

"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

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

Handwritten solution for problem 1:

$$1. r'(t) = \cos t \mathbf{i} - \sin t \mathbf{j} + \mathbf{k}$$
$$|r'(t)| = \sqrt{2}$$
$$T(t) = \frac{\langle \cos t \mathbf{i}, -\sin t \mathbf{j}, \mathbf{k} \rangle}{\sqrt{2}}$$
$$T'(t) = \frac{\langle -\sin t \mathbf{i}, -\cos t \mathbf{j}, 0 \rangle}{\sqrt{2}}$$
$$|T'(t)| = \frac{1}{\sqrt{2}}$$
$$K = \frac{|T'(t)|}{|r'(t)|} = \frac{\frac{1}{\sqrt{2}}}{\sqrt{2}} = \frac{1}{2}$$

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

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

Handwritten solution for problem 2:

2. \$ Velocity :

$$v(t) = r'(t) = 1 + 2t$$

Acceleration :

$$a(t) = r''(t) = 2$$

~~Speed: $|r'(t)| = \sqrt{1+4t^2}$~~

~~$s(t) = \int_0^t |r'(u)| du = t^2 + t$~~

~~$s(t) =$~~

Speed :

$$s'(t) = |r'(t)| = \sqrt{1+4t^2}$$