

"QUIZ" for Lecture 3

E-MAILSCANNED .pdf OF COMPLETED QUIZ to DrZcalc3@gmail.com (Attachment: q3FirstLast.pdf) ASAP BUT NO LATER THAN Sept. 15, 8:00pm

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

$$\rightarrow u = \vec{PQ} = Q - P = (1, 0, 1) - (0, 1, 1) = \langle 1, -1, 0 \rangle$$

$$\rightarrow v = \vec{PR} = R - P = (1, 1, 0) - (0, 1, 1) = \langle 1, 0, -1 \rangle$$

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

$$\rightarrow \text{Choosing point } Q(1, 0, 1): 1(x-1) + 1(y-0) + 1(z-1) = 0$$

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

$$\rightarrow \boxed{x + y + z = 2}$$

2. Find the intersection of the line

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

and the plane

$$\rightarrow r(t) = \langle 1, 1, 0 \rangle + \langle 0, 2t, 4t \rangle = \langle 1, 1+2t, 4t \rangle, \quad x+y+z=14 \quad . \quad x=1; y=1+2t; z=4t$$

$$\rightarrow x+y+z=14; (1)+(1+2t)+(4t)=14; 2+6t=14; 6t=12; \underline{t=2}$$

$$\rightarrow \text{Point of intersection: } \boxed{(1, 5, 8)}$$