MA 114 — Calculus II   Fall 2014
Sections 1 – 8 and 401, 402

Exam 1   Sep. 23, 2014

Name: ───────────────

Section: ───────────────

Last 4 digits of student ID #: ───────

- No books or notes may be used.
- Turn off all your electronic devices and do not wear ear-plugs during the exam.
- You may use a calculator, but not one which has symbolic manipulation capabilities or a QWERTY keyboard.
- Additional blank sheets for scratch work are available upon request.
- **Multiple Choice Questions:**
  Record your answers on the right of this cover page by marking the box corresponding to the correct answer.
- **Free Response Questions:**
  Show all your work on the page of the problem. Clearly indicate your answer and the reasoning used to arrive at that answer.

Multiple Choice Answers

Question					
1	A	B	C	D	E
2	A	B	C	D	E
3	A	B	C	D	E
4	A	B	C	D	E

Exam Scores

Question	Score	Total
MC		20
5		15
6		16
7		16
8		15
9		18
Total		100

Unsupported answers for the free response questions may not receive credit!

Record the correct answer to the following problems on the front page of this exam.

1. Let $a > 0$ be a fixed number. Evaluate the improper integral $\int_a^\infty x^2 e^{-x^3} dx$.

A. ∞.

B. 0.

C. $\dfrac{1}{3e^{a^3}}$.

D. e^{a^3}.

E. $-\dfrac{1}{e^{a^3}}$.

2. Let $C > 1$ be a fixed number. Which of the following answers is true for the series $\displaystyle\sum_{n=1}^\infty \dfrac{(-1)^n n}{Cn + 17}$?

A. The series is divergent.

B. The series is absolutely convergent.

C. The series is convergent, but not absolutely convergent.

D. The series is absolutely convergent, but not convergent.

E. None of the above.

3. Which of the following are true for a series $\sum\limits_{n=1}^{\infty} a_n$? Check all that apply.

A. If the series is convergent, then it is also absolutely convergent.

B. If $\lim\limits_{n\to\infty} a_n = 0$, then the series converges.

C. If $\lim\limits_{n\to\infty} a_n \neq 0$, then the series diverges.

D. If the series is alternating, then it is convergent.

E. None of the above.

4. Evaluate the series $\sum\limits_{n=0}^{\infty} 2^{3-2n}$.

A. The series is divergent.

B. $\sum\limits_{n=0}^{\infty} 2^{3-2n} = 6.$

C. $\sum\limits_{n=0}^{\infty} 2^{3-2n} = 11.$

D. $\sum\limits_{n=0}^{\infty} 2^{3-2n} = \dfrac{32}{3}.$

E. $\sum\limits_{n=0}^{\infty} 2^{3-2n} = \dfrac{21}{2}.$

5.   Evaluate the integral

$$\int_2^{10} \frac{x}{\sqrt{x^2 - 4}}\, dx.$$

6. Use the limit comparison test to determine whether the series $\displaystyle\sum_{n=1}^{\infty} \frac{3}{\ln(n+1)}$ converges.

7. Determine whether the following series converges or diverges. Make sure to state all tests that you use.

(a) $\displaystyle\sum_{n=1}^{\infty} \frac{3^n n^2}{n!}$

(b) $\displaystyle\sum_{n=1}^{\infty} \frac{5 + 3^n}{100 + 4^n}$

8. Determine whether the series $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n}{\sqrt[3]{n}}$ is absolutely convergent, conditionally convergent or divergent. Make sure to state all tests that you use.

9. Consider the power series $\displaystyle\sum_{n=1}^{\infty} \frac{x^n}{n \cdot 4^n}$.

(a) Find the radius of convergence.

(b) Find the interval of convergence.