RUID: 201001195

"QUIZ" for Lecture 4

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E-MAILSCANNED .pdf OF COMPLETED QUIZ to DrZcalc3@gmail.com (Attachment: q4FirstLast.pdf) ASAP BUT NO LATER THAN Sept. 17, 8:00pm

1. Find a parametric equation for the tangent line to the curve with the given parametric equation at the specified point

$$x = \cos t \quad , \quad y = \sin t \quad , \quad z = t^2 + 1 \quad ; \quad (1,0,1)$$

$x(t) = 1$
$y(t) = t$
$z(t) = 1$

$r(0) = (1,0,1)$ occurs at $t = 0$

$r'(0) = \langle \sin(0), \cos(0), 2(0) \rangle$

$= \langle 0, 1, 0 \rangle$

$r'(t) = \langle 1, 0, 1 \rangle + t\langle 0, 1, 0 \rangle$

$\langle 1, t, 1 \rangle$

2. Find $\mathbf{r}(t)$ if

$$\mathbf{r}'(t) = t\mathbf{i} + 2\mathbf{j} + (t+1)\mathbf{k}$$

and

$$\mathbf{r}(0) = \mathbf{i} + 2\mathbf{j} + 3\mathbf{k} \quad .$$

$$r(t) = r_0 + \int_0^t \langle t, 2, t+1 \rangle$$

$$r(t) = \langle 1, 2, 3 \rangle + \left\langle \frac{t^2}{2}, 2t, \frac{t^2}{2} + t \right\rangle \Big|_0^t$$

$$r(t) = \langle 1, 2, 3 \rangle + \left\langle \frac{t^2}{2}, 2t, \frac{t^2}{2} + t \right\rangle - \langle 0, 0, 0 \rangle$$

$$r(t) = \left\langle \frac{t^2}{2} + 1, 2t + 2, \frac{t^2}{2} + t + 3 \right\rangle$$

$$\boxed{r(t) = \left(\frac{t^2}{2} + 1\right)\mathbf{i} + (2t+2)\mathbf{j} + \left(\frac{t^2}{2} + t + 3\right)\mathbf{k}}$$