Math 220 U1 **Quiz 9** **Fall 2014**

Name _____

- You may work with other students in our class. However each student should write up solutions separately and independently – nobody should copy someone else's work.
- You may use your notes, the textbook, and past homework / worksheets.
- You may use a calculator only for basic arithmetic. In particular you should not use its graphing features.
- You are not allowed to search the internet, use wolfram|alpha, or use technology for anything beyond what is stated above.
- The quiz is due at the beginning of class on **Thursday, 13 November** by 9:05am.
- There is a higher expectation for the quality of your work on a take-home quiz. Everything should be written logically and legibly with sufficient work to justify each answer. Blank copies of the quiz are available on the course webpage.
- Be sure that the pages are nicely stapled – do not just fold the corners.
- I will tell the TAs in the tutoring room that they are not allowed to help you on this quiz, so don't even try to ask them for help.

1. (2 points) Fill in the missing information to show that the given definite integral can be expressed as the limit of a Riemann sum. The only variables appearing in your limit should be n and k. You do not need to evaluate this limit.

$$\int_4^6 \frac{\ln(1+x^2)}{\sin x}\,dx = \lim_{n\to\infty} \sum_{k=1}^{n} \Bigg[\qquad \Bigg]$$

2. (2 points) Suppose that $f(x)$ is an odd, continuous function on $(-\infty, \infty)$. Evaluate

$$\int_{-6}^{3} (f(x)+4)\,dx + \int_{-3}^{5} (f(x)-2)dx - \int_{-6}^{5} (f(x)+3)\,dx.$$

3. (3 points) Evaluate

$$\lim_{n\to\infty} \sum_{k=1}^{n} \left(\frac{8k^3}{n^4} - \frac{4}{n} - \frac{k^2}{9n^4} \right)$$

Equations (5)-(7) on page 374 of your book might be useful.

4. (3 points) Evaluate the definite integral

$$\int_e^{e^2} \frac{dx}{x(\ln x)}.$$