Math 21B: Calculus II
Fall 2016, Sections B01-B02
Homework Sheet 2
Due: Tuesday, October 4th, 2016

Submit your solutions to the following problems at the beginning of your discussion section on Tuesday, October 4th. 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. Suppose the following information is known for continuous functions $f(x)$ and $g(x)$.

$$\int_4^6 f(x)\ dx = 5 \qquad \int_6^9 f(x)\ dx = 3$$

$$\int_4^9 g(x)\ dx = 7 \qquad \int_6^9 g(x)\ dx = 9$$

   (a) Find $\displaystyle\int_4^9 f(x)\ dx - \int_4^6 g(x)\ dx$.

   (b) Find $\displaystyle\int_4^9 (2f(x) + 3g(x))\ dx$.

2. Is the following statement true? Justify your answer.

$$\int \sqrt{x^2+1}\ dx = \frac{1}{2}x\sqrt{x^2+1} + \frac{1}{2}\ln\left(\sqrt{x^2+1} + x\right) + C$$

3. Evaluate the following integrals.

(a) $\int (3x+1)^2 \, dx$

(b) $\int \frac{1}{2x} \, dx$

(c) $\int \left(\csc^2(x) + \csc(x)\cot(x)\right) \, dx$

(d) $\int_1^2 \frac{1}{(5x)^2} \, dx$

(e) $\int_0^{\pi} \sin\left(\frac{1}{2}x\right) \, dx$