

$$\vec{a} = (1, 2, -3) \quad \vec{b} = (-3, 4, 1)$$



I  $\vec{c} = (x, y, z)$

$$\begin{cases} \vec{a} \cdot \vec{c} = 0 \\ \vec{b} \cdot \vec{c} = 0 \end{cases}$$

$$\begin{cases} x + 2y - 3z = 0 \\ -3x + 4y + z = 0 \quad | +3r_1 \end{cases}$$

$$\begin{cases} x + 2y - 3z = 0 \\ 10y - 8z = 0 \end{cases}$$

$$\begin{cases} x = -2y + 3z = \frac{7}{5}z \\ y = \frac{4}{5}z \quad , z \in \mathbb{R} \end{cases}$$

wp.  $z = 10$

$y = 8$

$x + 16 - 30 = 0$

$x = 14$

wp.  $(14, 8, 10)$

II  $\vec{i} = (1, 0, 0) \quad \vec{j} = (0, 1, 0) \quad \vec{k} = (0, 0, 1)$

$$\vec{a} \times \vec{b} = \begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ 1 & 2 & -3 \\ -3 & 4 & 1 \end{vmatrix} = \vec{i} \begin{vmatrix} 2 & -3 \\ 4 & 1 \end{vmatrix} - \vec{j} \begin{vmatrix} 1 & -3 \\ -3 & 1 \end{vmatrix} + \vec{k} \begin{vmatrix} 1 & 2 \\ -3 & 4 \end{vmatrix} =$$

$$= \vec{i} \cdot (2 + 12) - \vec{j} \cdot (1 - 9) + \vec{k} \cdot (4 + 6) = \underline{(14, 8, 10)}$$

$$\begin{cases} |c & d| \\ |e & f| \end{cases} = cf - de$$