

"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 $(0, 1, 1)$, $(1, 0, 1)$, $(1, 1, 0)$.

$$u = PQ = \langle 1-0, 0-1, 1-1 \rangle = \langle 1, -1, 0 \rangle$$

$$v = PR = \langle 1-0, 1-1, 0-1 \rangle = \langle 1, 0, -1 \rangle$$

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

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

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

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

2. Find the intersection of the line

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

and the plane

$$x + y + z = 14$$

$$r(t) = \langle x_0, y_0, z_0 \rangle + t\langle x_1 - x_0, y_1 - y_0, z_1 - z_0 \rangle$$

$$= \langle 1, 1, 0 \rangle + t\langle x_1 - 1, y_1 - 1, z_1 - 0 \rangle$$

$$x_1 - 1 = 0 \quad y_1 - 1 = 2 \quad z_1 - 0 = 4$$

$$x_1 = 1 \quad y_1 = 3 \quad z_1 = 4$$

$$\langle 1, 3, 4 \rangle$$

$$\langle 0, 2t, 4t \rangle$$

$$0 + 2t + 4t = 14$$

$$6t = 14$$

$$t = \frac{14}{6}$$

$$\boxed{\langle 0, 4\frac{2}{3}, \frac{28}{3} \rangle}$$