Calculus II Test 1A NAME_____
100 points No notes, no calculators. Spring, 2010

PART 1. Part 1 consists of 9 questions. Show your work and clearly mark your final answer in the space provided. (6points each)

1. If $F(x)=\int_2^x e^{t^2+1}\,dt$, find $F'(x)$.

2. Evaluate the definite integral $\int_{-3}^{3}\sqrt{9-x^2}\,dx$ by interpreting it in terms of area.

3. Evaluate $\int_1^2 x\ln x\,dx$

4. Evaluate $\int \frac{x}{\sqrt{1-x^2}}\,dx$

5. Evaluate $\int_1^e \frac{1}{6x}\,dx$

6. Evaluate $\int \frac{1}{x^2-1}\,dx$

7. Evaluate $\int \frac{e^{\sqrt{x}}}{\sqrt{x}}\,dx$.

8. Write out the terms of the Riemann sum M_4 with $n = 4$ and using the midpoint rule in order to approximate $\int_1^3 \frac{1}{x}\,dx$. You do not need to actually compute and add the terms in the sum.

9. Find the average value of $f(x) = \frac{x}{x-1}$ over the interval [2, 4].

Part 2. **Part 2 consists of 4 problems. Problems 1 through 3 are worth 10 points each. Problem 4 is worth 16 points. Show all your work for full credit! Displaying only the final answer (even if correct) without the relevant steps is not enough.**

1. Evaluate $\int x^2 \sin x \, dx$

2. Evaluate $\int \frac{x+1}{x^2(x^2+1)} \, dx$

3. A particle moves along a line with velocity function $v = t^2 - t$, $t \geq 0$, where v is measured in meters per second.

   a. Find the change in position, i.e. the displacement, over the time interval [0, 3].

   b. Find the distance traveled by the particle during the time interval [0, 3].

4. Evaluate the following integrals.

a. $\int \frac{\cos^2 x - \sin x}{\cos x} dx$

b. $\int \sin^4 x \cos^3 x \, dx$

c. $\int \sec^4 x \tan x \, dx$