"QUIZ" for Lecture 5

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E-MAIL SCANNED .pdf OF COMPLETED QUIZ to DrZcalc3@gmail.com (Attachment: q5FirstLast.pdf) ASAP BUT NO LATER THAN Sept. 21, 8:00pm

1, Find the curvature for

$$\mathbf{r}(t) = \sin t\,\mathbf{i} + \cos t\mathbf{j} + t\,\mathbf{k} \quad .$$

$r'(t) = \langle \cos(t), -\sin(t), 1 \rangle$

$r''(t) = \langle -\sin(t), -\cos(t), 0 \rangle$

$$K(t) = \frac{|r'(t) \times r''(t)|}{|r'(t)|^3} = \frac{|\langle \cos(t), -\sin(t), -\cos^2(t) - \sin^2(t) \rangle|}{|\langle \cos(t), -\sin(t), 1 \rangle|^3}$$

$$K(t) = \frac{\sqrt{2}}{2\sqrt{2}} = \frac{1}{2}$$

2.: Find the velocity, acceleration, and speed of a particle with the given position function.

$$\mathbf{r}(t) = t\,\mathbf{i} + t^2\,\mathbf{j} + 5\,\mathbf{k} \quad .$$

Velocity: $V(t) = \langle 1, 2t, 0 \rangle$

Speed: $s(t) = \sqrt{4t^2 + 1}$

acceleration: $a(t) = \langle 0, 2, 0 \rangle$