

$$\textcircled{1} \begin{array}{l} \hookrightarrow \\ \hookrightarrow \end{array} \left[\begin{array}{ccc|c} -1 & 3 & 2 & 8 \\ 1 & -4 & 1 & 3 \\ -1 & 2 & 5 & 3 \end{array} \right] \quad \textcircled{2} \begin{array}{l} \textcircled{1} \\ \textcircled{1} \end{array} \left[\begin{array}{ccc|c} -1 & 3 & 2 & 8 \\ 0 & -1 & 3 & 11 \\ -1 & 2 & 5 & 3 \end{array} \right]$$

$$\textcircled{3} \left[\begin{array}{ccc|c} 1 & -3 & -2 & -8 \\ 0 & 1 & -3 & -11 \\ -1 & 2 & 5 & 3 \end{array} \right] \quad \textcircled{4} \left[\begin{array}{ccc|c} 1 & -3 & -2 & -8 \\ 0 & 1 & -3 & -11 \\ 0 & -1 & 3 & -5 \end{array} \right]$$

$$\textcircled{5} \left[\begin{array}{ccc|c} 1 & -3 & -2 & -8 \\ 0 & 1 & -3 & -11 \\ 0 & 0 & 0 & -16 \end{array} \right] \Rightarrow \text{since } 0 \neq -16$$

there is No Solution

$$\textcircled{1} \begin{array}{l} \hookrightarrow \\ \hookrightarrow \end{array} \left[\begin{array}{ccc|c} -1 & 3 & 2 & 8 \\ 1 & -4 & 1 & 3 \\ 1 & -5 & 4 & 14 \end{array} \right] \quad \textcircled{2} \begin{array}{l} \textcircled{1} \\ \textcircled{1} \end{array} \left[\begin{array}{ccc|c} -1 & 3 & 2 & 8 \\ 0 & -1 & 3 & 11 \\ 0 & -2 & 6 & 22 \end{array} \right]$$

$$\textcircled{3} \begin{array}{l} \textcircled{2} \\ \hookrightarrow \end{array} \left[\begin{array}{ccc|c} 1 & -3 & -2 & -8 \\ 0 & 1 & -3 & -11 \\ 0 & -2 & 6 & 22 \end{array} \right] \quad \textcircled{4} \left[\begin{array}{ccc|c} 1 & -3 & -2 & -8 \\ 0 & 1 & -3 & -11 \\ 0 & 0 & 0 & 0 \end{array} \right]$$

\Rightarrow intersection of these planes is a line

$$\text{(a)} \quad x - 3y - 2z = -8 \Rightarrow x - 3(3z - 11) - 2z = -8$$

$$\text{(b)} \quad y - 3z = -11 \quad \begin{array}{l} \nearrow \\ x - 9z + 33 - 2z = -8 \end{array}$$

$$\boxed{y = 3z - 11}$$

$$x - 11z = -41$$

$$\boxed{x = 11z - 41}$$

line of intersection : $(11z - 41, 3z - 11, z)$