Math 233 - Quiz 5

Name _____

February 26, 2026

Score _____

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

1. (2 points) Assume k is a positive constant and compute the curvature of the graph of $y = e^{kx}$ at the point where $x = 0$.

2. (4 points) Let $\vec{r}(t) = t\,\hat{\imath} + \ln(\cos t)\,\hat{\jmath} + 5\,\hat{k}$. Compute $\hat{T}(t)$ and $\hat{N}(t)$. (You'll need the identity $1 + \tan^2 t = \sec^2 t$.)

3. (3 points) State the three important characteristics of the principal unit normal vector.

4. (1 point) Describe the surface in space defined by the equation $y^2 + z = 2$.