

"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

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

$$x = 1 = \cos t \Rightarrow t = 0$$

$$y = 0 = \sin t \Rightarrow t = 0$$

$$z = 1 = t^2 + 1 \Rightarrow t = 0$$

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

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

$$r'(0) = \langle -\sin(0), \cos(0), 2(0) \rangle$$

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

$$x = 1 - 0t = 1$$

$$y = 0 - 1t = -t$$

$$z = 1 - 0t = 1$$

$$\langle 1, -t, 1 \rangle$$

2. Find  $r(t)$  if

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

and

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

$$r'(t) = t\langle 1, 0, 0 \rangle + 2\langle 0, 1, 0 \rangle + (t+1)\langle 0, 0, 1 \rangle$$

$$= \langle t, 0, 0 \rangle + \langle 0, 2, 0 \rangle + \langle 0, 0, t+1 \rangle$$

$$= \langle t, 2, t+1 \rangle$$

$$r(t) = \int r'(t) = \int \langle t, 2, t+1 \rangle = \langle \frac{1}{2}t^2, 2t, \frac{1}{2}t^2 + t \rangle + C$$

$$r(0) = \langle 1, 0, 0 \rangle + \langle 0, 2, 0 \rangle + \langle 0, 0, 3 \rangle = \langle 1, 2, 3 \rangle = C$$

$$r(t) = \langle \frac{1}{2}t^2, 2t, \frac{1}{2}t^2 + t \rangle + \langle 1, 2, 3 \rangle$$

$$= \langle \frac{1}{2}t^2 + 1, 2t + 2, \frac{1}{2}t^2 + t + 3 \rangle$$