

Math 104
Practice Midterm Exam 2A

Name _____

Write all answers (A, B, C, D, E, F) in the spaces provided below!

1. _____

7. _____

2. _____

8. _____

3. _____

9. _____

4. _____

10. _____

5. _____

11. _____

6. _____

12. _____

1. The testing booklet contains 12 multiple choice questions and 3 free response questions.
2. No calculators are permitted.
3. One piece of paper (8.5 in. by 11 in.) is permitted, with writing on both sides allowed.
4. There is no penalty for guessing.
5. No partial credit will be given on the multiple choice questions.

1. Evaluate the integral.

$$\int_1^e x(\ln(x))^2 dx$$

A.) $-\frac{e^2}{4} + e - \frac{1}{4}$

B.) $\frac{e}{6}$

C.) $\frac{e^2}{6}$

D.) $\frac{e^2}{2} - e$

E.) $\frac{e^2}{2} - \frac{e}{2}$

F.) $\frac{e^2}{4} - \frac{1}{4}$

2. Evaluate the integral.

$$\int_0^1 \frac{1}{(4-x^2)^{3/2}} dx$$

A.) $\frac{\sqrt{3}}{2}$

B.) $\frac{\sqrt{3}}{4} - \frac{1}{2}$

C.) $\frac{\sqrt{3}}{36} - \frac{1}{32}$

D.) $\frac{\sqrt{3}}{12}$

E.) $\frac{\sqrt{3}}{6} - \frac{1}{4}$

F.) $\frac{\sqrt{3}}{8} - \frac{1}{4}$

3. Evaluate the improper integral if possible

$$\int_3^{\infty} \frac{1}{x^2 - 4x + 5} dx$$

- A.) $\frac{\sqrt{3}}{2} + \frac{1}{2}$ B.) $\frac{\sqrt{3}}{2} + \frac{1}{4}$ C.) $\frac{\sqrt{3}}{4} + \frac{1}{4}$ D.) $\frac{\pi}{2}$ E.) $\frac{\pi}{4}$
F.) The integral diverges

4. Evaluate the improper integral if possible

$$\int_{2^{10}}^{\infty} \frac{1}{x^{1.1}} dx$$

A.) The integral diverges
F.) 25

B.) 5

C.) 50

D.) 1/2

E.) 1/5

5. Evaluate the integral.

$$\int_0^1 x^2 e^{2x} dx$$

A.) $-\frac{e^2}{4} + e - \frac{1}{4}$
F.) $\frac{e^2}{4} - \frac{1}{4}$

B.) $\frac{e}{6}$

C.) $\frac{e^2}{6}$

D.) $\frac{e^2}{2} - e$

E.) $\frac{e^2}{2} - \frac{e}{2}$

6. Evaluate the integral

$$\int_0^1 \frac{1}{x^{1/3}(x^{2/3} + 1)} dx$$

A.) 0

B.) $2/3$

C.) 1

D.) $3/2$

E.) $\ln 2$

F.) $\frac{3}{2} \ln 2$

7. Evaluate the integral

$$\int_3^4 \frac{4}{x^2 - 4} dx$$

A.) $\ln \frac{12}{5}$

B.) $\ln \frac{5}{3}$

C.) $\ln \frac{1}{3}$

D.) $4 \ln 7$

E.) $\ln \frac{4}{3}$

F.) $\ln \frac{2}{15}$

8. Find the area of the surface obtained by rotating the curve $y = 2x^2 + 1$ with $3 \leq y \leq 9$ about the y -axis.

A.) $\frac{\pi}{48}(65\sqrt{65} - 1)$

B.) $\frac{2\pi}{3}(5\sqrt{5} - 1)$

C.) $\frac{\pi}{12}(17\sqrt{17} - 5\sqrt{5})$

D.) $\frac{\pi}{24}(65\sqrt{65} - 17\sqrt{17})$

E.) $\pi\left(\frac{99}{10} - \frac{5\sqrt{5}}{6}\right)$

F.) $\frac{2\pi}{3}(5\sqrt{5} - 2\sqrt{2})$

9. Evaluate the integral

$$\int_0^{1/2} \sqrt{1-4x^2} dx$$

A.) $\frac{\pi}{8}$

B.) $\frac{\pi}{6}$

C.) $\frac{\pi}{4}$

D.) $\frac{\pi}{3}$

E.) $\frac{\pi}{2}$

F.) π

10. Evaluate the integral

$$\int_2^3 \frac{x^3 - x^2 - 1}{x^2 - x} dx$$

A.) $\frac{1}{2} + \ln 2$ B.) $\frac{5}{2} + \ln 3$

C.) $\frac{5}{2} - \ln 3$

D.) $\ln 3 - \ln 4$

E.) $\frac{5}{2} + \ln 3 - 2 \ln 2$

F.) $\frac{5}{2} - \ln 3 + 2 \ln 2$

11. Find the length of the curve $y = 1 + \frac{2}{3}(x - 1)^{3/2}$ for $1 \leq x \leq 4$

- A.) $\frac{14}{3}$ B.) $\frac{2}{3} \ln 3$ C.) $\frac{4}{3}\pi$ D.) 4.75 E.) 1 F.) $1/2$

12. Evaluate the integral

$$\int_0^{\pi/2} \cos^3(x) dx$$

A.) $\frac{3\pi}{8}$

B.) $\frac{8\pi}{3} + \ln 3$

C.) $\frac{3\pi}{16}$

D.) π

E.) $\frac{5}{8}$

F.) $\frac{3}{4}$

Free Response 1. Find a curve through the origin whose length from a to b is given by the following

$$\int_a^b \sqrt{1 + \left(\frac{1}{1+x^2}\right)^2} dx$$

Free Response 2. Evaluate the integral

$$\int_2^9 \frac{x^4 + 5x^3 - 5x^2 + 6x - 2}{(x + 6)(x - 1)} dx$$

Free Response 3. Let T_n be the approximation to $\int_0^6 x^2 dx$ using the trapezoidal rule where $[0, 6]$ is divided into n intervals. What value of n is needed to guarantee that the absolute value of the error (in the approximation T_n) is less than $\frac{1}{1,001}$?