Math 16A (Fall 2007)
Kirkbride
Midterm 2 Review

*Note: Be sure to understand ALL problems from the homework. These are just some selected practice problems.

Derivatives: Find the derivative of the following functions:

1. $f(x) = x^8 - 3x^{-6} + 500^{10} - x^{-\frac{2}{3}} + \dfrac{1}{\sqrt{x}} + 8$

2. $f(x) = \dfrac{(2x-5)^2}{x}$

3. $f(x) = (x^2 + \dfrac{1}{x})^5$

4. $f(x) = (3x^3 + 7)^2(x^2 - 2x)$

5. $f(x) = \dfrac{x^2 + x - 1}{\sin x - 1}$

6. $f(x) = \dfrac{2x^2 - 3}{\sqrt{\cos x}}$

7. $f(x) = (x^2 - 1)(8x + \dfrac{1}{x})(x^3 + 2x)$

8. $f(x) = \csc 3x + \cot 3x$

9. Given $f'(x) = 5x^4 - 6x^2 + \cos 2x$, find $f'''(x)$

Average/Instantaneous Rate of Change

10. Find the average rate of change of the function over the given interval. Then compare with the instantaneous rate of change at the endpoints.

    $f(x) = x^3 + x, [-2, 2]$

11. Also think about word problems like 41-46 on page 167 from the Chapter 2 Review Exercises

Graphing functions

12. Find when f'(x) = 0 and use a sign chart to find the relative extrema of the function $f(x) = \frac{1}{4}x^4 - 8x$.

13. Determine the intervals on which the graph of the following function is concave up or concave down, $h(x) = x^5 - 10x^2$.

14. Consider the function $f(x) = x^3 - \frac{3}{2}x^2$
    a) Find any/all relative extrema (use a sign chart)
    b) Find any/all points of inflection (use a sign chart)
    c) Find any/all x and y intercepts
    d) Find any/all horizontal and vertical asymptotes (use limits)
    e) Sketch the graph of this function

15. Consider the function $f(x) = \dfrac{2x}{1+x^2}$
    a) Find any/all relative extrema (use a sign chart)
    b) Find any/all points of inflection (use a sign chart)
    c) Find any/all x and y intercepts
    d) Find any/all horizontal and vertical asymptotes (use limits)
    e) Sketch the graph of this function

Also review marginal profit, revenue, and cost, as well as velocity and acceleration. Some suggested review problems to look at
Chapter 2 Review Exercises
pg. 169, 47-56, 89, 90, 100