Math 122B020F14 Quiz 7 November 20, 2014 Name: _____

1. Compute the following limit. If L'Hôpital's rule applies, you must explain why it applies and use it.

$$\lim_{x\to 0} \frac{xe^x}{3x + \sin(x)}$$

2. Consider the piecewise function defined below:

$$f(t) = \begin{cases} 2 & -1 \le x \le 0 \\ 2 - 2x & 0 \le x \le 1 \\ 1 - x & 1 \le x \le 2 \end{cases}$$

Compute $\int_{-1}^{2} f(t)dt$ using the interpretation of the integral as a signed area. Hint: graph the function and use geometry.

3. Let $g(t) = 1/t$.

(a) Suppose we want to *estimate* $\int_1^2 g(t)dt$ to within $1/10$. How many terms should we take in a left hand or right hand sum?

(b) Will the left hand sum be an over estimate or under estimate? Why?

(c) Approximate $\int_1^4 g(t)dt$ using a **2 term right hand sum**.

4. Suppose that $x(t)$ gives the height of a ball in meters at time t seconds. What is the interpretation of $\int_0^5 x'(t)dt$?