Key

Birzeit University
Department of Mathematics
Math 231

Quiz#1

Name: ……………..   Number… …

Question #1: Find the parametric equation of the line segment from
the point $p(2,1,5)$ to $q(-1,5,1)$

$$X = 2 + (-3)t \quad (1pt)$$
$$y = 1 + 4 \ t \ (1pt) \quad 0 \le t \le 1 \quad (2 pts)$$
$$Z = 5 + -4t \ (1 pt)$$

Question #2: Find the equation of the plane through the point $p(1,-2,5)$
and normal to the line $x=1+2t$, $y=-2+t$ $z=7+5t$

* the vector $\vec{n} = 2i + j + 5k$ is normal to the (2pts)
plane

* the plane pass through $p.(1,-2,5)$ so

Eqn of plane is $2(x-1) + 1(y+2) + 5(Z-5) = 0$ (2pts)

$$2x + y + 5Z = 25 \quad (1pt)$$

Question #3: Find the point of intersection of the two lines
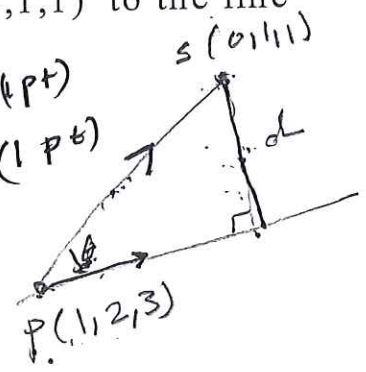$L_1 :$ $x=1+2t$, $y=2+3t$, $z=3+4t$ and $L_2 :$ $x=2+s$, $y=3+s$, $z=6+5s$

$$\left. \begin{array}{l} 1+2t = 2+s \\ 2+3t = 3+s \end{array} \right\} \Rightarrow t = 0, \ s = -1 \qquad 2pts$$

subsitute in $Z \Rightarrow$ on the first line $\left. \begin{array}{l} Z = 3 \\ Z = 1 \end{array} \right]$ $3 \ne -1$ 2pts
                  on the second line

so No point of intersection   1pt.

Question #4: Find the distance from the point $(0,1,1)$ to the line

L : $x=1+2t$, $y=2+3t$, $z=3+4t$

$(1pt)$ $d = \dfrac{|PS \times \vec{R}|}{|\vec{R}|}$

$\overrightarrow{PS} = -\vec{i} - \vec{j} - 2\vec{k}$ $(1pt)$

parallel $\overrightarrow{R} = 2\vec{i} + 3\vec{j} + 4\vec{k}$ $(1pt)$

$$\begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ -1 & -1 & -2 \\ 2 & 3 & 4 \end{vmatrix}$$

$(1)^{POINT} = \dfrac{|2\vec{i} - \vec{k}|}{\sqrt{4+9+16}} = \dfrac{\sqrt{5}}{\sqrt{29}}$
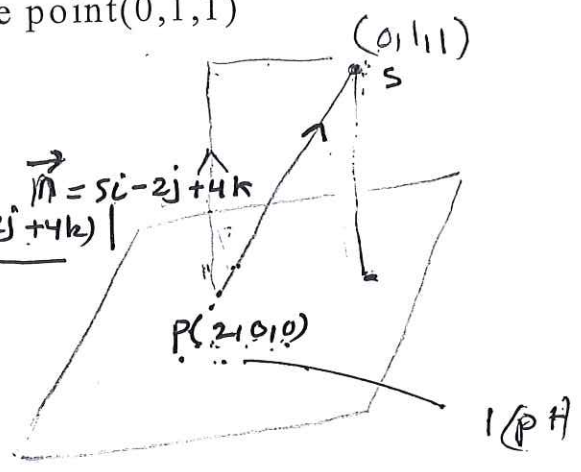
$= \sqrt{\dfrac{5}{29}}$ point

Question #5: Find the distance from the point $(0,1,1)$ to the plane $5x-2y+4z=10$ $(1pt)$

$1pt$ $\vec{d} = \dfrac{|PS \cdot \vec{n}|}{|n|} = \dfrac{|(-2\vec{i} + \vec{j} + \vec{k}) \cdot (5\vec{i} - 2\vec{j} + 4\vec{k})|}{|n|}$

$\vec{n} = 5\vec{i} - 2\vec{j} + 4\vec{k}$

$P(2,0,0)$

$= \dfrac{8}{\sqrt{45}}$ ✓ $(2pts)$

$1(pt)$

Question #6: Sketch the surface $x^2 + y^2 - 1 = z$

$(5pts)$

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