Math 191 Spring 1998
Assignment 5: More Derivative Stuff

The due date for this assignment is Friday February 11.
Reading assignment: Sections 3.4, 3.5, 3.6, 3.*S*, 4.3.

1. Use the definition of derivative to compute the derivative of the following functions:

   (a) $f(z) = z^3 + 2z + 1$

   (b) $g(x) = 1/(3x^2)$

   (c) $\gamma(t) = \sqrt[3]{t}$

2. Use problem 1 from assignment 3 and the definition of derivative to show that $(f+g)' = f' + g'$.

3. Do the following exercises from the text:

   - page 108 numbers 3 to 18 multiples of 3
   - pages 115 and 116 numbers 9 to 36 multiples of 3
   - pages 101 and 102 numbers 3 to 30 multiples of 3
   - pages 120 and 121 numbers 9 to 36 multiples of 3
   - page 144 numbers $3, 6, 8, 9$.

4. Review the concept of inverse functions from Chapter 1.

   (a) Suppose f and g are inverse functions and $g'(x)$ is known. Use chain rule and the fact that f and g are inverse functions to find $f'(x)$ in terms of g' and f.

   (b) Suppose $E(x)$ and $L(x)$ are inverse functions and $L'(x) = \frac{1}{x}$. Use the above result to find $E'(x)$.

5. Simultaneous tangent lines. Sketch the graphs of $f(x) = -(x^2+1)$ and $g(x) = (x-1)^2$. Find the equations of the lines that are tangent to both curves simultaneously.