

## Midterm 2

Thursday, 02/28/08

- Complete the following problems. You may use any result from class you like, but if you cite a theorem be sure to verify the hypotheses are satisfied.
- This is a closed-book, closed-notes exam. No calculators or other electronic aids will be permitted.
- In order to receive full credit, *you must show all of your work and justify your answers.* Your answer should be clearly labeled.
- It is OK to leave your work unsimplified.
- If you need extra room, use the back sides of each page. If you need more paper, use the extra at the front of the classroom and staple it to your exam. Include all scratch work with the test. Do not unstaple or detach pages from this exam.
- Please sign the following:

“On my honor, I have neither given nor received any aid on this examination. I have furthermore abided by all other aspects of the honor code with respect to this examination.”

Name: \_\_\_\_\_

Signature: \_\_\_\_\_

1. \_\_\_\_\_ (/6 points)

2. \_\_\_\_\_ (/8 points)

3. \_\_\_\_\_ (/4 points)

4. \_\_\_\_\_ (/24 points)

5. \_\_\_\_\_ (/5 points)

6. \_\_\_\_\_ (/8 points)

7. \_\_\_\_\_ (/5 points)

8. \_\_\_\_\_ (/40 points)

Total. \_\_\_\_\_ (/100 points)

1. (6 points) Determine whether each statement is true or false. If the statement is true, cite your reasoning. If it is false, provide an example showing the statement to be false.

(a) If a function is differentiable at  $x = 0$  it must be continuous at  $x = 0$ .

(b) If  $f(x)$  satisfies  $f'(0) = 0$ , then  $f(x)$  has a local maximum or a local minimum at  $x = 0$ .

2. (8 points) Use the definition of the derivative (i.e. the limit definition) to compute:  
 $\frac{d}{dx}(3x^2 + 15)$ .