

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

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

$$\vec{a} = PQ = \langle 1, -1, 0 \rangle$$

$$\vec{b} = PR = \langle 1, 0, -1 \rangle$$

$$\text{Normal to plane } (\vec{n}) = \vec{a} \times \vec{b}$$

$$\vec{n} = \langle 1, 1, 1 \rangle$$

$$\text{Passing point: } P(0, 1, 1)$$

Equation of plane:

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

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

2. Find the intersection of the line

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

and the plane

$$x + y + z = 14$$

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

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

$$x + y + z = 14$$

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

$$2 + 6t = 14$$

$$t = 2$$

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

$$\boxed{\text{Intersection is } (1, 5, 8)}$$