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Quiz for Lecture 3

Section 24

1. Find an equation of the plane that passes through the points $P(0, 1, 1)$, $Q(1, 0, 1)$, $R(1, 1, 0)$

$$\begin{aligned} \vec{PQ} &= \longrightarrow \langle 1, -1, 0 \rangle \\ \vec{QR} &= \longrightarrow \langle 0, 1, -1 \rangle \end{aligned} \quad \left. \vphantom{\begin{aligned} \vec{PQ} \\ \vec{QR} \end{aligned}} \right\} \vec{PQ} \times \vec{QR} = \langle 1, 1, 1 \rangle$$

$$1(x-1) + 1(y) + 1(z-1) = 0$$

$$x-1 + y + z - 1 = 0$$

$$x + y + z = 2$$

2. Find the intersection of the line $r(t) = \langle 1, 1, 0 \rangle + t\langle 0, 2, 4 \rangle$ and the plane $x + y + z = 14$

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

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

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

$$6t = 12 \quad t = 2$$

$$\text{Point: } (1, 5, 8)$$

The line $r(t) = \langle 1, 1, 0 \rangle + t\langle 0, 2, 4 \rangle$ intersects the plane $x + y + z = 14$ at the point $(1, 5, 8)$.