

MATH 1272
Midterm I
Professor Bramson
October 7, 2004

Name: _____

T.A.: _____

INSTRUCTIONS: There are 100 points possible on the exam. Do as many problems as you can. Answers must be in the boxes provided to be counted. Show your work in the space provided below each problem - outside the boxes. If you need extra space, state where the work is being done. Also, be sure to justify your answers. Note that some formulas are given on page 8. Page 7 is provided as scratch; be sure your exam has all 8 pages. **NO CALCULATORS** are permitted. **GOOD LUCK!**

1. (10 pts) Compute $\int \log x \, dx$.

--

2. (10 pts) Compute $\int e^{\sqrt{2y}} \, dy$.

--

Point total for page:

--

3. (15 pts) How should you simplify $\int \frac{x^7 - 2x^5 + 3x^2 - 3}{(x^2 + 4)(x^4 + 4x^2)} dx$ using partial fractions before trying to integrate it? Do not bother to compute the constants in the numerators - just write down the correct form using the constants A, B , etc., and the appropriate denominators.

4. (5 pts) Which substitution should one try for $\int (\tan x \sec x)^5 dx$? (No justification is required.)

(A) $u = \sin x$

(C) $u = \sec x$

(E) $u = \tan x \sec x$

(B) $u = \tan x$

(D) $u = \sec^2 x$

(F) $u = \tan x + \sec x$

Name: _____

5. (15 pts) Apply Simpson's Rule to approximate $\int_0^2 e^{x^2} dx$ using $n = 6$. Write your answer as a sum of exponential functions.

As $n \rightarrow \infty$, how quickly does the error in Simpson's Rule go to 0, in terms of a power of n ? (You don't need to give the other coefficients.)

Point total for page:

--	--

Name: _____

6. (15 pts) Compute $\int \frac{e^x}{e^{2x} + 5e^x + 4} dx$.

--	--

--

--

Point total for page:

Point total for page:

--

7. (15 pts) What is the surface area of the solid obtained by rotating the curve $y = x^3$ from $x = 1$ to $x = 2$ around the x axis? Be sure to include the surface at each end. You should not compute any complicated integrals, but you need to explicitly give the integrand. Write down any formulas you are using.

Explain your answer carefully, stating all results that you are using.



Point total for page:

Point total for page:

8. (15 pts) Which of the following is true for

$$\int_5^{\infty} \frac{e^{-x^4}}{x} dx?$$

- (A) The limit exists and it is finite.
- (B) The limit exists and it is ∞ .
- (C) The limit exists and it is $-\infty$.
- (D) The limit does not exist.

Explain your answer *carefully*, stating all results that you are using.

Point total for page: