and 273-01

Math 273-02, Written Assignment 2 Name: _____ ID#: _____

I prefer that you submit your answers on a printed copy of this document, like it's a quiz or exam. However, you may instead rewrite the questions by hand before solving them. Staple sheets together, in order. **Be neat**. **Always give enough work and clear explanation so that fellow students could follow what you did (from start to finish) just by reading your paper**. Numbers in [ ] give point values for each question.

1. Suppose the position of a particle (as a function of time) is given by $\mathbf{r}(t) = \langle \cos(\pi t), \sin(\pi t), \sqrt{t} \rangle$.

[4] (a) Find the velocity, speed and acceleration functions for this particle.

should be (-1,0,3)

[4] (b) Find equation(s) which describe the line that's tangent to the graph of $\mathbf{r}$ at the point $(0, -1, 3)$.

[4] (c) Using only your brain, graph the curve $\mathbf{r}$ for $0 \leq t \leq 4$.

2. Suppose the position of an object (as a function of time) is given by $\mathbf{r}(t) = \langle 5 - 3t,\, t^2,\, 2 \rangle$.

[4] (a) Find simplified expressions for the tangential acceleration a_{T}, normal acceleration a_{N}, and curvature $\kappa(t)$.

[4] (b) By hand, find the distance this object travels from $t = 0$ to $t = 2$. You may use this formula:

$$\int \sqrt{a^2 + x^2}\, dx = \frac{x}{2}\sqrt{a^2 + x^2} + \frac{a^2}{2}\ln(x + \sqrt{a^2 + x^2}) + C$$

I want a simplified answer involving ln and $\sqrt{\ }$.