

Math 202 — **Exam #2** — May 10, 2006

Please PRINT your name and ID# on the cover of your exam booklet and indicate if you are handing-in more than one booklet. Write clearly and cross-out work not to be graded.

ALL ANSWERS GO IN THE EXAM BOOK. **NO CALCULATORS ALLOWED.**

1. Evaluate the following integral: (20 pts.)

$$\int \cos^3 x \sin^2 x \, dx$$

2. Given

$$\int_0^1 \frac{e^x}{e^x - 1} \, dx$$

- (a) Explain why it is improper. (5 pts.)
- (b) Determine if it is convergent or divergent. If it is convergent, find its value; if it is divergent, show (by calculation) or explain (by comparison) why. (15 pts.)
3. Use the Trapezoidal Rule with 4 subintervals to approximate $\int_0^4 \sqrt{1+x} \, dx$. Leave your answer in terms of **radicals**. (20 pts.)
4. Find dy/dx as a function of t for the curve given parametrically by $x(t) = t^3 - 12t$ and $y(t) = t^2 - 1$. **Also** find any values of t for which this derivative does not exist. (20 pts.)
5. **Sketch** the region that is inside the lemniscate (figure-eight) $r^2 = 8 \cos(2\theta)$, and **find its area**. (20 pts.)