Math 20B First Exam 4:40 PM January 29, 2001

- Please put your name, ID number, and section number (or time) on your blue book.
- The exam is CLOSED BOOK.
- Calculators are NOT allowed.
- **You must show your work to receive credit.**

1. (48 pts.) Evaluate the following. Remember to show your work!

   (a) $\lim_{x\to 0} \dfrac{\cos x - 1}{e^x - 1}$.

   (b) $F'(x)$ given that $F(x) = \displaystyle\int_{\sqrt{x}}^{2} \cos(t^2)\, dt$.

   (c) $\displaystyle\int e^t \sqrt{1+e^t}\, dt$.

   (d) $\displaystyle\int_0^2 |x-1|\, dx$.

2. (20 pts.) (a) Verify that $\ln|\sin u|$ is an antiderivative of $\cot u$.

   (b) Compute $\displaystyle\int_{\pi/4}^{\pi/2} \cot x\, dx$. Your final answer may contain logarithms, but it should NOT contain trig functions.

3. (12 pts.) Verify the inequality $\displaystyle\int_0^1 \sqrt{2+x^2}\, dx \le \sqrt{3}$ without evaluating the integral.

4. (a) (15 pts.) Given the table of information below, use a linear approximation to estimate $g(16)$.

x	0	5	10	15
$g(x)$	0	20	35	45

   (b) (5 pts.) Do you think your prediction is an overestimate or underestimate? Why? You must give a reason to receive credit.

END OF EXAM