pmatrix} \begin{pmatrix} -2 & 3 \\ 2 & -1 \end{pmatrix}$$

$$[28] \begin{pmatrix} 1 & 3 \end{pmatrix} \begin{pmatrix} -1 & 1 \\ 1 & 2 \end{pmatrix}$$

$$[29] \begin{pmatrix} 2 & 4 \\ 5 & 5 \end{pmatrix} \begin{pmatrix} 3 \\ -2 \end{pmatrix}$$

$$[30] \begin{pmatrix} -4 & 2 \\ 4 & -3 \end{pmatrix} \begin{pmatrix} 2 \\ 3 \end{pmatrix}$$

$$[31] \begin{pmatrix} 3 & -4 \\ 1 & -5 \end{pmatrix} \begin{pmatrix} 5 \\ 1 \end{pmatrix}$$

$$[32] \begin{pmatrix} -1 & 1 \\ -5 & 3 \end{pmatrix} \begin{pmatrix} -1 \\ 2 \end{pmatrix}$$

$$[33] \begin{pmatrix} 1 & -2 \\ 1 & 5 \\ 1 & -1 \end{pmatrix} \begin{pmatrix} 4 \\ 1 \end{pmatrix}$$

$$[35] \begin{pmatrix} 2 & 4 \\ 3 & -3 \\ 1 & -5 \end{pmatrix} \begin{pmatrix} 2 \\ 1 \end{pmatrix}$$

$$[37] \begin{pmatrix} 5 & -5 \\ -2 & 4 \\ 0 & 1 \end{pmatrix} \begin{pmatrix} 1 & 1 \\ 2 & 1 \end{pmatrix}$$

$$[39] \begin{pmatrix} 3 & 4 \\ 3 & 1 \\ -2 & 0 \end{pmatrix} \begin{pmatrix} -4 & -3 \\ 3 & 4 \end{pmatrix}$$

$$[41] (3 \ 1 \ 2) \begin{pmatrix} 1 \\ -3 \\ 0 \end{pmatrix}$$

$$[43] (1 \ -1 \ 3) \begin{pmatrix} 2 \\ 1 \\ -3 \end{pmatrix}$$

$$[45] (-3 \ 3 \ 1) \begin{pmatrix} 1 & -1 \\ 2 & 2 \\ -2 & -2 \end{pmatrix}$$

$$[47] (-3 \ 1 \ 2) \begin{pmatrix} 2 & -5 \\ 2 & 2 \\ 5 & -3 \end{pmatrix}$$

$$[49] \begin{pmatrix} 3 & 3 & -1 \\ -2 & 1 & 0 \end{pmatrix} \begin{pmatrix} -1 \\ 2 \\ 0 \end{pmatrix}$$

$$[51] \begin{pmatrix} -2 & 1 & 1 \\ -2 & -1 & 0 \end{pmatrix} \begin{pmatrix} -2 \\ -1 \\ 1 \end{pmatrix}$$

$$[53] \begin{pmatrix} 2 & -1 & 0 \\ 2 & 3 & 2 \\ 3 & 1 & 1 \end{pmatrix} \begin{pmatrix} 1 \\ -2 \\ 3 \end{pmatrix}$$

$$[55] \begin{pmatrix} 0 & -1 & 3 \\ -3 & -2 & 3 \\ 1 & 1 & -1 \end{pmatrix} \begin{pmatrix} -1 \\ 3 \\ 2 \end{pmatrix}$$

$$[57] \begin{pmatrix} 0 & -2 & 2 \\ -2 & 3 & 0 \end{pmatrix} \begin{pmatrix} 1 & 3 \\ 2 & -1 \\ 1 & 0 \end{pmatrix}$$

$$[59] \begin{pmatrix} 0 & -1 & 3 \\ -3 & -2 & 3 \\ 1 & 1 & -1 \end{pmatrix} \begin{pmatrix} -1 \\ 3 \\ 2 \end{pmatrix}$$

$$[34] \begin{pmatrix} 3 & 0 \\ 3 & 2 \\ -1 & -2 \end{pmatrix} \begin{pmatrix} 2 \\ -1 \end{pmatrix}$$

$$[36] \begin{pmatrix} 0 & 2 \\ -3 & 4 \\ -2 & -1 \end{pmatrix} \begin{pmatrix} 2 \\ 3 \end{pmatrix}$$

$$[38] \begin{pmatrix} -2 & 2 \\ -4 & -2 \\ 5 & 2 \end{pmatrix} \begin{pmatrix} -1 & 0 \\ 3 & 2 \end{pmatrix}$$

$$[40] \begin{pmatrix} 3 & 1 \\ -2 & 1 \\ -3 & 5 \end{pmatrix} \begin{pmatrix} 1 & 1 \\ -1 & 1 \end{pmatrix}$$

$$[42] (2 \ 2 \ 3) \begin{pmatrix} 0 \\ 2 \\ 1 \end{pmatrix}$$

$$[44] (3 \ -2 \ 3) \begin{pmatrix} 1 \\ -1 \\ 3 \end{pmatrix}$$

$$[46] (1 \ 2 \ 1) \begin{pmatrix} -1 & 0 \\ 2 & -1 \\ 5 & 1 \end{pmatrix}$$

$$[48] (-1 \ -1 \ 1) \begin{pmatrix} -1 & 1 \\ 3 & -3 \\ 5 & -1 \end{pmatrix}$$

$$[50] \begin{pmatrix} 3 & -2 & 2 \\ 2 & -2 & 1 \end{pmatrix} \begin{pmatrix} -2 \\ 1 \\ 3 \end{pmatrix}$$

$$[52] \begin{pmatrix} 3 & -2 & 2 \\ 1 & -3 & -2 \end{pmatrix} \begin{pmatrix} 1 \\ -2 \\ 1 \end{pmatrix}$$

$$[54] \begin{pmatrix} 3 & -2 & 2 \\ 2 & -2 & 1 \end{pmatrix} \begin{pmatrix} -2 \\ 1 \\ 3 \end{pmatrix}$$

$$[56] \begin{pmatrix} 3 & 3 & -2 \\ -3 & 3 & 1 \\ 3 & -1 & -2 \end{pmatrix} \begin{pmatrix} 1 \\ -1 \\ 1 \end{pmatrix}$$

$$[58] \begin{pmatrix} 3 & 2 & -1 \\ 3 & 3 & -2 \end{pmatrix} \begin{pmatrix} -2 & 0 \\ 2 & 3 \\ 3 & 1 \end{pmatrix}$$

$$[60] \begin{pmatrix} 1 & 3 & 2 \\ 2 & 0 & 3 \end{pmatrix} \begin{pmatrix} 3 & -4 \\ -3 & 1 \\ -1 & 1 \end{pmatrix}$$

以上.

解答

問題 1.

[1] $\begin{pmatrix} -15 \\ 6 \end{pmatrix}$

[3] $\begin{pmatrix} -8 \\ 2 \end{pmatrix}$

[5] $\begin{pmatrix} 5 & -1 \\ -15 & 3 \end{pmatrix}$

[7] $\begin{pmatrix} -1 & 5 \\ 1 & -5 \end{pmatrix}$

[9] $\begin{pmatrix} -15 & 20 & 5 \\ 3 & -4 & -1 \end{pmatrix}$

[11] $\begin{pmatrix} 8 & 6 & -8 \\ -4 & -3 & 4 \end{pmatrix}$

[13] $\begin{pmatrix} 4 & 1 \\ 8 & 2 \\ -4 & -1 \end{pmatrix}$

[15] $\begin{pmatrix} -3 & 2 \\ 0 & 0 \\ 3 & -2 \end{pmatrix}$

[17] $\begin{pmatrix} 3 & -1 & 2 \\ 0 & 0 & 0 \\ -6 & 2 & -4 \end{pmatrix}$

[19] $\begin{pmatrix} -1 & 2 & -3 \\ -1 & 2 & -3 \\ 4 & -8 & 12 \end{pmatrix}$

[21] (3)

[23] (6)

[25] $(-1 \ 3)$

[27] $(2 \ 5)$

[29] $\begin{pmatrix} -2 \\ 5 \end{pmatrix}$

[31] $\begin{pmatrix} 11 \\ 0 \end{pmatrix}$

[33] $\begin{pmatrix} 2 \\ 9 \\ 3 \end{pmatrix}$

[35] $\begin{pmatrix} 8 \\ 3 \\ -3 \end{pmatrix}$

[2] $\begin{pmatrix} -12 \\ 6 \end{pmatrix}$

[4] $\begin{pmatrix} 0 \\ 12 \end{pmatrix}$

[6] $\begin{pmatrix} 8 & -4 \\ -6 & 3 \end{pmatrix}$

[8] $\begin{pmatrix} -10 & 25 \\ 6 & -15 \end{pmatrix}$

[10] $\begin{pmatrix} 0 & 2 & 1 \\ 0 & -8 & -4 \end{pmatrix}$

[12] $\begin{pmatrix} -2 & -8 & 6 \\ 1 & 4 & -3 \end{pmatrix}$

[14] $\begin{pmatrix} -1 & 2 \\ -2 & 4 \\ 4 & -8 \end{pmatrix}$

[16] $\begin{pmatrix} 12 & 3 \\ -4 & -1 \\ -8 & -2 \end{pmatrix}$

[18] $\begin{pmatrix} -6 & 2 & 4 \\ 9 & -3 & -6 \\ 6 & -2 & -4 \end{pmatrix}$

[20] $\begin{pmatrix} 0 & 8 & -8 \\ 0 & 0 & 0 \\ 0 & -8 & 8 \end{pmatrix}$

[22] (-16)

[24] (-1)

[26] $(-9 \ 5)$

[28] $(2 \ 7)$

[30] $\begin{pmatrix} -2 \\ -1 \end{pmatrix}$

[32] $\begin{pmatrix} 3 \\ 11 \end{pmatrix}$

[34] $\begin{pmatrix} 6 \\ 4 \\ 0 \end{pmatrix}$

[36] $\begin{pmatrix} 6 \\ 6 \\ -7 \end{pmatrix}$

[37]
$$\begin{pmatrix} -5 & 0 \\ 6 & 2 \\ 2 & 1 \end{pmatrix}$$

[39]
$$\begin{pmatrix} 0 & 7 \\ -9 & -5 \\ 8 & 6 \end{pmatrix}$$

[41]
$$(0)$$

[43]
$$(-8)$$

[45]
$$(1 \ 7)$$

[47]
$$(6 \ 11)$$

[49]
$$\begin{pmatrix} 3 \\ 4 \end{pmatrix}$$

[51]
$$\begin{pmatrix} 4 \\ 5 \end{pmatrix}$$

[53]
$$\begin{pmatrix} 4 \\ 2 \\ 4 \end{pmatrix}$$

[55]
$$\begin{pmatrix} 3 \\ 3 \\ 0 \end{pmatrix}$$

[57]
$$\begin{pmatrix} -2 & 2 \\ 4 & -9 \end{pmatrix}$$

[59]
$$\begin{pmatrix} 3 \\ 3 \\ 0 \end{pmatrix}$$

[38]
$$\begin{pmatrix} 8 & 4 \\ -2 & -4 \\ 1 & 4 \end{pmatrix}$$

[40]
$$\begin{pmatrix} 2 & 4 \\ -3 & -1 \\ -8 & 2 \end{pmatrix}$$

[42]
$$(7)$$

[44]
$$(14)$$

[46]
$$(8 \ -1)$$

[48]
$$(3 \ 1)$$

[50]
$$\begin{pmatrix} -2 \\ -3 \end{pmatrix}$$

[52]
$$\begin{pmatrix} 9 \\ 5 \end{pmatrix}$$

[54]
$$\begin{pmatrix} -2 \\ -3 \end{pmatrix}$$

[56]
$$\begin{pmatrix} -2 \\ -5 \\ 2 \end{pmatrix}$$

[58]
$$\begin{pmatrix} -5 & 5 \\ -6 & 7 \end{pmatrix}$$

[60]
$$\begin{pmatrix} -8 & 1 \\ 3 & -5 \end{pmatrix}$$