

Math 233 - Quiz 4
September 22, 2022

Name _____

Score _____

Show all work to receive full credit. Supply explanations when necessary. This quiz is due September 27.

1. (3 points) Find a vector-valued function $\vec{r}(t)$ that satisfies

$$\vec{r}'(t) = 4 \sin(2t) \hat{i} + (te^{t^2} + t) \hat{j} + \frac{5}{t+1} \hat{k}, \quad \vec{r}(0) = \hat{i} + 2\hat{j} - \hat{k}.$$

2. (2 points) Let $\vec{r}(t) = \ln(t^2 + 1) \hat{i} + \sin(\pi t) \hat{j} + e^{1-t} \hat{k}$. Compute $\hat{T}(1)$.

Turn over.

3. (2 points) Reparameterize the position vector in terms of the arc-length parameter.

$$\vec{r}(t) = (2t - 4)\hat{i} + (3t - 9)\hat{j} - (8t - 1)\hat{k}$$

4. (3 points) Find the curvature at the point P .

$$\vec{r}(t) = t\hat{i} + t^2\hat{j} + \frac{t^3}{4}\hat{k}, \quad P(2, 4, 2)$$