

"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

NAME:

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

$$P = (0, 1, 1) \quad Q = (1, 0, 1) \quad R = (1, 1, 0)$$

$$a = \vec{PQ} = \vec{Q} - \vec{P} = (1, 0, 1) - (0, 1, 1) = (1, -1, 0)$$

$$b = \vec{PR} = \vec{R} - \vec{P} = (1, 1, 0) - (0, 1, 1) = (1, 0, -1)$$

$$n = a \times b = \begin{vmatrix} i & j & k \\ 1 & -1 & 0 \\ 1 & 0 & -1 \end{vmatrix} = i(1 \cdot 0) - j(-1 \cdot 0) + k(0 \cdot 1) \\ = i + j + k$$

$$(1, 1, 1) \cdot \langle x, y, z \rangle = (1, 1, 1) \cdot (1, 1, 1)$$

$$\Rightarrow x + y + z = 1 + 1 + 1 \quad \rightarrow \boxed{x + y + z = 3}$$

2. Find the intersection of the line

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

and the plane

$$x + y + z = 14$$

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

$$x = 1, \quad y = 1 + 2t, \quad z = 4t$$

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

$$6t = 12$$

$$t = 2$$

$$x = 1 \quad y = 5 \quad z = 8$$

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