MARK BOX		
PROBLEM	POINTS	
1 - 10	10	
TOTAL	10	

NAME (legibly printed): _____

class PIN: _____

INSTRUCTIONS:

(1) To receive credit you must:
   (a) **work in a logical fashion, show all your work, indicate your reasoning**; **no credit will be given for an answer that *just appears***; such explanations help with partial credit
   (b) if a line/box is provided, then:
      — show you work BELOW the line/box
      — put your answer on/in the line/box
   (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) This exam covers (from *Calculus* by Anton, Bivens, Davis 8th ed.): Section 8.7 .

Problem Inspiration: just like the homework.

Honor Code Statement

I understand that it is the responsibility of every member of the Carolina community to uphold and maintain the University of South Carolina's Honor Code.
As a Carolinian, I certify that I have neither given nor received unauthorized aid on this exam.
Furthermore, I have not only read but will also follow the above Instructions.
I hereby verify that I did NOT receive help from other people on this take-home exam problem.

Signature : _____

Numerical Integration . Let

$$f(x) = \frac{1}{(x+1)^2} \qquad \text{and} \qquad I = \int_{x=1}^{x=4} f(x)\ dx\ .$$

The 10 steps of this problem are similar to the homework but the number of subintervals is **6** and **not 10**. **On the parts that say "Do not use a calculator", you need not do alot of arthritic.**

1. Find the exact value of I, without using a calculator. Your answer should be a fraction, without decimal places.

$I\ =$

2. Find an approximation for I, using part 1 and your calculator, to as many decimal places as your calculator will give you.

$I\ \approx$

3. Approximate I using the Trapezoid Rule T_n with $n = 6$ subintervals. Do not use a calculator (so your answer will have several numbers added together).

$T_6 =$

4. Find an approximation for T_6, using part 3 and your calculator, to as many decimal places as your calculator will give you.

$T_6\ \approx$

5. Approximate I using Simpon's Rule S_{2n} with $2n = 6$ subintervals. Do not use a calculator (so your answer will have several numbers added together).

$S_6 =$

6. Find an approximation for S_6, using part 5 and your calculator, to as many decimal places as your calculator will give you.

$S_6 \approx$

***.** Find the first 4 derivatives of the given $y = f(x)$ that we are working with.

7. Use inequality (11), page 563, to find an upper bound on the error in part 3. Do not use a calculator.

$|T_6 - I| \leq$

8. Use your calculator to approximate the error estimate in part 7 to as many decimal places as your calculator will give you.

$|T_6 - I| \lessapprox$

9. Use inequality (12), page 563 to find an upper bound on the error in part 5. Do not use a calculator.

$|S_6 - I| \leq$

10. Use your calculator to approximate the error iestimate in part 9, to as many decimal places as your calculator will give you.

$|S_6 - I| \lessapprox$