

"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

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

$$r' = \cos t - \sin t + 1$$

$$r'' = -\sin t - \cos t$$

$$\sqrt{\cos^2 + \sin^2 + 1^2} = \sqrt{1^2 + 1} = \sqrt{2}$$

$$\sqrt{\cos^2 + \sin^2 + 1^2} = \sqrt{2^3}$$

\mathbf{i}	\mathbf{j}	\mathbf{k}
\cos	$-\sin$	1
$-\sin$	$-\cos$	0

$$= i(0 - (-\cos t)) - j(-(-\sin t)) + k(-\cos^2 t - \sin^2 t)$$

$$= i(\cos t) - j(\sin t) - k(1)$$

$$\frac{\sqrt{2}}{\sqrt{2^3}}$$

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

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

$$r' = i + 2t j + 0 k = \text{velocity} \quad |r'| = \sqrt{1^2 + 2t^2 + 0^2} = \sqrt{2t^2 + 1} = \text{speed}$$

$$r'' = 0 i + 2 j + 0 k = \text{acceleration}$$