

Math 170-007  
April 20, 2004

Exam 3 Name \_\_\_\_\_

This test consists of 4 pages, none of which is intentionally left blank. Take a few seconds right now to be sure you have all the pages. The point value of each question is to the left of the question number. Show all your work in the space provided. If you run out of room for an answer, continue working on the back of the page. Your answers must be justified by your work.

(10) 1. Find the absolute maximum and minimum for  $f(x) = 2x^3 + 3x^2 - 12x$  on the interval  $[-1, 2]$ .

(10) 2. Use the second derivative test to find all local extrema for  $f(x) = (x - 2)^2(x + 3)$

(10) 3. Find the intervals on which  $f(x) = \ln(1 - x^2)$  is increasing and those on which it is decreasing.

(10) 4. If  $f(-1) = 2$  and  $f'(x) < 2$  on the interval  $[-1, 1]$ , show that  $f(1) < 6$ .

(15) 5. Find the dimensions of the rectangle of largest area that can be inscribed in a circle of radius 5.

(15) 6. If  $f'(x) = x\sqrt{x^2 + 1}$  and  $f(0) = 3$ , what is  $f(x)$ ?

(15) 7. Sketch the graph of  $f(x) = \frac{x^2}{x^2 + 9}$

(15) 8. Use two iterations of Newton's method, starting with  $x = 2$ , to approximate a zero of  $f(x) = x^3 - 9$ .