

1 次の行列を行基本変形により, 階段行列に変形せよ.

$$(1) \begin{pmatrix} 1 & -3 \\ -6 & -5 \end{pmatrix}$$

$$(2) \begin{pmatrix} 0 & 0 & 3 \\ 2 & 0 & 1 \\ -1 & 1 & -5 \end{pmatrix}$$

2 次の連立1次方程式を基本変形(掃き出し法)を用いて解け.

$$(1) \left(\begin{array}{cc|c} x & y & \\ \hline 1 & 1 & 3 \\ 3 & 2 & 5 \end{array} \right)$$

$$(2) \left(\begin{array}{ccc|c} x & y & z & \\ \hline 4 & -1 & 8 & 1 \\ 2 & 0 & 5 & 1 \\ 0 & 1 & 2 & 1 \end{array} \right)$$

0解答:

$$\boxed{1} \quad (1) \quad \left(\begin{array}{cc} 1 & -3 \\ -6 & -5 \end{array} \right) \xrightarrow{\textcircled{2}+6\times\textcircled{1}} \left(\begin{array}{cc} 1 & -3 \\ 0 & -23 \end{array} \right)$$

もちろん $\left(\begin{array}{cc} 1 & -3 \\ 0 & 1 \end{array} \right)$ や $\left(\begin{array}{cc} 1 & 0 \\ 0 & 1 \end{array} \right)$ まで変形しても正解.

$$(2) \quad \left(\begin{array}{ccc} 0 & 0 & 3 \\ 2 & 0 & 1 \\ -1 & 1 & -5 \end{array} \right) \xrightarrow{\textcircled{1}\leftrightarrow\textcircled{3}} \left(\begin{array}{ccc} -1 & 1 & -5 \\ 2 & 0 & 1 \\ 0 & 0 & 3 \end{array} \right) \xrightarrow{\textcircled{2}+2\times\textcircled{1}} \left(\begin{array}{ccc} -1 & 1 & -5 \\ 0 & 2 & -9 \\ 0 & 0 & 3 \end{array} \right)$$

$$\boxed{2} \quad (1) \quad \left(\begin{array}{cc|c} x & y & 3 \\ 1 & 1 & 3 \\ 3 & 2 & 5 \end{array} \right) \xrightarrow{\textcircled{2}-3\times\textcircled{1}} \left(\begin{array}{cc|c} 1 & 1 & 3 \\ 0 & -1 & -4 \end{array} \right) \xrightarrow{\textcircled{2}\times(-1)} \left(\begin{array}{cc|c} 1 & 1 & 3 \\ 0 & 1 & 4 \end{array} \right) \xrightarrow{\textcircled{1}-\textcircled{2}} \left(\begin{array}{cc|c} 1 & 0 & -1 \\ 0 & 1 & 4 \end{array} \right)$$

よって $x = -1, y = 4$

$$(2) \quad \left(\begin{array}{ccc|c} x & y & z & 1 \\ 4 & -1 & 8 & 1 \\ 2 & 0 & 5 & 1 \\ 0 & 1 & 2 & 1 \end{array} \right) \xrightarrow{\textcircled{1}\leftrightarrow\textcircled{2}} \left(\begin{array}{ccc|c} 2 & 0 & 5 & 1 \\ 4 & -1 & 8 & 1 \\ 0 & 1 & 2 & 1 \end{array} \right) \xrightarrow{\textcircled{2}-2\times\textcircled{1}} \left(\begin{array}{ccc|c} 2 & 0 & 5 & 1 \\ 0 & -1 & -2 & -1 \\ 0 & 1 & 2 & 1 \end{array} \right)$$

$$\xrightarrow{\textcircled{3}+\textcircled{2}} \left(\begin{array}{ccc|c} 2 & 0 & 5 & 1 \\ 0 & -1 & -2 & -1 \\ 0 & 0 & 0 & 0 \end{array} \right) \xrightarrow{\textcircled{1}\times\frac{1}{2}, \textcircled{2}\times(-1)} \left(\begin{array}{ccc|c} 1 & 0 & \frac{5}{2} & \frac{1}{2} \\ 0 & 1 & 2 & 1 \\ 0 & 0 & 0 & 0 \end{array} \right)$$

$$z = t \text{ とおけば, } \begin{cases} x = \frac{1}{2} - \frac{5}{2}t \\ y = 1 - 2t \\ z = t \end{cases} \quad (t \text{ は任意})$$