MA 123 — Elementary Calculus Spring 2010
FIRST MIDTERM EXAM 02/10/2010

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	M. Shaw	MWF 12:00 pm - 12:50 pm, CP 153
002	T. Chapman	MWF 2:00 pm - 2:50 pm, CP 139
003	P. Koester	TR 12:30 pm - 1:45 pm, CP 153
004	M. Shaw	MWF 9:00 am- 9:50 am, BS 116
005	P. Koester D. Moore	MWF 1:00 pm - 1:50 pm, CB 122 T 11:00 am - 12:15, CB 303
006	P. Koester J. Polly	MWF 1:00 pm - 1:50 pm, CB 122 R 11:00 am - 12:15, DH 301
007	P. Koester D. Moore	MWF 1:00 pm - 1:50 pm, CB 122 T 9:30 am - 10:45, CB 243
008	P. Koester J. Polly	MWF 1:00 pm - 1:50 pm, CB 122 R 9:30 am - 10:45, CB 243
009	D. Leep A. Barra	MWF 10:00 am - 10:50 am, CP 320 T 1:00 pm - 2:15, CP 397
010	D. Leep A. Barra	MWF 10:00 am - 10:50 am, CP 320 R 1:00 pm - 2:15, CB 304
011	D. Leep A. Barra	MWF 10:00 am - 10:50 am, CP 320 T 2:30 pm - 3:45, CP 246
012	D. Leep A. Barra	MWF 10:00 am - 10:50 am, CP 320 R 2:30 pm - 3:45, CP 235
013	A. Corso	MWF 12:00 pm - 12:50 pm, CB 110
401	D. Little	TR 6:00 pm-7:15 pm, CB 339
402	D. Little	TR 7:30 pm-8:45 pm, CB 339

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. Let $f(x) = 5x + 2$. Find a function $g(x)$ so that $f(g(x)) = x$.

Possibilities:

(a) $g(x) = \dfrac{1}{5\,x + 2}$

(b) $g(x) = \dfrac{x - 2}{5}$

(c) $g(x) = \dfrac{x}{5\,x + 2}$

(d) $g(x) = \dfrac{1}{5}\,x + 2$

(e) $g(x) = 5x - 2$

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2. Suppose

$$5 + 3x - 2x^2 \;=\; A + B(x - 1) + C(x - 1)(x - 2)$$

Find A.

Possibilities:

(a) 6

(b) 8

(c) 10

(d) 12

(e) 14

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3. Different algebraic expressions may represent the same equation. Which of the following are equations of the line through $(1, 2)$ and $(3, 6)$

(I) $y - 2 = 2(x - 1)$

(II) $y - 6 = 2(x - 3)$

(III) $y - 3 = 2(x - 6)$

Possibilities:

(a) Only I

(b) Only II

(c) Only III

(d) Only I and II

(e) Only I and III

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4. Find the point where the curve $y + 6 = (x - 1)^2$ intersects the y-axis.

Possibilities:

(a) $(0, 5)$
(b) $(-5, 0)$
(c) $(0, -5)$
(d) $(0, 4)$
(e) $(4, 0)$

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5. Suppose $f(x) = x^2 + 2x - 4$. Compute the limit

$$\lim_{h \to 0} \frac{f(3 + h) - f(3)}{h}$$

Possibilities:

(a) 2
(b) 5
(c) 8
(d) 11
(e) The limit does not exist

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6. Compute the limit

$$\lim_{x \to 5} \frac{x^2 - 9x + 20}{x - 5}$$

Possibilities:

(a) 0
(b) -1
(c) 1
(d) 3
(e) The limit does not exist

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7. Compute the limit

$$\lim_{x \to 1} \frac{8x^2 - 10x + 34}{x^2 - 12x + 27}$$

Possibilities:

(a) 0

(b) 0.5

(c) 1

(d) 1.5

(e) 2

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8. Which of the following is the correct expression for $g'(3)$?

Possibilities:

(a) $\lim_{h \to 0} \frac{g(3+h) - g(3)}{h}$

(b) $\lim_{h \to 0} \frac{g(3) - g(3+h)}{h}$

(c) $\lim_{h \to 0} \frac{g(3-h) - g(3)}{h}$

(d) $\lim_{h \to 0} \frac{g(3-h) + g(3)}{h}$

(e) $\lim_{h \to 0} \frac{g(3+h) - g(3-h)}{h}$

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9. Find the slope of the tangent line to the graph of $y = 5x^2 + 2x + 7$ at $x = -1$.

Possibilities:

(a) -8

(b) -1

(c) 0

(d) 1

(e) 12

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10. A car travels at 70 miles per hour from 8:00 am to 9:30 am. Then it travels 25 miles from 9:30 am to 10:00 am. Find the average speed of the car from 8:00 am to 10:00 am.

Possibilities:

(a) 95

(b) 47.5

(c) 60

(d) 65

(e) 61.34

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11. Find the average rate of change of $f(t) = 3t^2 + 4$ from $t = 1$ to $t = 1 + h$

Possibilities:

(a) $\dfrac{6h + 3h^2 + 8}{h}$

(b) $3 + h$

(c) $\dfrac{6 + 3h}{h}$

(d) $6 + h$

(e) $6 + 3h$

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12. A ball is thrown up in the air. The height of the ball is given by

$$h(t) = -16t^2 + 32t + 9$$

where t is measured in seconds and h is measured in feet. Find the height of the ball when the speed of the ball is zero.

Possibilities:

(a) 25

(b) 1

(c) 9

(d) $41/32$

(e) 57

13.

$$f(x) = \begin{cases} 3x^2 - 7, & x \leq 2; \\ 2x + B, & x > 2 \end{cases}$$

Find the value of B which makes $f(x)$ continuous for all x.

Possibilities:

(a) 0
(b) 1
(c) 2
(d) 3
(e) 4

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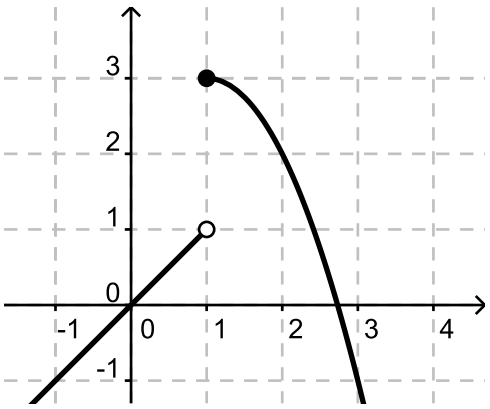
14. Which of the following statements are true?

(I) $\lim_{x \to 1^+} f(x) = 3$
(II) $f(1) = 3$
(III) $\lim_{x \to 1^-} f(x) = 3$



Possibilities:

(a) Only I is true
(b) Only II is true
(c) Only III is true
(d) Only I and II are true
(e) Only I and III are true

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15. Find the average rate of change of $g(t)$ from $t = 1$ to $t = 3$, where

$$g(t) = \frac{12}{t}$$

Possibilities:

(a) 4
(b) -1
(c) 1
(d) -2
(e) -4
