

"QUIZ" for Lecture 4

NAME: (print!) Shawn Goda Section: 23

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

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

$$\left. \begin{aligned} 1 &= \cos t, & 0 &= \sin t, & 1 &= t^2 + 1 \\ t &= 0, & t &= 0, & t &= 0 \\ r(t) &= \langle \cos t, \sin t, t^2 + 1 \rangle \\ r'(t) &= \langle -\sin t, \cos t, 2t \rangle \\ r'(0) &= \langle 0, 1, 0 \rangle \end{aligned} \right\} \begin{aligned} x &= 1 + 0t \\ y &= 0 + t \\ z &= 1 + 0t \end{aligned}$$

~~↓~~

$$\begin{aligned} x &= 1 \\ y &= t \\ z &= 1 \end{aligned}$$

2. Find $r(t)$ if

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

and

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

$$\begin{aligned} r(t) &= \int r'(t) dt \\ &= \int t\hat{i} + 2\hat{j} + (t+1)\hat{k} dt \\ &= \frac{t^2}{2}\hat{i} + 2t\hat{j} + \left(\frac{t^2}{2} + t\right)\hat{k} + C \end{aligned}$$

when $t=0$, $r = \hat{i} + 2\hat{j} + 3\hat{k}$

$$\Rightarrow \hat{i} + 2\hat{j} + 3\hat{k} = 0\hat{i} + 0\hat{j} + 0\hat{k} + C \quad C = \hat{i} + 2\hat{j} + 3\hat{k}$$

$$r(t) = \frac{t^2}{2}\hat{i} + 2t\hat{j} + (t+1)\hat{k} + (\hat{i} + 2\hat{j} + 3\hat{k})$$