MAT 126 Calculus B Spring 2006
Practice Midterm II

Answer each question in the space provided and on the reverse side of the sheets. Show your work whenever possible. Unless otherwise indicated, **answers without justification will get little or no partial credit!** Cross out anything that grader should ignore and circle or box the final answer. The actual exam will contain 5 problems. This practice test contains more problems to give you more practice.

1. Evaluate the following definite integrals

(a)
$$\int_0^{13} \frac{2}{(2x+1)^{\frac{2}{3}}} dx$$

(b)
$$\int_0^{\frac{\pi}{2}} e^{\sin x} \cos x \, dx$$

(c)
$$\int_0^1 x^4(1+x^5)^{20} dx$$

(d)
$$\int_0^1 \tan^{-1} x \, dx$$

(e)
$$\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} |\sin t| \, dt.$$

(f)
$$\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} (1+t^2)^2 \sin^5 t \, dt.$$

2. Evaluate the following indefinite integrals

(a)
$$\int x^3 e^{x^4} dx$$

(b)
$$\int te^t dt$$

(c)
$$\int x^2 \cos x \, dx$$

(d)

$$\int \cos(\sqrt{x})dx$$

3. Evaluate the following indefinite integrals

(a)

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

(b)

$$\int \frac{1}{x} (\ln x)^2 \, dx$$

(c)

$$\int x^7 \ln x \, dx$$

4. Evaluate the following indefinite integrals

(a)

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

(b)

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

5. (a) Write a formula for $\tan x$ in terms of $\sin x$ and $\cos x$.

(b) Evaluate

$$\int \tan x \, dx$$

6. Evaluate

$$\int_{\frac{\pi}{4}}^{\frac{\pi}{2}} \frac{x}{\sin^2 x} \, dx$$

7. (a) Set

$$f(x) = \int_1^{x^2} \sin t^3 dt + x^3$$

Find $f(1)$ and $f'(x)$.

(b) Set

$$f(x) = \int_{\sqrt{x}}^{x-2} \tan^2 t \, dt$$

Find $f(4)$ and $f'(x)$.