

11 Q #4.

$$L_1 \quad y = 2x + 2, \quad z = 3 - x$$

$$L_2 \quad \frac{x-1}{3} = \frac{y-1}{6} = \frac{1-z}{3}$$

$$L_2: \quad \frac{x-1}{3} = \frac{y-1}{6} = \frac{z-1}{-3}$$

point
(1, 1, 1)
dir. vector
 $3\vec{i} + 6\vec{j} - 3\vec{k}$

$$L_1: \quad x = \frac{y-2}{2}, \quad x = 3-z$$

$$x = \frac{y-2}{2} = 3-z$$

$$\frac{x-0}{1} = \frac{y-2}{2} = \frac{z-3}{-1}$$

pt (0, 2, 3)
dir. vector
 $\vec{i} + 2\vec{j} - \vec{k}$

b Find 3 points on the plane

$$A(1, 1, 1)$$

$$\vec{AB} = -\vec{i} + \vec{j} + 2\vec{k}$$

$$B(0, 2, 3)$$

$$\vec{AC} = 3\vec{i} + 6\vec{j} - 3\vec{k}$$

$$C(4, 7, -2)$$

$$\hookrightarrow \text{use } \vec{i} + 2\vec{j} - \vec{k}$$

$$\vec{AB} \times \vec{AC} = \det \begin{pmatrix} -\vec{i} + 2\vec{j} - 2\vec{k} & -(\vec{k} + 4\vec{i} + \vec{j}) \\ \vec{i} & \vec{j} \\ -1 & 1 \\ 1 & 2 & -1 \end{pmatrix} \begin{matrix} -1 & 1 \\ 1 & 2 \end{matrix}$$

$$\vec{n} = -5\vec{i} + \vec{j} - 3\vec{k}$$

plane: $-5x + y - 3z = \boxed{-7}$

$$-5(1) + 1 - 3(1) = -7$$

$\boxed{\text{TR}} \#1$

$$\begin{bmatrix} 5 & 1 & 2 & 3 \\ 1 & \textcircled{1} & 1 & 3 \\ 4 & \textcircled{2} & 2 & 5 \\ -10 & -2 & -4 & -6 \end{bmatrix} \rightarrow \begin{bmatrix} 5 & 1 & 2 & 3 \\ +4 & 0 & +1 & 0 \\ -6 & 0 & \textcircled{-2} & -1 \\ 8 & 0 & 2 & 0 \end{bmatrix}$$

$$\rightarrow \begin{bmatrix} 5 & 1 & 2 & 3 \\ 4 & 0 & 1 & 0 \\ 2 & 0 & 0 & -1 \end{bmatrix} \begin{matrix} \rightarrow \\ \rightarrow \\ \rightarrow \end{matrix}$$

$5(-\frac{1}{2}) + y + 2(2) = 3$
 $4(-\frac{1}{2}) + z = 0$
 $z = 2$
 $2x = -1$
 $x = -\frac{1}{2}$
 $y = \frac{3}{2}$

*2.
$$\begin{cases} 2x + y + z = 1 \\ 3x + y + 2z = 3 \\ 4x + y + 3z = 5 \end{cases}$$
 No unique solution

$$\begin{bmatrix} 2 & 1 & 1 & 1 \\ 3 & \textcircled{1} & 2 & 3 \\ 4 & \textcircled{1} & 3 & 5 \end{bmatrix} \rightarrow \begin{bmatrix} 2 & 1 & 1 & 1 \\ 1 & 0 & 1 & 2 \\ \cancel{2} & \cancel{1} & \cancel{2} & \cancel{1} \\ 1 & 0 & 1 & 2 \end{bmatrix}$$

$$\begin{cases} 2x + y + z = 1 \rightarrow x = \frac{1-y-z}{2} \\ x + z = 2 \rightarrow x = 2-z \end{cases}$$

$$x = \frac{1-y-(2-x)}{2}$$

$$x = \frac{-1-y+x}{2}$$

$$2x = -1-y+x$$

$$x = -1-y$$

$$x = \frac{y - (-1)}{-1} = \frac{z - 2}{-1}$$

$$\frac{y+1}{-1}$$