"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

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

→ $r(t) = \langle \cos(t), \sin(t), t^2+1 \rangle = \langle 1, 0, 1 \rangle$

→ $\cos(t) = 1$, $\sin(t) = 0$, $t^2+1 = 1 \Rightarrow t = 0$, $t = 0$, $t = 0$ so $t_0 = 0$ ✓

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

→ $r'(0) = \langle 0, 1, 0 \rangle$ (direction vector)

→ $(1,0,1) + t\langle 0,1,0\rangle = (1,0,1) + \langle 0, t, 0\rangle = \langle 1, t, 1\rangle$

→ $x(t) = 1$, $y(t) = t$, $z(t) = 1$

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

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

and

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

→ $\int r'(t)\,dt = r(t)$

→ $i\int t\,dt + 2j\int 1\,dt + K\int (t+1)\,dt$

→ $r(t) = \frac{t^2}{2}i + 2tj + \left(\frac{t^2}{2} + t\right)K + C$

→ $r(0) = C = i + 2j + 3K$

→ $r(t) = \frac{t^2}{2}i + 2tj + \left(\frac{t^2}{2} + t\right)K + i + 2j + 3K$

→ $r(t) = i\left(\frac{t^2}{2} + 1\right) + j(2t+2) + K\left(\frac{t^2}{2} + t + 3\right)$