

## Final Exam of 211, Dec 22, 2005

Note: You need to show your works in a clear way. A single answer will not gain any credit.

Name (Print):

Signature:

Student ID:

Section:

1.(Points)

2.(Points)

3.(Points)

4.(Points)

5.(Points)

6.(Points)

7.(Points)

8.(Points)

Total Points

I. (30 points.) Find the indicated integrals

(a).  $\int_1^2 e^x \sin x \, dx$

(b).  $\int \cos^3 x \sin x \, dx$

II. (20 points.) A person wants to draw a rectangle of area  $25 \text{ inch}^2$ . What dimension will minimize the circumference?

III. (20 points.) Use the trapezoidal rule to approximate  $\int_0^1 \sqrt{x^2 + 1} dx$  with  $n = 4$ .

**IV.** (30 points.) Given the function  $f(x) = e^{-x^2+2x+7}$ , determine where the function is concave up and where it is concave down?

V. (20 points.) Find  $f'(x)$  if

(a).  $f(x) = e^x \cos(x^2) - 2x$

(b).  $f(x) = \frac{\sin x \ln x}{x^2}, x > 0.$

VI. (30 points.) Find the indicated limits

(a).  $\lim_{x \rightarrow 1} \frac{\sqrt{x^2+4} - \sqrt{x^2+4x}}{x-1}$

(b).  $\lim_{x \rightarrow \infty} \frac{2x^2+3x-5}{7x^3-2x+3}$

**VII.** (20 points.) For the curve defined implicitly by  $x^2 \sin y - \cos y + 7y + e^x = 0$ , find an equation of the tangent line of the curve at  $(0, 0)$ .

**VIII.** (30 points.) find the absolute maximum and the absolute minimum of the function  $f(x) = \sin x + \cos x$  on  $[0, 2\pi]$ .