

GEORGIA TECH

SCHOOL OF MATHEMATICS

MATH 2401

CALCULUS III

Quiz # 1

August 30th 2012

First Name : _____

Last Name : _____

1. Compute the derivative of $\vec{f}(t) = t^{1/4} \vec{i} + t\sqrt{t} \vec{j} + e^{3t} \vec{k}$

$$\frac{d\vec{f}}{dt} =$$

2. Carry out the integral $I = \int_0^1 \left(t \vec{i} + te^{-t^2/2} \vec{j} + \sin(\pi t) \vec{k} \right) dt$
(Hint : each term is the derivative of some function)

$$I =$$

3. Let $\vec{r}(t) = \rho \cos t \vec{i} + \rho \sin t \vec{j} + ht \vec{k}$ where $\rho > 0$ and $h > 0$ are constants.

(a) Compute the derivative of $\vec{L}(t) = \vec{r}(t) \times d\vec{r}/dt(t)$.

$$\frac{d\vec{L}}{dt} =$$

(b) Compute the unit tangent vector $\vec{T}(t)$

$$\vec{T}(t) =$$

(c) Compute the unit normal vector $\vec{N}(t)$

$$\vec{N}(t) =$$