Quiz 1 - MA3335

Show your work! No credit will be given for answers without work!

1. Find the equation of the line passing through the points (3,4,5) and (3,4,7).

$R_0 = 3\vec{i}+4\vec{j}+5\vec{k}$

$R_1 = 3\vec{i}+4\vec{j}+7\vec{k}$

$\vec{v} = R_1 - R_0 = 2\vec{k}$

$R = R_0 + t\vec{v}$

$= 3\vec{i}+4\vec{j}+5\vec{k}+2t\vec{k} \quad t\in\mathbb{R}$

2. Find the point of intersection of the lines

L1: R=2i+3j+3k+t(i-2j+5k)

L2: $\frac{x+3}{2}=\frac{y+1}{2}=-z$

$l_1: R = 2i+3j+3k+t(i-2j+5k) = (2+t)i+(3-2t)j+(3+5t)k.$

$l_2: R = -3i-j+0k+s(2i+2j-k) = (-3+2s)i+(-1+2s)j+(-s)k.$

$$\begin{cases} 2+t=-3+2s & ① \\ 3-2t=-1+2s & ② \\ 3+5t=-s & ③ \end{cases} \Rightarrow \begin{cases} t-2s=-5 \\ -2t-2s=-4 \\ 5t+s=-3 \end{cases}$$

$$\begin{pmatrix} 1 & -2 & -5 \\ -2 & -2 & -4 \\ 5 & 1 & -3 \end{pmatrix} \to \begin{pmatrix} 1 & -2 & -5 \\ 1 & 1 & 2 \\ 5 & 1 & -3 \end{pmatrix} \to \begin{pmatrix} 1 & -2 & -5 \\ 0 & 3 & 7 \\ 0 & 11 & 24 \end{pmatrix}$$

No solution.

Hence there is no intersection.