

Math 1210-1 HW 10
Due Wednesday March 24, 2003

Please show all of your work and box your answer. Be sure to write in complete sentences when appropriate.

Antiderivatives

1. Find the indicated antiderivatives.

(a) $\int 2 dx.$

(b) $\int x + \pi dx.$

(c) $\int x^{1000} + x^2 dx.$

(d) $\int \frac{x^5 - 2x}{x^3} dx.$

(e) $\int \theta + \cos \theta d\theta.$

(f) $\int 4x^{5/2} dx.$

(g) $\int (\sqrt{3}x^2 + 1)^{11} 2\sqrt{3}x dx.$

(h) $\int (9x^2 - 2x)(6x^3 - 2x^2 + 1)^3 dx.$

(i) $\int \cos^3 \left(2\pi x + \frac{\pi}{6} \right) \sin \left(2\pi x + \frac{\pi}{6} \right) dx.$

(j) $\int 3x \sin(x^2) dx.$

2. In each of the following problems $f''(x)$ is given. Find $f(x)$ by antidifferentiating twice. Note that $f(x)$ should be a family of functions given by two parameters C_1 and C_2 , one from each antiderivative.

(a) $f''(x) = x$

(b) $f''(x) = -9.81$

(c) $f''(x) = \sin x$

3. Prove the formula

$$\int [f(x)g'(x) + f'(x)g(x)] dx = f(x)g(x) + C.$$

(Hint: How did we prove all of the formulas in class?)

4. Find $\int |x| dx$. (Hint: Recall what $\int f(x) dx$ actually means. Also write down the definition for $|x|$.)