"QUIZ" for Lecture 4

NAME: (print!) Krithika Patrachari Section: 22

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

$r(t)=\langle \cos t, \sin t, t^2+1\rangle$

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

$\langle \cos t, \sin t, t^2+1\rangle = \langle 0, 1, 0\rangle$

$\cos\frac{\pi}{2} = 0 \quad \sin\frac{\pi}{2} = 1 \quad t^2 = -1$

$t = \text{dne}$

$t_0 = \frac{\pi}{2}$

$r'(t) = \langle -\sin t, \cos t, 2t\rangle$

$r'(\frac{\pi}{2}) = \langle -\sin\frac{\pi}{2}, \cos\frac{\pi}{2}, \pi\rangle$

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

$\langle 1, 0, 1\rangle + t\langle -1, 0, \pi\rangle$

$= \langle 1-t, 0, 1+\pi t\rangle$

$x(t) = 1-t \quad y(t) = 0 \quad z(t) = 1+\pi t$

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

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

and

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

$r(t) = \int (t\mathbf{i} + 2\mathbf{j} + (t+1)\mathbf{k})\,dt$

$= \frac{1}{2}t^2\mathbf{i} + t^2\mathbf{j} + \frac{1}{2}t^2\mathbf{k} + C$

$r(1) = \frac{1}{2}\mathbf{i} + \mathbf{j} + \frac{1}{2}\mathbf{k} + C = \mathbf{i} + 2\mathbf{j} + 3\mathbf{k}$

$C = \frac{1}{2}\mathbf{i} + \mathbf{j} + \frac{5}{2}\mathbf{k}$

$r(t) = \frac{1}{2}t^2\mathbf{i} + t^2\mathbf{j} + \frac{1}{2}t^2\mathbf{k} + \frac{1}{2}\mathbf{i} + \mathbf{j} + \frac{5}{2}\mathbf{k}$

$r(t) = (\frac{1}{2}t^2 + \frac{1}{2})\mathbf{i} + (t^2+1)\mathbf{j} + (\frac{1}{2}t^2 + \frac{5}{2})\mathbf{k}$