MA 123 — Elementary Calculus FALL 2008
FIRST MIDTERM 09/24/2008

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

You may use the following formula for the derivative of a quadratic function.

If $p(x) = Ax^2 + Bx + C$, then $p'(x) = 2Ax + B$.

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. John leaves at 9:00 am and drives from Lexington to Ashland arriving at 11:00 am. He stops for two hours since his girlfriend Mary is not yet ready. Then they drive together from Ashland to Columbus arriving at Columbus after a three-hour drive. The distance from Lexington to Ashland is 110 miles and the distance from Ashland to Columbus is 130 miles. Find the average velocity of John's car in miles per hour for the entire trip (including the two hour stop) correct to two decimal places.

Possibilities:

(a) 33.81

(b) 33.42

(c) 35.00

(d) 34.29

(e) 34.47

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2. Let $f(x) = 2x^2 - 3x$. Find the average rate of change of $f(x)$ from $x = 3$ to $x = 3 + h$.

Possibilities:

(a) $9 - h$

(b) $9 + h$

(c) 9

(d) $9 - 2h$

(e) $9 + 2h$

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3. Suppose that $h(t) = \dfrac{2}{t}$. Find the average rate of change of $h(t)$ from $t = 5$ to $t = 10$.

Possibilities:

(a) $-.05$

(b) $-.04$

(c) $.05$

(d) $.04$

(e) $.02$

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4. Let $g(x) = x^2 + 4x + 5$. Find a value of c between 1 and 10 such that the average rate of change of $g(x)$ from $x = 1$ to $x = 10$ is equal to the instantaneous rate of $g(x)$ at $x = c$.

Possibilities:

(a) 4.75

(b) 5.0

(c) 5.25

(d) 5.5

(e) 5.75

---

5. Compute

$$\lim_{x \to 3} \frac{x^2 - 7x + 12}{x - 3}.$$

Possibilities:

(a) 0

(b) 1

(c) -1

(d) 2

(e) Does not exist

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6. Let $f(x) = \begin{cases} x^2 + 8x + 15 & \text{if } x \leq 2 \\ 4x + 7 & \text{if } x > 2. \end{cases}$

Find $\lim_{x \to 2^+} f(x)$.

Possibilities:

(a) 15

(b) 20

(c) 30

(d) 35

(e) Does not exist

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7. Compute $\lim_{h \to 0} \dfrac{(h+4)^2 - 16}{h}$.

Possibilities:

(a) 4
(b) 5
(c) 6
(d) 7
(e) 8

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8. Find the slope of the tangent line to the graph of $f(x) = 3x^2 - 7x + 4$ at $x = 2$.

Possibilities:

(a) 5
(b) 6
(c) 7
(d) 8
(e) 9

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9. If $h(t)$ represents the height of an object above ground level at time t and $h(t)$ is given by

$$h(t) = -16t^2 + 96t + 1,$$

find the height of the object at the time when the velocity is zero.

Possibilities:

(a) 144
(b) 145
(c) 148
(d) 150
(e) 160

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10. Compute $\lim_{x \to 3^-} \dfrac{|4x - 12|}{x - 3}$.

Possibilities:

(a) 4

(b) -4

(c) 0

(d) Cannot be determined

(e) Does not exist

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11. Find A and B such that the equation of the line through $(1, 3)$ and $(2, 7)$ can be written as

$$y = A + B(x - 2).$$

Possibilities:

(a) $A = 4$ and $B = 7$

(b) $A = 7$ and $B = 4$

(c) $A = 3$ and $B = 1$

(d) $A = 7$ and $B = 2$

(e) This is not possible.

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12. What is the value of x such that the slope of the tangent line to the graph of $f(x) = x^2 - 10x + 14$ is 6?

Possibilities:

(a) There is no such x.

(b) 6

(c) 7

(d) 8

(e) 9

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13. Consider the function $f(x) = \begin{cases} 2x^2 + 3 & \text{if } x \leq 3 \\ 3x + B & \text{if } x > 3 \end{cases}$.

Find a value of B such that $f(x)$ is continuous at $x = 3$.

Possibilities:

(a) 6

(b) 9

(c) 12

(d) 15

(e) There is no such value of B.

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14. The values of x satisfying the inequality $x^2 + 5x - 24 < 0$ are

Possibilities:

(a) $x < -8$ and $x > 3$

(b) $x < 8$ and $x > -3$

(c) Cannot be determined

(d) $-3 < x < 8$

(e) $-8 < x < 3$

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15. Compute

$$\lim_{x \to 0} \left(\frac{2x^2 - 3x + 4}{x} + \frac{5x - 4}{x} \right).$$

Possibilities:

(a) 5

(b) 4

(c) 3

(d) 2

(e) 1
