MA 181 Review Sheet for Test #4 – Spring, 2006
Riseberg

Test #4 will be given on Tuesday, April 25. The test will cover sections 4.1 - 4.4, 4.6, 4.8, and 4.9.

MAKEUP POLICY REMINDER:
If you know in advance that you have to miss a quiz or test, you can make arrangements with me to take the quiz or test **before** it is given in class. Otherwise, no makeup quizzes will be given. If you miss an hour test, it may be made up only if you

1. Contact me on or before the scheduled test date. My office telephone number is 301-279-5215. Leave a message if I am not there. Be sure to state your name and telephone number clearly, and tell me when I can get in touch with you.
2. Can prove that you have a legitimate excuse.
3. Show me all homework on the relevant material.

If you do not meet these conditions, you will not be permitted to take a makeup test and the percentage equivalent of your final exam grade will be substituted for the grade of the missed test. No student will be permitted to take more than one makeup test.

For this test, you should be able to

- Solve problems involving related rates.
- Analytically determine and use the first and/or second derivatives of a function to find critical numbers, intervals on which the function is increasing/decreasing, local and absolute extreme values, hypercritical numbers, intervals on which the function is concave up/concave down, and points of inflection.
- Construct the graph of the function from information about its derivative(s).
- Solve optimization problems involving applications.
- Apply the Second Derivative Test to determine whether a function has a local maximum, minimum or neither at a critical number.
- Use Newton's Method to find the solutions of an equation to a stated number of decimal places.
- Find the general antiderivative of a given function and find a specific antiderivative if initial conditions are provided.
- Use antiderivatives to solve applied problems involving velocity and/or acceleration.

Suggested Review Problems from the Text ADD RR
Chapter 4 Review (p. 335)

Concept Check: 1, 2, 3b, 4, 5, 6, 9, 10	Exercises: 1, 3, 4, 7, 8, 11, 17, 23, 24, 33, 34, 35, 37, 43, 44, 47 - 54, 57, 59a, 59c
True-False Quiz: 1 - 7	

Additional Exercises

1. Given that the function $f(x) = xe^{ax}$, where a is a constant, has a point of inflection when x = 1, find the value of a.
2. A rectangular region is to be enclosed with a fence. One side faces the street and will

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have decorative fencing costing $20 per foot, while the remaining three sides will have plain fencing costing $10 per foot. The area of the region is to be 3200 square feet. Use the methods of Calculus to determine the dimensions of the region which will minimize the cost of the fencing.

3. The lateral surface area of a solid right circular cylinder is 4π square meters. A hemisphere whose diameter is equal to the diameter of the cylinder is cut from the solid cylinder. Find the dimensions of the cylinder if the remaining volume is to be a maximum or minimum. Determine which (a maximum or a minimum).

You should also go over homework and worksheet problems.

Answers for Chapter 4 even-numbered review problems:

True-False: 2. F 4. T 6. F

Exercises:

4. Absolute minimum: f(1) = 0, Absolute maximum: $f(\sqrt{e}) = \frac{1}{2e}$

8. (a) V.A.: x = 1, x = -1, H.A.: y = 0
   (b) f is decreasing on $(-\infty,-1)$ & $(-1,0)$; f is increasing on $(0,1)$ & $(1,\infty)$
   (c) Local minimum f(0) = 1; no local maximum
   (d) f is CD on $(-\infty,-1)$ & $(1,\infty)$, CU on (-1,1), no point of inflection.

24. (a) Local and absolute minimum at x = 0 (b) CU on $(-\infty,\infty)$

44. $r = \sqrt[3]{\frac{3V}{5\pi}} = h$ 50. $G(t) = 2t^{1/2} + \frac{2}{3}t^{3/2} + C$

52. $f(x) = x - 2\cos x - \sin x + 5$

54. $f(x) = \frac{1}{10}x^5 + \frac{1}{4}x^4 - \frac{2}{3}x^3 + \frac{5}{2}x^2 - \frac{251}{60}x + 2$

Answers for Additional Exercises

1. a = -2

2. Street side and side parallel to street: $\frac{80\sqrt{3}}{3}$ *ft*, sides perpendicular to street: $40\sqrt{3}$ *ft*

3. r = 1 meter, h = 2 meters; it is a maximum