

Math 152 – Calculus II, Fall 2006
Second Midterm

November 1, 2006, 8:30 – 9:20

Last Name:	
First Name:	
SFU ID (email or numeric):	

1. DO NOT LIFT UP THE COVER PAGE UNTIL INSTRUCTED.
2. No calculators are allowed.
3. This test is comprised of 7 pages (including cover page) and one formula sheet at the back.
4. Once the test begins, please check that all pages are intact.
5. Do ALL questions.
6. Clearly explain your answer. No credit will be given for just writing down the answer.
7. If the answer space provided is not sufficient, write your answer on the back of the previous page. Clearly mark the question number.
8. This exam has two bonus points: While there is a total of 27 points on the exam, the score will be out of 25.
9. All the best!

Question	Points	Score
1	6	
2	6	
3	3	
4	2	
5	4	
6	3	
7	3	
Total:	27	

1. Evaluate the following indefinite integrals. Clearly indicate which methods you apply.

(a) (3 points)

$$\int (\cos x)^5 (\sin x)^3 dx$$

Answer

(b) (3 points)

$$\int \frac{e^{\sqrt{x}}}{\sqrt{x}} dx$$

Answer

2. Evaluate the following indefinite integrals. Clearly indicate which methods you apply.

(a) (3 points)

$$\int \frac{x+1}{x^2-2x+2} dx$$

Answer

(b) (3 points)

$$\int \frac{x}{\cos^2(x)} dx$$

Answer

3. (3 points) Determine if the following integral converges

$$\int_1^{\infty} \left(\frac{\sin x}{x} \right)^2 dx$$

Answer

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4. (2 points) Express the arc length of the graph of $\sin(x)$ with $0 \leq x \leq \pi$ as an integral. You don't have to evaluate the integral.
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Answer

5. We approximate the value of an integral $\int_a^b f(x)dx$ using the midpoint rule M_n and using Simpson's rule S_n . Suppose we have computed that for $n = 10$ we have

$$\left| \int_a^b f(x)dx - M_{10} \right| \leq 10^{-1} \text{ and } \left| \int_a^b f(x)dx - S_{10} \right| \leq 10^{-1}.$$

- (a) (2 points) How big should we take n to make sure that $\left| \int_a^b f(x)dx - M_n \right| \leq 10^{-5}$? Explain.

Answer

- (b) (2 points) How big should we take n to make sure that $\left| \int_a^b f(x)dx - S_n \right| \leq 10^{-5}$? Explain.

Answer

6. (3 points) Evaluate the following definite integral. Clearly indicate your methods.

$$\int_{-1}^1 \ln(x^2) dx$$

Answer

7. (3 points) Evaluate the following definite integral. Clearly indicate your methods.

$$\int_1^3 x \sqrt{1 - (x - 2)^2} dx$$

Answer