

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

$$PQ = Q - P = (1, 0, 1) - (0, 1, 1) = (1, -1, 0)$$

$$PR = R - P = (1, 1, 0) - (0, 1, 1) = (1, 0, -1)$$

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

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

$$PQ \times PR = i - 2j + k$$

$$(x - 0) - 2(y - 1) + (z - 1) = 0$$

$$x - 2y + 2 + z - 1 = 0 \quad \rightarrow$$

$$x - 2y + z = -1$$

2. Find the intersection of the line

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

and the plane

$$x + y + z = 14$$

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

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

$$x = 1$$

$$y = 2t + 1$$

$$z = 4t$$

$$x + y + z = 14$$

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

$$6t + 2 = 14$$

$$6t = 12$$

$$t = 2$$

$$(1, 5, 8)$$