AMAT 309 L02 Winter 2003
Quiz 2 30 Minutes

NAME: _____ **ID**: _____

1. A particle moves along the path [25]

$$\mathbf{r} = \langle \frac{t^3}{3} + 2t, \sqrt{5}t, \frac{\sqrt{2}}{2}t^2 \rangle \ .$$

What is the arc length of this curve for $0 \leq t \leq 3$?

2. For each of the follwing answer True or False. Here $\mathbf{r}(t)$ is any curve and $\mathbf{v}, \mathbf{a}, \mathbf{T}, \mathbf{N}, \mathbf{B}$ have their usual meanings. [25]

(a) $\mathbf{v} \bullet \mathbf{N} = 0$ _____

(b) $\mathbf{a} \bullet \mathbf{N} = 0$ _____

(c) $\mathbf{a} \bullet \mathbf{B} = 0$ _____

(d) $\mathbf{v} \times \mathbf{T} = \mathbf{0}$ _____

(e) $\mathbf{a} \times \mathbf{T} = \mathbf{0}$ _____

3. A particle moves along the curve $\mathbf{r} = \langle t^3, t-2, t^2 \rangle$. For any time t, find $\mathbf{T}, \mathbf{N}, \mathbf{B}, \kappa, \tau$. [50]