

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

**NAME:** \_\_\_\_\_

**SSN:** \_\_\_\_\_

**Section 001 (MW 9:05)**

or

**Section 002 (MW 10:10)**

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**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  $\pi$  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, 8<sup>th</sup> ed.): Chapters 8 and 9 .

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**Problem Inspiration:**

1. # 1 of class handout of 100 integrals, also an example from class
  2. # 10 of class handout of 100 integrals
  3. an example from class
  4. an example from class
  5. # 47 of class handout of 100 integrals, also an example from class
  6. # 44 of class handout of 100 integrals
  7. an example from class
  8. homework problem § 9.2 # 23
  9. an example from class
  10. homework problem § 9.4 # 7
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1.

$$\int \frac{dx}{\sqrt{x}(1+x)} = \quad +C$$

2.

$$\int \frac{dx}{\sqrt{x^2 + 4}} = \quad +C$$

3.

$$\int e^x \cos x dx = \quad \quad \quad +C$$

4.

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

5.

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

6.

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

HINT:  $x^3 + 1 = (x + 1)(x^2 - x + 1)$ . This is a long one!

7.

$$\lim_{x \rightarrow \infty} \frac{x^2}{e^x} =$$

8.

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

9.

$$\int_1^{\infty} \frac{dx}{x^2} =$$

10.

$$\int_{-1}^1 \frac{dx}{x^3} =$$

HINT: make a (very) rough sketch of the integrand (i.e., the function you need to integrate).