MA 123 — Elementary Calculus FALL 2008
SECOND MIDTERM 10/22/2008

Name: _____ **Sec.:** _____

Do not remove this answer page — you will return the whole exam. You will be allowed two hours to complete this test. No books or notes may be used. You may use a graphing calculator during the exam, but NO calculator with a Computer Algebra System (CAS) or a QWERTY keyboard is permitted. Absolutely no cell phone use during the exam is allowed.

The exam consists of 15 multiple choice questions. Record your answers on this page by filling in the box corresponding to the correct answer. For example, if (b) is correct, you must write

[a] [b] [c] [d] [e]

Do not circle answers on this page, but please do circle the letter of each correct response in the body of the exam. It is your responsibility to make it CLEAR which response has been chosen. You will not get credit unless the correct answer has been marked on both this page and in the body of the exam.

GOOD LUCK!

1. [a] [b] [c] [d] [e]

2. [a] [b] [c] [d] [e]

3. [a] [b] [c] [d] [e]

4. [a] [b] [c] [d] [e]

5. [a] [b] [c] [d] [e]

6. [a] [b] [c] [d] [e]

7. [a] [b] [c] [d] [e]

8. [a] [b] [c] [d] [e]

9. [a] [b] [c] [d] [e]

10. [a] [b] [c] [d] [e]

11. [a] [b] [c] [d] [e]

12. [a] [b] [c] [d] [e]

13. [a] [b] [c] [d] [e]

14. [a] [b] [c] [d] [e]

15. [a] [b] [c] [d] [e]

For grading use:

number of correct problems	**(out of 15)**
Total	**(out of 100 pts)**

Please make sure to list the correct section number on the front page of your exam.
In case you forgot your section number, consult the following table:

Section #	**Instructor**	**Lectures**
001	A. Corso	MWF 8:00am-8:50am, CP 153
002	J. Robbins	MWF 12:00pm-12:50pm, CP 153
003	T. Chapman	TR 8:00am-9:15am, BS 116
004	M. Anton	MWF 12:00pm-12:50pm, BS 116
005	D. Leep	MWF 3:00pm-3:50pm, CP 153
401	P. Cooley	TR 6:00pm-7:15pm, CB 347
402	P. Cooley	TR 7:30pm-8:45pm, CB 347

Multiple Choice Questions

Show all your work on the page where the question appears.
Clearly mark your answer both on the cover page on this exam
and in the corresponding questions that follow.

1. Suppose that $h(x) = f(x)g(x)$. Assume that $f(2) = 3$, $f'(2) = -2$, $g(2) = 1$, and $g'(2) = 5$. Find $h'(2)$.

Possibilities:

(a) -20

(b) -17

(c) 11

(d) 13

(e) Cannot be determined

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2. Suppose that $f(x) = \dfrac{x^2 + 1}{x + 4}$.
Find $f'(-3)$.

Possibilities:

(a) -8

(b) -9

(c) -10

(d) -14

(e) -16

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3. Suppose that $h(x) = f(g(x))$. Assume that $f(3) = 6$, $f'(3) = 6$, $g(2) = 3$, and $g'(2) = 4$. Find $h'(2)$.

Possibilities:

(a) -30

(b) 24

(c) 18

(d) -20

(e) -15

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4. Suppose that $f(x) = e^{g(x)}$. Assume that $g(5) = 3$ and $g'(5) = 5$. Find $f'(5)$.

Possibilities:

(a) $5e^4$
(b) $5e^3$
(c) $3e^5$
(d) $4e^3$
(e) $3e^4$

---

5. Suppose that $f(x) = \ln(g(x))$. Assume that $g(5) = 3$ and $g'(5) = 4$. Find $f'(5)$.

Possibilities:

(a) $5/3$
(b) $3/5$
(c) $4/3$
(d) $3/4$
(e) Does not exist

---

6. Suppose that $f(x) = (x^2 - 5)^{3/2}$. Find $f'(3)$.

Possibilities:

(a) 9
(b) 18
(c) 27
(d) 12
(e) 36

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7. Suppose that $f(x) = \dfrac{2}{x+3}$. Find $\dfrac{f(x+h)-f(x)}{h}$.

Possibilities:

(a) $\dfrac{-2}{(x+3)^2}$

(b) $\dfrac{-2}{h(x+3)^2}$

(c) $\dfrac{2}{(x+h+3)(x+3)}$

(d) $\dfrac{-2}{(x+h+3)(x+3)}$

(e) $\dfrac{2}{(x+3)^2}$

---

8. Suppose that $g(x) = [f(x)]^3$ and the equation of the tangent line to the graph of $f(x)$ at $x = 2$ is $y = -1 + 4(x-2)$. Find $g'(2)$.

Possibilities:

(a) 15

(b) -15

(c) -1

(d) -12

(e) 12

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9. Suppose that $Q(t) = Q_0 e^{rt}$. Assume that $(0, 5)$ lies on the graph of $Q(t)$. Assume also that the slope of the tangent line to the graph of $Q(t)$ at $t = 0$ is 10. Find r.

Possibilities:

(a) 1

(b) 2

(c) e

(d) 5

(e) 10

---

10. Suppose that $f(x) = 64\sqrt{x}$. Find $f''(4)$.

Possibilities:

(a) -2
(b) -1
(c) 1
(d) 2
(e) Does not exist

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11. Suppose that $f(t) = 12\sqrt{t+7}$. Find the limit

$$\lim_{h \to 0} \frac{f(2+h) - f(2)}{h}.$$

(Hint: Relate the limit to the derivative.)

Possibilities:

(a) -1
(b) 0
(c) 1
(d) 2
(e) 3

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12. Find the minimum value of $f(x) = x^3 - 3x + 3$ on the interval $[-2, 4]$.

Possibilities:

(a) 2
(b) 1
(c) 0
(d) -1
(e) -2

---

13. How many years will it take an investment to triple in value if the interest rate is 4% compounded continuously?

Possibilities:

(a) $\frac{\ln(3)}{.04}$

(b) 75

(c) $\frac{\ln(.04)}{3}$

(d) $\frac{3}{\ln(4)}$

(e) $\frac{\ln(3)}{4}$

---

14. Find the equation of the tangent line to the graph of $f(x) = x^2e^x$ at $x = 1$.

Possibilities:

(a) $y = 3ex + 2e$

(b) $y = 2ex + 3e$

(c) $y = 3ex - 2e$

(d) $y = 2ex - 3e$

(e) $y = 2ex - e$

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15. Find the maximum of $g(t) = |t + 4| + 10$ on the interval $[-12, 12]$.

Possibilities:

(a) 19

(b) 20

(c) 24

(d) 26

(e) 28
