MA 162 Exam 2 Spring 2005

Name: _____

Student ID: _____

Lecturer: _____

Recitation Instructor: _____

Recitation Time: _____

Instructions:

1. This package contains 11 problems worth 9 points each.
2. Please supply all information requested above and on the mark–sense sheet. You get 1 point for supplying all information correctly.
3. Work only in the space provided, or on the backside of the pages. Mark your answers clearly on the scantron. Also circle your choice for each problem in this booklet.
4. No books, notes, or calculator, please.

MA 162 Exam 2 Spring 2005

1. For the integral $\int_1^9 \frac{6}{x} dx$ the Midpoint Rule with $n = 4$ gives the approximate value

A. 8.5

B. 9

C. 10.5

D. 11

E. 12.5

2. $\int_0^{\frac{\pi}{3}} \sin^{-2} x \cos^3 x \, dx =$

A. 0

B. 1

C. $\frac{\sqrt{3}}{2}$

D. integral is divergent

E. $\frac{3\sqrt{3}}{8} - 1$

3. Which of the following integrals are convergent?

I. $\displaystyle\int_0^\infty \sin(2t)\,dt.$

II. $\displaystyle\int_1^\infty \frac{\sin^2 t}{t^3+1}\,dt.$

A. Neither.

B. Only I.

C. Only II.

D. Both are.

E. None of the above is correct.

4. The length of the curve $y = \sqrt{x} - \dfrac{x^{\frac{3}{2}}}{3}, \quad 1 \le x \le 9$ is

A. $\displaystyle\int_1^9 \left(\frac{1}{2x} + \frac{x}{2}\right) dx$

B. $\displaystyle\int_1^9 \left(\frac{1}{2x} - \frac{x}{2}\right) dx$

C. $\displaystyle\int_1^9 \left(\frac{1}{2\sqrt{x}} + \frac{\sqrt{x}}{2}\right) dx$

D. $\displaystyle\int_1^9 \left(\frac{1}{2\sqrt{x}} - \frac{\sqrt{x}}{2}\right) dx$

E. $\displaystyle\int_1^9 \left(\frac{1}{\sqrt{x}} - \sqrt{x}\right) dx$

5. If masses of 3kg, 3kg, and 1kg are placed at the points $(0, 2)$, (2,0) and $(-3, -3)$, where should a mass of 2kg be placed so that both moments M_x, M_y of the system are 0?

A. $\left(\frac{1}{2}, \frac{3}{2}\right)$

B. $\left(-\frac{3}{2}, -\frac{3}{2}\right)$

C. $\left(\frac{1}{2}, \frac{1}{2}\right)$

D. $\left(\frac{1}{2}, \frac{5}{2}\right)$

E. $\left(-\frac{1}{2}, \frac{1}{2}\right)$

6. $\sum_{n=1}^{\infty} \frac{2^{n+2}}{3^n} =$

A. 6

B. 2

C. 12

D. 8

E. series is divergent

7. Find the following limits.

a. $\lim_{n\to\infty} \frac{n^2}{e^n}$

b. $\lim_{n\to\infty} \frac{\sqrt{2n^2+3n}}{2n+1}$

A. $a = 1$, b does not exist

B. $a = 0$, b does not exist

C. a does not exist, $b = \frac{1}{\sqrt{2}}$

D. $a = 0$, $b = \frac{1}{\sqrt{2}}$

E. $a = 0$, $b = 1$

8. Which of the following statements are true?

I. If $\sum_{n=1}^{\infty} a_n$ converges, then $\lim_{n\to\infty} a_n = 0$.

II. If $\lim_{n\to\infty} a_n = 0$, then $\sum_{n=1}^{\infty} a_n$ converges.

III. If $\lim_{n\to\infty} a_n \neq 0$, then $\sum_{n=1}^{\infty} a_n$ diverges.

A. Only I and II.

B. Only I and III.

C. Only II and III.

D. All are true.

E. Only I is true.

9. The series $\sum_{n=2}^{\infty} \frac{1}{n(\ln n)}$

A. converges by integral test.

B. converges by comparison test.

C. converges because $\lim_{n\to\infty} \frac{1}{n(\ln n)} = 0.$

D. diverges because $\lim_{n\to\infty} \frac{1}{n(\ln n)} \neq 0.$

E. diverges by integral test.

10. The series $\sum_{n=1}^{\infty} \frac{1}{\sqrt{2n^3 - n}}$

A. converges because $\lim_{n\to\infty} \frac{1}{\sqrt{2n^3 - n}} = 0.$

B. diverges by integral test.

C. diverges by comparison test.

D. diverges because $\lim_{n\to\infty} \sqrt{2n^3 - n} \neq 0.$

E. converges by limit comparison test.

11. By the Alternating Series Estimation Theorem, if we approximate $\sum_{n=1}^{\infty} \frac{(-1)^n}{n!}$ with the sum of the first 4 terms, we are guaranteed an error less than or equal to

A. $\frac{1}{120}$

B. $\frac{1}{240}$

C. $\frac{1}{256}$

D. $\frac{1}{512}$

E. $\frac{1}{720}$