Lecture 3 Quiz (PDF)

1. $P = (0,1,1)$, $Q = (1,0,1)$, $R = (1,1,0)$

$PQ = (0,1,1) - (1,0,1) = \langle -1, 1, 0 \rangle$

$PR = (0,1,1) - (1,1,0) = \langle -1, 0, 1 \rangle$

$$\begin{vmatrix} i & j & k \\ -1 & 1 & 0 \\ -1 & 0 & 1 \end{vmatrix} = \begin{vmatrix} 1 & 0 \\ 0 & 1 \end{vmatrix} i - \begin{vmatrix} -1 & 0 \\ -1 & 1 \end{vmatrix} j + \begin{vmatrix} -1 & 1 \\ -1 & 0 \end{vmatrix} k$$

$$(1-0)i - (-1-0)j + (0+1)k$$

$$i + j + k$$

$$\langle 1, 1, 1 \rangle$$

$d = OP \cdot (PQ \times PR) = \langle 0,1,1 \rangle \cdot \langle 1,1,1 \rangle$

$= 0 + 1 + 1 = 2$

$\boxed{i + j + k = 2}$

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

$x + y + z = 14$

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

$r(t) = \langle 1, 2t+1, 4t \rangle$

$1 + (2t+1) + 4t = 14$

$6t + 2 = 14$

$t = 2$

$(1, 2(2)+1, 4(2))$

$\boxed{(1, 5, 8)}$