

## MAT 127: Calculus C, Fall 2009

### Mini-Quiz:

*Taylor series, limits, and integration*

**DO NOT TURN THIS PAGE OVER YET**

This mini-quiz is **for practice only**. It will not be graded or even collected.

On the next page, you will find a problem involving power series. You will need to find intervals of convergence and to use power series to compute a limit and to integrate.

You have **20 minutes** to complete the entire problem.

Taking about 20 minutes on the analogous problem on the final should be ok (this would be one point per minute, which is what you need to average). Thus, you are being asked to complete the mini-quiz at about the same pace as needed for the final exam.

(a) Find the radius and interval of convergence of the power series

$$f(x) = \sum_{n=0}^{\infty} \frac{2^n x^n}{1 + \sqrt{n}}.$$

(b) Find  $\lim_{x \rightarrow 0} \frac{f(x) - 1 - x}{1 - e^{x^2}}$

(c) Find the Taylor series expansion for the function  $g = g(x)$  given by

$$g(x) = \int_0^x \frac{f(u) - 1}{u} du$$

around  $x=0$ . What are the radius and interval of convergence of this power series?