Math 190 Lab 9: Nov 15 and 17

Work through the following problems while the instructor and TA circulate. When you have completed the problems (to the satisfactory of the facilitators) you can spend the rest of the lab working on the weeks homework.

Warm up: Find the general anti-derivative of
- $f(x) = 0$
- $f(x) = -2$
- $f(x) = 4x$
- $f(x) = x^n$ where $n \neq -1$
- $f(x) = \frac{1}{x}$
- $f(x) = e^x$
- $f(x) = \sin x$
- $f(x) = \cos x$

Questions:

1. Evaluate the following definite integrals

    (a) $\displaystyle\int_0^{\pi/3} (2\sin x + \cos x)\, dx$

    (b) $\displaystyle\int_{-3}^{-1} \frac{x + x^2}{x} dx$

2. Suppose

$$\int_2^5 f(x)dx = 7.$$

    Find

$$\int_5^2 f(x)dx.$$

    Explain your answer either with a picture or with reference to the Fundamental Theorem of Calculus.

3. Recall the following integral rules where k is a constant
    - $\int_a^b (f(x) \pm g(x))\, dx = \int_a^b f(x)dx \pm \int_a^b g(x)dx$
    - $\int_a^b kf(x)dx = k\int_a^b f(x)dx.$

    Note that these rule works for indefinite integrals as well. Use these rules when you attempt problem 1 of this weeks homework (HW9).