MA 181 Review Sheet for Test #3 – Spring, 2006
Riseberg

Test #3 will be given on Monday, April 3. It will include material from Sections 3.1 - 3.8. The test will be in two parts. On Part I, no calculators will be permitted. After you hand in Part I, you will be given Part II and you will be permitted to use a calculator.

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.

It is essential that you know and are able to apply all of the differentiation rules and formulas. This includes the power rule, product rule, quotient rule, chain rule, implicit differentiation, logarithmic differentiation, and formulas for the derivatives of algebraic, exponential, trigonometric (sine, cosine, tangent and secant), inverse sine, inverse tangent, and logarithmic functions. In addition, you should be able to

- Apply the Chain Rule to the process of finding derivatives implicitly.
- Find derivatives of parametric curves and solve problems involving tangent lines to parametric curves.
- Use derivatives to solve problems involving tangent lines, velocity, acceleration, and other rates of change.
- Interpret the derivative verbally.
- Use logarithmic differentiation to find the derivative of functions of the type $f(x)^{g(x)}$ and of functions involving extremely messy products and/or quotients.
- Use a linear approximation to approximate the value of a function.
- Find differentials and use them to estimate computational errors.

Recommended Review Problems:

Chapter 3 Review (pp. 255 - 257)
Concept Check: 1, 2, 4, 5 True-False Quiz: 1 - 9, 12

Exercises: 1, 3, 4, 5, 7, 9, 10, 11, 13, 15 – 21, 23, 25 – 32, 35 – 43 odd, 47 – 56, 59, 60, 62, 63, 64, 68, 70, 71 (a), 72

Additional Review Problem: A curve C is defined by the parametric equations $x = 2\cos t,\ y = 3\sin t,\ 0 \le t \le 2\pi$.

(a) Find the equation of the tangent line to C when $t = \pi/4$.
(b) At what points is the tangent horizontal? Vertical?

OVER

Answers for even-numbered problems

TF: 2. F 4. T 6. F 8. F 12. F

Exercises:

4. $\dfrac{3x+5}{(2x+1)^{3/2}}$	10. $\dfrac{e^x}{\sqrt{1-e^{2x}}}$	16. $\dfrac{y-2x\cos y}{2\cos 2y - x^2\sin y - x}$
18. $\dfrac{2}{x+1}$	20. $(\ln x)^{\cos x}\left(\dfrac{\cos x}{x\ln x} - \sin x \ln(\ln x)\right)$	
26. $\dfrac{(x^2+1)^4}{(2x+1)^3(3x-1)^5}\left(\dfrac{8x}{x^2+1} - \dfrac{6}{2x+1} - \dfrac{15}{3x-1}\right)$		28. $-\sin x e^{\cos x} - e^x \sin(e^x)$
30. $\pi(\ln 10)10^{\tan(\pi\theta)}\sec^2(\pi\theta)$	32. $\dfrac{2x}{x^2-4} - \dfrac{2}{2x+5}$	
48. (a) -2 (b) -3/8 (c) 6		50. $2xg'(x^2)$
52. $g'(g(x))g'(x)$	54. $e^{g(x)}g'(x)$	56. $\dfrac{g'(\ln x)}{x}$
60. (a) $y = \dfrac{1}{4}x + \dfrac{1}{4}(\ln 4 + 1)$ (b) $y = ex$	62. (a) (0,e) (b) $(e^{3/2}, \infty)$	64. (a) 6t (b) Upward when t > 2, downward when 0 $\leq$ t < 2 (c) 23 (e) speeding up when t > 2, slowing down when 0 < t < 2
68. (a) $\dfrac{dV}{dh} = \dfrac{1}{3}\pi r^2$ (r constant) (b) $\dfrac{dV}{dr} = \dfrac{2}{3}\pi rh$ (h constant)		70. (a) 0 (b) $K(-ae^{-at} + be^{-bt})$ (c) $t = \dfrac{\ln(b/a)}{b-a}$
72. Maximum error $\approx 12 + \dfrac{3\pi}{2} \approx 16.7 cm^2$		**Additional problem:** (a) $y = -\dfrac{3}{2}x + 3\sqrt{2}$ (b) Horizontal at (0, 3) and (0, -3); vertical at (2, 0) and (-2, 0)