

Your Name

Your Signature

Student ID #

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	Christine	Katie	
Section (Tues.)	12:30	12:30	1:30
(circle one)	CB	CA	CC

Problem	Total Points	Score
1	12	
2	12	
3	7	
4	7	
5	12	
Total	50	

- This exam is closed book. You may use one  $8\frac{1}{2} \times 11$  sheet of notes.
- Do not share notes.
- Graphing calculators are not allowed.
- In order to receive credit, you must show your work. Do not do computations in your head. Instead, write them out on the exam paper.
- Place a box around **YOUR FINAL ANSWER** to each question.
- If you use a trial and error (or guess and check) method when an algebraic method is available, you will not receive full credit.
- If you need more room, use the backs of the pages and indicate to the reader that you have done so.
- Raise your hand if you have a question.

1 (12 points) Compute the following indefinite integrals.

(a) (6 points)  $\int 4y \sec^2(2y) dy$

(b) (6 points)  $\int \frac{16 + 4x^2 - x^3}{x^3 - 4x^2 + 4x} dx$

2 (12 points) Compute the following definite integrals.

(a) (6 points)  $\int_{1/\sqrt{3}}^1 \frac{dt}{t\sqrt{4t^2-1}}$

(b) (6 points)  $\int_0^{\pi^3} \sin(x^{1/3}) dx$

- 3 (7 points) A bag of sand originally weighs 160 lbs. It is lifted at a constant rate of 4 ft/min. The sand leaks out of the bag at a constant rate so that when it has been lifted 20 ft only half the sand is left. How much work is done lifting the bag 20 ft?

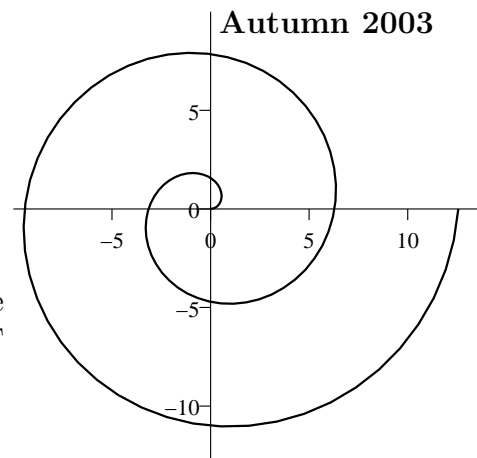
- 4 (7 points) Determine if the improper integral  $\int_0^1 x^3 \ln(x) dx$  is convergent or divergent. If it is convergent, evaluate it.

- 5 (12 points) Consider the spiral given by the parametric equations

$$\begin{cases} x = t \cos t \\ y = t \sin t \end{cases}$$

where  $0 \leq t \leq 4\pi$ .

- (a) (6 points) Set up an integral that computes the arclength of the spiral. SET UP ONLY. DO NOT EVALUATE.



- (b) (6 points) Use the Trapezoid Rule with  $n = 3$  to approximate the arclength of the spiral.