MATH 021B DISCUSSION WORKSHEET 2

Problem 1. Learn (or relearn) the names of your groupmates. Also learn what their favorite movies are and why.

Problem 2. Evaluate the following integrals by interpreting them in terms of areas:

(a) $\int_{-4}^{4}(|x|-3)\mathrm{d}x$

(b) $\int_{0}^{5}|9-3x|\mathrm{d}x$

(c) $\int_{-3}^{3}\sqrt{9-x^2}\mathrm{d}x$

Problem 3. Suppose that

$$\int_{-2}^{6} f(x)\mathrm{d}x = 5, \qquad \int_{3}^{10} f(x)\mathrm{d}x = -2, \qquad \text{and} \qquad \int_{-2}^{10} f(x)\mathrm{d}x = 7.$$

Compute:

(a) $\int_{6}^{3} f(x)\mathrm{d}x$

(b) $\int_{3}^{6}(-3f(x)+7)\mathrm{d}x$

Problem 4. Find the average value of the function $f(x) = \sqrt[3]{x+1}$ over the interval $[0, 26]$.

Problem 5. Find antiderivatives of the following functions:

(a) $f(x) = -4\sec(2x)\tan(2x)$

(b) $g(x) = \sec^2(3x) + \frac{1}{x\sqrt[3]{x}}$

Problem 6. Compute the integrals:

(a) $\int 5\sin(\pi^2)\mathrm{d}x$

(b) $\int \left(\frac{-2}{4x^2+1} - \frac{1}{x}\right)\mathrm{d}x$

Problem 7. Find f if $f'(x) = \cos(x) + 6e^{-3x}$ and $f(0) = -1$.

Problem 8. How are Problems 5, 6, and 7 similar? How are they different? Explain.

Problem 9. Evaluate the definite integrals:

(a) $\int_0^5 e^{2x} + \pi\cos(\pi x)\mathrm{d}x$

(b) $\int_0^6 |x^2 - 4x + 3|\,\mathrm{d}x$

Problem 10. Find the derivatives of the following functions:

(a) $f(x) = \int_3^x \ln(\ln(t))\mathrm{d}t$

(b) $g(x) = \int_{2e^x}^{\tan(x)} \sqrt{1-t^4}\mathrm{d}t$