

"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

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

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

$\cos(t) = 1, \sin(t) = 0, t^2 + 1 = 1 \rightarrow t = 0, t = 0, t = 0, t = 0$

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

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

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

$x(t) = 1, \quad y(t) = t, \quad z(t) = 1$

2. Find $r(t)$ if

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

and

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

$$r(t) = \frac{1}{2}t^2\mathbf{i} + 2t\mathbf{j} + \left(\frac{1}{2}t^2 + t\right)\mathbf{k} \Big|_{t=0}^t = \frac{1}{2}(0)^2\mathbf{i} + 2(0)\mathbf{j} + \left(\frac{1}{2}(0)^2 + (0)\right)\mathbf{k} = \mathbf{C}$$

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

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

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