Math 21B: Calculus II
Fall 2016, Sections B01-B02
Homework Sheet 3
Due: Tuesday, October 11th, 2016

Submit your solutions to the following problems at the beginning of your discussion section on Tuesday, October 11th. You should present your work in a clean and organized fashion, either on a printed copy of this document or a separate sheet of paper. As stated in the syllabus, late submissions will **not** be accepted.

1. Evaluate the following integrals.

   (a) $\displaystyle \int x\sqrt{x^2+1}\ dx$

   (b) $\displaystyle \int \frac{1}{x\ln(x)}\ dx$

   (c) $\displaystyle \int \cot(x)\ dx$

   (d) $\displaystyle \int_0^\pi \cos(\sin(\sin(x)))\cos(\sin(x))\cos(x)\ dx$

2. Estimate the value of $\int_0^4 e^{x^2} \, dx$ with $n = 6$ subdivisions using

   (a) trapezoid rule, and
   (b) Simpson's rule.

   Estimate your error in each case.

3. Show that for any real number $a > 1$,

$$\int_1^a \ln(x) \, dx + \int_0^{\ln(a)} e^y \, dy = a \ln(a).$$

   Where in your reasoning is the assumption $a > 1$ used?