

Name: _____

Math S–Xab Final Exam (Part I)—Tuesday, August 17, 2004

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Problem Number	Possible Points	Score
1	5	
2	5	
3	5	
4	5	
5	5	
6	5	
7	5	
8	5	
Total	40	

Directions—No Calculators are allowed on this part of the exam. Please Read Carefully! You have three hours to take both parts of this exam. Make sure to use correct mathematical notation. Pace yourself by keeping track of how many problems you have left to go and how much time remains. You do not have to answer the problems in any particular order, so move to another problem if you find you are stuck or spending too much time on a single problem. To receive full credit on a problem, you will need to justify your answers carefully—unsubstantiated answers will receive little or no credit (except if the directions for that question specifically say no justification is necessary, such as in a True/False section). Please be sure to write neatly—illegible answers will receive little or no credit. If more space is needed, use the back of the previous page to continue your work. Be sure to make a note of this on the problem page so that the grader knows where to find your answers.

1. (5 points) Find the derivative of $f(x) = \sqrt{2x + \tan x}$

2. (5 points) Find the derivative of $f(x) = e^x \arctan x$.

3. (5 points) Find the derivative of $f(x) = \frac{\sin x}{x^2 - 2x + 5}$.

4. (5 points) Find the derivative of $f(x) = \ln \left(\frac{x(x^3 - x)^{20}}{\sqrt[7]{x^2 - 2}} \right)$

5. (5 points) Evaluate the antiderivative $\int \sin^3 x \cos x \, dx$.

6. (5 points) Evaluate the antiderivative $\int \left(x^7 + e^x - \frac{1}{x} + e^\pi \right) dx$.

7. (5 points) Evaluate the definite integral $\int_0^1 \frac{1}{\sqrt{1-x^2}} dx$.

8. (5 points) Evaluate the definite integral $\int_0^{\sqrt{\pi/3}} 2x \sin(x^2) dx$.