Mathematics 132 – Calculus for Physical and Life Sciences 2
Discussion 1 – Practice with Antiderivatives
January 26, 2005

Goals

Today we want to practice using the antiderivative formulas we introduced last time, and which are also covered in §6.2 of the text. Work out answers to these problems *individually*, then compare with your group partners and reconcile any differences. You will hand in *one copy* of your group's work as the assignment.

Discussion Questions

A. Find the following indefinite integrals (antiderivatives).

1) $\int \frac{4}{x^{1/2}} + \frac{3}{x^{1/3}}\ dx$

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

3) $\int (x+1)^3\ dx$ (Hint: multiply out, then integrate)

4) $\int \frac{t^4+3t^2+1}{\sqrt[3]{t}}\ dt$

5) $\int 4\cos(x) - 3\sin(x)\ dx$

B. Find the exact values of the following definite integrals using the Fundamental Theorem.

1) $\int_0^1 x^4 + x + 3\ dx$

2) $\int_e^{e^2} \frac{4}{x}\ dx$

3) $\int_0^{1/2} \frac{dx}{\sqrt{1-x^2}}$

4) $\int_{-2}^{2} 3^x\ dx$

C. The *average value* of the function $f(x) = 6/x^2$ on the interval from $x = 1$ to $x = c$ is 1. Find the value of c.

D. In A 3, suppose the problem said $\int (x+1)^{33}\ dx$ instead of what is there. Obviously, you don't want to multiply out $(x+1)^{33}$(!) Can you find an indefinite integral a different way? (Think Chain Rule, but "in reverse.")

Assignment

Group writeups due in class on Monday, January 31.