

Charles Richardson

Lecture 4 Worksheet

1.  $\vec{N} = \langle 2, 1, -4 \rangle$

$$2(x-8) + 1(y+1) - 4(z-6) = 0$$

$$2x - 16 + y + 1 - 4z + 24 = 0$$

$$\boxed{2x + y - 4z = -9}$$
 $P = (8, -1, 6)$

2.  $P_1 = (0, 0, 3)$

 $P_2 = (-1, 2, 0)$ 
 $P_3 = (1, 1, 1)$ 
 $\langle -1, 2, -3 \rangle$ 
 $\langle 1, 1, -2 \rangle$ 

$$\begin{array}{ccccc|c} i & j & k & i & j \\ -1 & 2 & -3 & -1 & 2 \\ 1 & 1 & -2 & 1 & 1 \\ -4i - 3j - 7k + 3i - 2j - 2k \\ -i - 5j - 3k = \langle -1, -5, -3 \rangle \end{array}$$

$$\begin{array}{c} -1(x-0) - 5(y-0) - 3(z-3) = 0 \\ \boxed{-x - 5y - 3z = 9} \end{array}$$

3.

$$\begin{array}{ccccc|c} i & j & k & i & j \\ 2 & 5 & 1 & 2 & 5 \\ -1 & 2 & -1 & -1 & 2 \\ -7i + j + 9k \\ \langle -7, 1, 9 \rangle \end{array}$$

$$\begin{array}{l} 2x + 5y + z = 9 \\ -x + 2y - z = 0 \\ \hline x = 4 \\ y = 0 \\ z = -4 \end{array}$$

$$\boxed{r = (4, 0, -4) + t(-7, 1, 9)}$$

4.  $r(0) = \langle 2, 4, 1 \rangle$

 $r(1) = \langle 1, 6, 1 \rangle$ 
 $P = (0, 5, -1)$ 
 $\langle -1, 2, 0 \rangle$ 
 $\langle -2, 1, -2 \rangle$ 

$$\begin{array}{ccccc|c} i & j & k & i & j \\ -1 & 2 & 0 & -1 & 2 \\ -2 & 1 & -2 & -2 & 1 \\ -4i - 2j + 3k \end{array}$$

$$\begin{array}{c} -4(x-0) - 2(y-5) + 3(z+1) = 0 \\ -4x - 2y + 10 + 3z + 3 = 0 \\ \hline \boxed{-4x - 2y + 3z = -13} \end{array}$$

5.  $(x+t) - (x+3t) - 2t = -4 \Rightarrow -2t - 2t = -4 \Rightarrow t = +1$

$$\boxed{(2, 4, 1)}$$