Math 233 - Quiz 5

Name _____

October 6, 2022

Score _____

Show all work to receive full credit. Supply explanations when necessary. This quiz is due October 11.

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

2. (3 points) Let $\vec{r}(t) = t\,\hat{\imath} + \ln(\cos t)\,\hat{\jmath} + 5\,\hat{k}$. Compute $\hat{T}(t)$ and $\hat{N}(t)$.

Turn over.

3. (6 points) A baseball is hit from 3 ft above home plate with an initial velocity vector of $\vec{v}(0) = \langle 80, 80 \rangle$. Assume the playing field is flat, ignore all forces except gravity, and use $g = 32\,\text{ft/sec}^2$.

   (a) How far does the ball travel horizontally?

   (b) What is the maximum height of the ball?

   (c) What is the length of the baseball's entire path? (Use technology to approximate the value of your integral.)

   (d) Does the ball clear a 20-ft fence that is 380 ft downrange?