Name:

SM223 – Calculus III with Optimization
Assoc. Prof. Nelson Uhan

Fall 2017

Quiz 4 – 21 September 2017

Instructions. You have 10 minutes to complete this quiz. You may not use any other materials (e.g., notes, homework, books, calculator). Show all your work.

Problem	Weight	Score
1	1	
2	1	
3	1	
Total		/ 30

Problem 1. Find the length of the curve $\vec{r}(t) = \langle 2t, \cos 2t, \sin 2t \rangle$, $0 \le t \le \pi$.

Problem 2. Suppose the position of an airplane at time t is given by $\vec{r}(t) = \langle t^2 + t, t^2 - t, \frac{1}{3}t^3 \rangle$. Find its speed at time $t = 1$.

(turn over)

Problem 3. Joe Flacco throws a football at an angle of 45° to the horizontal at an initial speed of 16 m/s. It leaves his hand 2 m above the ground. How long does it take for the football to travel a horizontal distance of 20 m?

Your answer should be in the form "$t = \ldots$, but you do not need to simplify further. Use $g = 9.8\text{m/s}^2$.