

MATH 140A
EXAMINATION 3
April 1, 2002

NAME _____
STUDENT NUMBER _____
INSTRUCTOR _____
SECTION NUMBER _____

There are 8 multiple choice questions. For each problem five possible answers are given, only one of which is correct. You should solve the problem and circle the letter of the answer that you wish to give. Circle only one choice.

There is 1 short answer question. For this question, please state the definition in the space provided.

There are 5 partial credit questions. In order to obtain full credit for these problems, all work must be shown. Credit will not be given for an answer not supported by work.

The point value for each question is in parentheses to the right of the question number.

THE USE OF CALCULATORS IS NOT PERMITTED IN THIS EXAMINATION.

This is a closed-book, no-notes examination.

At the end of the examination, the booklet will be collected.

M-C:	_____	(40)
9.	_____	(5)
10.	_____	(11)
11.	_____	(12)
12.	_____	(8)
13.	_____	(12)
14.	_____	(12)
Total:	_____	(100)

**Do not
write in
the box to
the left.**

1. (5 points) Let M be the absolute maximum value and m be the absolute minimum value of

$$f(x) = 4x^3 - 27x^2 + 24x + 1$$

on the interval $[0, 2]$. Then

- a) $M = 1$ and $m = -27$
- b) $M = \frac{27}{4}$ and $m = -27$
- c) $M = \frac{27}{4}$ and $m = -79$
- d) $M = 1$ and $m = -79$
- e) $M = 2$ and $m = 0$

2. (5 points) What number c satisfies the conclusion of the Mean Value Theorem for the function

$$f(x) = \cos(2x)$$

on the interval $\left[0, \frac{\pi}{6}\right]$?

- a) $\frac{1}{2} \sin^{-1}\left(\frac{3}{2\pi}\right)$
- b) $\frac{1}{2} \sin^{-1}\left(\frac{3}{\pi}\right)$
- c) $\frac{1}{2} \cos^{-1}\left(\frac{3}{\pi}\right)$
- d) The Mean Value Theorem does not apply since f is not continuous at 0.
- e) The Mean Value Theorem does not apply since f is not differentiable at 0.

3. (5 points) The critical number(s) of $F(x) = \frac{x^2 + x - 8}{x - 3}$ is(are)

- a) Only 1 .
- b) Only 3 .
- c) Only 5 .
- d) Only 1 and 5 .
- e) 1 , 3 , and 5 .

4. (5 points) The length of the largest interval on which the function $f(x) = x - \sqrt{x}$ is decreasing is

- a) $\frac{\sqrt{3}}{4}$
- b) $\sqrt{2}$
- c) $\frac{1}{2}$
- d) $\frac{2}{3}$
- e) $\frac{1}{4}$