

# MATH 162Q, Quest Calculus IIA

## Workshop #5

Due Monday October 26, 2009

Group members are required to write up solutions individually. It is important that you write up solutions in your own words. You should explain not only what, but also why you decided to do what you did. You should think of this as an opportunity to reflect on the process that will lead you to a correct solution to similar problems.

Please use this as a cover sheet to your workshop writeup. Make sure all work is stapled and turn it into the professor before class on the due date.

NAME: \_\_\_\_\_

Please list all your group members, and on a scale from **1 (low)** - **5 (high)** rank your and their participation in the workshop. This will not affect grades, rather, it will supply the professor and TA with workshop feedback.

Group Member	Participation

Problem 1. Find the values of  $p$  for which the integral converges, and evaluate the integral for those values of  $p$ .

$$\int_e^\infty \frac{1}{x(\ln x)^p} dx$$

Problem 2. Find the value of the constant  $C$  for which the integral

$$\int_0^\infty \left( \frac{x}{x^2 + 1} - \frac{C}{3x + 1} \right) dx$$

converges. Evaluate the integral for this value of  $C$ .

Problem 3. Suppose that  $f(x)$  is a function satisfying

- $f(1) = f'(1) = 0$ ,
- $f''$  is continuous on  $[0, 1]$ , and
- $|f''(x)| \leq 3$  for all  $x$ .

Show that

$$\left| \int_0^1 f(x) dx \right| \leq \frac{1}{2}$$

Hint: You will need to use “integration by parts” technique twice.