Quiz 2

1) Evaluate the given integral.

\[ \int \vec{r}(t) \, dt \text{ where } \vec{r}(t) = t^3 \hat{i} - \frac{2t}{t^2 + 1} \hat{j} + \cos(3t) \hat{k} \]

(5 points)

2) Determine the length of \( \vec{r}(t) = \langle \frac{1}{3} t^3, 4t, \sqrt{2} t^2 \rangle \) for \( 0 \leq t \leq 2 \)

(6 points)

3) Determine the curvature of curve \( \vec{r}(t), \quad -\pi \leq t \leq \pi \) at \( t = 0 \).

\[ \vec{r}(t) = e^{-t} \hat{i} + \sin t \hat{j} \]

(9 points)