

MARK BOX		
PROBLEM	POINTS	
1	10	
2	10	
3	10	
4	10	
5	10	
6	10	
7	10	
8	10	
9	10	
10	10	
LSUvsUSC		3
%	100	

NAME: _____

SSN: _____

Section 007 (MW 12:20 pm)

or

Section 008 (MW 2:30 pm)

INSTRUCTIONS:

- (1) To receive credit you must:
 - (a) work in a logical fashion, show all your work, indicate your reasoning
 - (b) when applicable put your answer on/in the line/box provided
 - (c) if no such line/box is provided, then box your answer
 - (2) The MARK BOX indicates the problems along with their points. Check that your copy of the exam has all of the problems.
 - (3) You may **not** use a calculator, books, personal notes. Give exact answers: for example, write $\ln 2$ instead of .6931, write $\sqrt{2}$ instead of 1.414, write π instead of 3.1415, write $\frac{1}{3}$ instead of 0.3333.
 - (4) During this exam, do not leave your seat. If you have a question, raise your hand. When you finish: turn your exam over, put your pencil down, and raise your hand.
 - (5) This exam covers (from *Calculus* by Varberg, Purcell, Rigdon, 8th ed.): Chapters 8 and 9 .
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Problem Inspiration:

1. class handout of 119 integrals
 2. homework problem
 3. class handout of 119 integrals
 4. homework problem, an example from class, Girardi's Spring 03 exam 2
 5. an example from class
 6. class handout of 119 integrals, homework problem, an example from class
 7. homework problem
 8. homework problem, Girardi's Spring 03 exam 2
 9. homework problem
 10. homework problem
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1.

$$\int \sec^3 x \tan^3 x dx = \qquad +C$$

2.

$$\int \frac{x \, dx}{\sqrt{3x+4}} =$$

$+C$

3.

$$\int \frac{x^2 dx}{\sqrt{4-x^2}} =$$

$+C$

4.

$$\int e^{2x} \cos x \, dx = \qquad \qquad \qquad +C$$

5.

$$\int \frac{5x^3 - 3x^2 + 2x - 1}{x^4 + x^2} dx = \qquad +C$$

HINT: $x^2 = (x - 0)^2$

6a. Let $n \in \mathbb{N} = \{1, 2, 3, 4, 5, \dots\}$. Derive a reduction formula for the below integral.

$$\int (\ln x)^n dx =$$

HINT: Your solution should look like:

$$\int (\ln x)^n dx = (\text{some function of } x) + (\text{maybe a constant}) \int (\ln x)^{\text{some number less than } n} dx$$

6b. Use your solution to **6a** to find the below 2 integrals.

$$\int \ln x dx = \qquad \qquad \qquad +C$$

$$\int (\ln x)^2 dx = \qquad \qquad \qquad +C$$

7.

$$\lim_{x \rightarrow \infty} \frac{x^{10000}}{e^x} =$$

EXPLAIN YOUR ANSWER!

8.

$$\lim_{x \rightarrow \infty} x^{\frac{1}{x}} =$$

9.

$$\int_2^{\infty} \frac{\ln x \, dx}{x^2} =$$

HINT: integration by parts

10.

$$\int_{-2}^0 \frac{dx}{2x+3} =$$

HINT: make a (very) rough sketch of the integrand (i.e., the function you need to integrate - where is it not defined).