Math 233 - Quiz 5

Name _____

September 25, 2025

Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. (4 points) Set up the definite integral that gives the length of the graph of $\vec{r}(t) = t\,\hat{\imath} + t^3\,\hat{\jmath} + e^{2t}\,\hat{k}$ from $t = 0$ to $t = 1$. Use your calculator to approximate the value of your integral.

2. (4 points) Let $\vec{r}(t) = (2t+1)\,\hat{\imath} + (-2t+3)\,\hat{\jmath} + t\,\hat{k}$. Find the arc length parameter starting at $t = 1$, and then reparameterize $\vec{r}$ in terms of arc length.

3. (1 point) Referring to problem 2, determine the curvature function for $\vec{r}(t)$.

4. (1 point) What is the curvature at any point on a circle of radius 5?