

1 (1) 行列の積を計算せよ. (1点)

$$\begin{pmatrix} 1 & -1 & 3 \\ 0 & 3 & 4 \\ 0 & 0 & 2 \end{pmatrix} \begin{pmatrix} 1 & 0 & 0 \\ 3 & 1 & 0 \\ 2 & 3 & 1 \end{pmatrix} = \begin{pmatrix} 4 & 8 & 3 \\ 17 & 15 & 4 \\ 4 & 6 & 2 \end{pmatrix}$$

(2) $a_{ij} = i + 2j$, ($1 \leq i \leq 2, 1 \leq j \leq 3$) のとき, 行列 (a_{ij}) を成分を用いて表せ. (1点)

$$(a_{ij}) = \begin{pmatrix} 1+2 \times 1 & 1+2 \times 2 & 1+2 \times 3 \\ 2+2 \times 1 & 2+2 \times 2 & 2+2 \times 3 \end{pmatrix} = \begin{pmatrix} 3 & 5 & 7 \\ 4 & 6 & 8 \end{pmatrix}$$

2 次の連立方程式を基本変形を用いて解け. (3点)

$$\begin{cases} x - 2y - 2z = 6 \\ 2x + 3y + z = -4 \\ 4x + y - 3z = 2 \end{cases}$$

$$\begin{aligned} & \begin{pmatrix} 1 & -2 & -2 & | & 6 \\ 2 & 3 & 1 & | & -4 \\ 4 & 1 & -3 & | & 2 \end{pmatrix} \xrightarrow[\textcircled{3}-4 \times \textcircled{1}]{\textcircled{2}-2 \times \textcircled{1}} \begin{pmatrix} 1 & -2 & -2 & | & 6 \\ 0 & 7 & 5 & | & -16 \\ 0 & 9 & 5 & | & -22 \end{pmatrix} \\ & \xrightarrow{\textcircled{3}-\textcircled{2}} \begin{pmatrix} 1 & -2 & -2 & | & 6 \\ 0 & 7 & 5 & | & -16 \\ 0 & 2 & 0 & | & -6 \end{pmatrix} \xrightarrow{\textcircled{2} \leftrightarrow \textcircled{3}} \begin{pmatrix} 1 & -2 & -2 & | & 6 \\ 0 & 2 & 0 & | & -6 \\ 0 & 7 & 5 & | & -16 \end{pmatrix} \\ & \xrightarrow{\textcircled{2} \times \frac{1}{2}} \begin{pmatrix} 1 & -2 & -2 & | & 6 \\ 0 & 1 & 0 & | & -3 \\ 0 & 7 & 5 & | & -16 \end{pmatrix} \xrightarrow[\textcircled{3}-7 \times \textcircled{2}]{\textcircled{1}+2 \times \textcircled{2}} \begin{pmatrix} 1 & 0 & -2 & | & 0 \\ 0 & 1 & 0 & | & -3 \\ 0 & 0 & 5 & | & 5 \end{pmatrix} \\ & \xrightarrow{\textcircled{3} \times \frac{1}{5}} \begin{pmatrix} 1 & 0 & -2 & | & 0 \\ 0 & 1 & 0 & | & -3 \\ 0 & 0 & 1 & | & 1 \end{pmatrix} \xrightarrow{\textcircled{1}+2 \times \textcircled{3}} \begin{pmatrix} 1 & 0 & 0 & | & 2 \\ 0 & 1 & 0 & | & -3 \\ 0 & 0 & 1 & | & 1 \end{pmatrix} \end{aligned}$$

よって $x = 2, y = -3, z = 1$