Assignment 7

1. Sketch the plane curve represented by the vector-valued function and give the orientation of the curve.

$$r(t) = \cos \theta \mathbf{i} + 3 \sin \theta \mathbf{j}$$

2. Find the limit (if it exists).

$$\lim_{t \to 0} \left(e^t \mathbf{i} + \frac{\sin t}{t} \mathbf{j} + e^{-t} \mathbf{k} \right)$$

3. Find the open interval(s) on which the curve given by the vector- valued function is smooth.

$$r(t) = t\mathbf{i} - 3t\mathbf{j} + \tan t \mathbf{k}$$

4. Find the indefinite integral.

(a)

$$\int (e^t \mathbf{i} + \mathbf{j} + t \cos t \mathbf{k}) \, dt$$

(b)

$$\int_0^{\frac{\pi}{4}} [(\sec t \tan t)\mathbf{i} + (\tan t)\mathbf{j} + (2 \sin t \cos t)\mathbf{k}] \, dt$$