

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  $q(-1,5,1)$

$$\begin{aligned}x &= 2 + (-3)t \quad (1 \text{ pt}) \\y &= 1 + 4t \quad (1 \text{ pt}) \\z &= 5 - 4t \quad (1 \text{ pt})\end{aligned} \quad 0 \leq t \leq 1 \quad (2 \text{ pts})$$

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

plane

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

$$\begin{aligned}\text{Eqn of plane is } 2(x-1) + 1(y+2) + 5(z-5) &= 0 \quad (2 \text{ pts}) \\2x + y + 5z &= 25 \quad (1 \text{ pt})\end{aligned}$$

Question #3: Find the point of intersection of the two lines

$L_1: x=1+2t, y=2+3t, z=3+4t$  and  $L_2: x=2+s, y=3+s, z=6+5s$

$$\left. \begin{aligned}1+2t &= 2+s \\2+3t &= 3+s\end{aligned} \right\} \Rightarrow t=0, s=-1 \quad 2 \text{ pts}$$

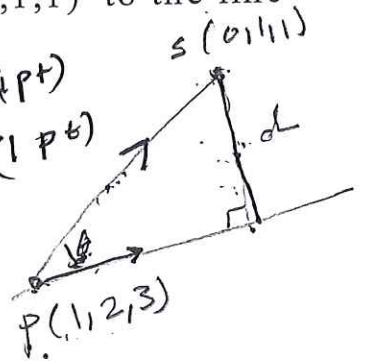
substitute in  $z \Rightarrow$  on the first line  $z=3$   
on the second line  $z=1$   $3 \neq 1$  2 pts  
so No point of intersection 1 pt.

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)  $d = \frac{|\vec{PS} \times \vec{R}|}{|\vec{R}|}$

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

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



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

i	j	k
-1	-1	-2
2	3	4

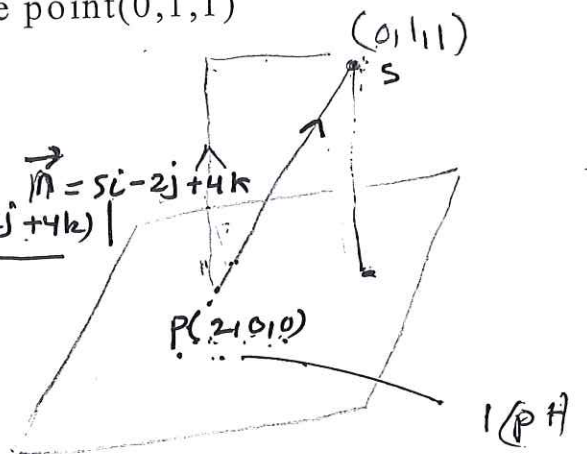
$= \frac{\sqrt{5}}{29}$  point

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

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

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

$= \frac{8}{\sqrt{45}}$  (2pts)



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

(5pts)

