Quiz 3 Name: Key
Math 253 09/10/19

Consider the parameterized lines

$$\mathbf{r}(t) = \langle 1+3t, 2-t, 4+6t \rangle$$
$$\mathbf{s}(t) = \langle -2+5t, 3+2t, -2-t \rangle$$

1. Show both these line pass through the point $\langle -2, 3, -2 \rangle$.

$-2 = 1+3t \Rightarrow t = -1$ $\qquad \vec{r}(-1) = <-2,3,-2>$

$-2 = -2+5t \Rightarrow t = 0$ $\qquad \vec{s}(0) = <-2,3,-2>$

2. Since the two lines contain a common point, they lie in a plane. Give a vector orthogonal to this plane.

The direction of $\vec{r}$ is $\vec{a} = <3,-1,6>$

The direction of $\vec{s}$ is $\vec{b} = <5,2,-1>$

The vector $\perp$ to the plane is

$$\vec{n} = \vec{a} \times \vec{b} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 3 & -1 & 6 \\ 5 & 2 & -1 \end{vmatrix} = \hat{i}(\quad) - \hat{j}(-3-30) + \hat{k}(6+5) = <-11,33,11>$$

or $<-1,3,1>$

3. Give the equation of the plane containing the two lines.

$<-1,3,1> \cdot <x,y,z> = <-1,3,1> \cdot <-2,3,-2>$

$-x+3y+z=9$