Math 202

12 March 2010
Second Midterm

NAME (Print!): _____

Check one: (1pm): _____
(2pm): _____

Problem	Points	Score
1	20	
2	20	
3	30	
4	20	
5	10	
Total	100	

Problem 1 (20 points): Answer the following:

(a) Using Simpson's rule with $n = 4$, approximate $\int_1^2 1/x \; dx$.

(b) For which n will Simpson's rule approximate $\int_1^2 1/x \; dx$ within 0.0001?

Problem 2 (20 points): Find the centroid of the region bounded by $y = \cos x$, $y = 0$, $x = 0$ and $x = \pi/2$.

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Problem 3 (30 points): Determine whether or not the following integrals converge or diverge. If it converges, give a reasonable upper bound for the number to which it coverges (e.g., $+\infty$ is not reasonable but 10 is).

(a) $\int_3^\infty \frac{dx}{x^2+x-6}$

(b) $\int_1^\infty \frac{\cos^2(x)}{1+x^2}\ dx$

Problem 4 (20 points): Find the following:

(a) The arclength of $y = \ln x$ for $1 \leq x \leq \sqrt{3}$.

(b) The surface area of $y = \sqrt{x}$ rotated around the x-axis for $4 \leq x \leq 9$.

Problem 5 (10 points): Find the values of p for which the integral $\int_0^1 \frac{dx}{x^p}$ converges; prove your answer. For those values of p for which it converges, find the value of the integral.

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