"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

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

$1 = \cos t$
$0 = \sin t$
$1 = t^2 + 1$
$t = 0$

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

$P(x_p, y_p, z_p)$ and direction $\vec{v}\langle a, b, c \rangle$

$x' = -\sin x$
$y' = \cos x$
$z' = 2t$

$x = 1 + 0t = 1$
$y = 0 + 1t = t$
$z = 1 + 0t = 1$

$\rightarrow$ $x = 1$, $y = t$, $z = 1$

a, b, c

$\therefore$ for $t = 0$, $\vec{v}\langle 0, 1, 0 \rangle$

$\therefore$ The tangent is
$x = 1$
$y = t$
$z = 1$

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

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

and

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

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

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

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

$\mathbf{i} + 2\mathbf{j} + 3\mathbf{k} = \mathbf{j}^2 + C$

$\mathbf{i} - \mathbf{j}^2 + 2\mathbf{j} + 3\mathbf{k} = C$

$r(t) = \frac{t^2}{2}\mathbf{i} + \cancel{\mathbf{j}^2} + (\frac{t^2}{2} + t)\mathbf{k} + \mathbf{i} \cancel{- \mathbf{j}^2} + 2\mathbf{j} + 3\mathbf{k}$

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