

## Math 158: Midterm exam I

February 4, 2008

LAST name \_\_\_\_\_ FIRST name \_\_\_\_\_

Student ID \_\_\_\_\_

### Instructions:

- Print your name and student ID number.
- This is a closed book exam.
- **Programmable and graphic calculators are NOT allowed.**
- If you have insufficient space, use the back of the page, but INDICATE that the solution is on the back. The back of the page can also be used for rough work.
- You may lose marks if your explanations are incomplete or poorly presented.
- There are 5 questions. Point values are given in parentheses. 40 points maximum.
- Duration 50 minutes.

Question	Score	Maximum
1		8
2		10
3		8
4		8
5		6
Total		40

1. (8 marks) Find

$$\int \frac{x^2}{e^{3x^3}} dx.$$

2. (10 marks) Consider the region between the  $x$  axis and the graph of  $f(x) = \frac{1}{2x+1}$  from  $x = 1$  to  $x = 3$ .
- (a) Find the exact value of the area of this region by integration.
  - (b) Approximate the area of the region using the trapezoidal rule with  $n = 4$ .
  - (c) Approximate the area of the region using Simpson's rule with  $n = 4$ .
  - (d) Which of the two approximation techniques was more accurate?

3. (8 marks) Find the area of the region enclosed by the curves  $f(x) = x^2 - 3x$ ,  $f(x) = x - 3$ ,  $x = 0$  and  $x = 2$ . Draw a picture to indicate your reasoning.

4. (2+6 marks)

- (a) What does the Fundamental Theorem of Calculus state?
- (b) Evaluate the definite integral

$$\int_1^5 \frac{\ln \sqrt{x}}{2x} dx.$$

5. (6 marks) Find

$$\int x\sqrt{x+1}dx.$$