Math 21B: Calculus II
Fall 2016, Sections B01-B02
Homework Sheet 5
Due: Tuesday, November 1st, 2016

Submit your solutions to the following problems at the beginning of your discussion section on Tuesday, November 1st. 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 integral using trig substitution. Is your answer surprising?

$$\int \frac{1}{x^2 + 1} \, dx$$

2. Do the following integral in 3 different ways: (i) using trig substitution, (ii) using U-substitution with $u = x^2$, and (iii) using partial fractions. Verify that you get the same answer each time. Which method was easiest?

$$\int \frac{x^3}{1 - x^2} \, dx$$

3. Evaluate the following integrals.

(a) $\int \dfrac{x^3 - 3}{(x-1)(x+2)} \, dx$

(b) $\int \sqrt{1 + \cos(4x)} \, dx$

(c) $\int \dfrac{1}{x^4 \sqrt{x^2 - 36}} \, dx$

(d) $\int \dfrac{1}{(x^2 + 1)(x^2 - 1)(x+1)} \, dx$