$5/6$

Math 1172 - Autumn 2015 Na

Quiz 10 - In Class Recitation Instruc

SHOW ALL WORK!!! Unsupported answers might not receive full credit.

Problem 1 [6 pts] Suppose $\vec{r}(t) = \langle 3t, 2\sin 2t, 2\cos 2t\rangle$, $0 \le t \le 2\pi$.

a) [2 pts] Find the length of the curve.

$$\int_0^{2\pi} \sqrt{(3)^2 + (4\cos 2t)^2 + (-4\sin 2t)^2}$$

$$\int_0^{2\pi} \sqrt{9 + 16\cos^2 2t + 16\sin^2 2t}$$

$$\int_0^{2\pi} \sqrt{9 + 16(\cos^2 2t + \sin^2 2t)}$$

$$\int_0^{2\pi} 5$$

$$5t \Big|_0^{2\pi}$$

$$10\pi$$

b) [1 pt] Find $\vec{r}'(t)$ and $|\vec{r}'(t)|$ for this curve.

$$r'(t) = \langle 3, 4\cos 2t, -4\sin 2t \rangle$$

$$\sqrt{3^2 + 16\cos^2 2(0) + 16\sin^2 2(0)}$$

$$|\vec{r}'(t)| = \sqrt{25}$$

$$|\vec{r}'(t)| = 5$$

c) [3 pts] Is the curve parameterized by arclength? If it is not, find another description of the cruve that uses arclength as a parameter.

~~$L = 10\pi t$~~

$L(t) = 5t$

(-1)

$$t = L/10\pi$$

$$R(t) = \langle 3(L/10\pi), 2\sin(2L/10\pi), 2\cos(2L/10\pi) \rangle$$

$$R'(t) = \langle 3/10\pi, 4\cos(2L/10\pi), 4\cos 2L/10\pi \rangle$$

$$\sqrt{9/100\pi + 16\cos^2 2L/10\pi + 16\cos^2 2L/10\pi}$$

$$\sqrt{9/100\pi + 16}$$

$$\langle 3(\sqrt{9/100\pi + 16}), 2\sin 2(\sqrt{9/100\pi + 16}), 2\cos 2(\sqrt{9/100\pi + 16} \rangle$$