Name: MATH 241 §004

Quiz 3: Ch. 13

Complete the following problems to the best of your ability. **SHOW ALL OF YOUR WORK.** Unshown work will not be graded. You may not use a calculator.

For this quiz, let the position of a particle in space be given by $\mathbf{r}(t) = \langle 3\cos(t), 3\sin(t), 4t\rangle$, where t is measured in seconds.

1. What shape does this function trace? You can sketch it, if you don't know a word for it.

2. What is $\mathbf{r}'(\pi/2)$? Give a real-world interpretation of this value.

3. What is the total length of the arc traced by the particle over the first 4 seconds?

4. Suppose another particle is traced by $\mathbf{s}(t) = \langle 3 - t, t^2, 0\rangle$. Do the paths intersect each other? Do the particles themselves ever touch?