
MIDTERM 1

Math 3B
1/26/2011

Name: _____

Section: _____

Signature: _____

Read all of the following information before starting the exam:

- Check your exam to make sure all pages are present.
- When you use a major theorem (like FTC or MVT), make sure to note its use. (You do not need to explicitly mention limit laws or rules for simplifying integrals.)
- You may use writing implements and a single 3" \times 5" notecard.
- NO CALCULATORS!
- Show all work, clearly and in order, if you want to get full credit. I reserve the right to take off points if I cannot see how you arrived at your answer (even if your final answer is correct).
- Circle or otherwise indicate your final answers.
- Good luck!

1	20	
2	20	
3	20	
4	10	
5	20	
6	20	
Total	110	

1. (20 points) (a) Approximate $\int_1^3 \sin x \, dx$ as a Riemann sum with 4 equal intervals, choosing the midpoint of each rectangle to be its height.

(b) Approximate $\int_0^1 f(x) \, dx$ as a Riemann sum with 3 equal intervals, choosing the left endpoint of each rectangle to be its height.

2. (20 points)

You have an unknown continuous function g , and are given the following information:

- $\int_0^1 g(x)dx = 1$,
- $\int_0^3 g(x)dx = 5$,
- When $x \geq 3$, $2 \leq g(x) \leq 4$

(a) What is $\int_2^2 g(x)dx$?

(b) What is $\int_1^3 g(x)dx$?

(c) Is it consistent with the information given that $\int_3^5 g(x)dx = 3$?

(d) Is it consistent with the information given that $\int_0^5 g(x)dx = 13$?

3. (20 points) Find the following indefinite integrals.

(a) $\int e^x + x^2 dx$

(b) $\int \frac{e^{1/x}}{x^2} dx$

(c) $\int 7x^4 + 5x^2 dx$

(d) $\int \sec^2 x dx$

4. (10 points) Find the following definite integrals if the integrand is continuous on the given interval; otherwise indicate that the function is discontinuous.

(a) $\int_0^1 e^x + x^2 dx$

(b) $\int_{-1}^1 \frac{e^{1/x}}{x^2} dx$

(c) $\int_2^4 7x^4 + 5x^2 dx$

(d) $\int_0^{\pi/4} \sec^2 x dx$

5. (20 points) Find the following definite integrals. (Hint: don't try to find the indefinite integral.)

(a) $\int_{-2}^2 e^{-x^2} \sin x \, dx$

(b) $\int_{-2}^2 \sqrt{4 - x^2} \, dx$

6. (20 points) Find the area enclosed by the curves $y = 8 - x^6$ and $y = 7x^3$.