"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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P Q R

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

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

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

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

Point: $P = (0,1,1)$: $1(x-0) + 1(y-1) + 1(z-1) = 0$

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

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

2. Find the intersection of the line

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

and the plane

$$x + y + z = 14 \quad .$$

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

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

$x = 1$

$y = 1 + 2t$

$z = 4t$

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

$2 + 6t = 14$

$6t = 12$

$t = 2$

$r(2) = \langle 1,1,0 \rangle + \langle 0,4,8 \rangle$

$= \boxed{\langle 1,5,8 \rangle}$