HW #1

General Instructions:

- Homework must be stapled, be relatively neat, and have your name on it. It must be on separate paper, not on this paper (though you do not need to copy the question).

- Homework exercises must be done in order (if you skip an exercise, still write down the number and leave some blank space).

- Don't copy!

The Assignment

Page number available on PDF (not when read online)

1. Evaluate the following limits

   (a) $\lim_{x \to -2} x^3$

   (b) $\lim_{x \to -\infty} x^3$

   (c) $\lim_{u \to 1} f(u)$, where $f(u) = \begin{cases} u^5 & \text{if } u > 1 \\ u^2 & \text{if } u \leq 1. \end{cases}$

   (d) $\lim_{y \to 0} h(y)$, where $h(y) = \begin{cases} 1 - \sqrt{y} & \text{if } y \geq 0 \\ 1/(y+1) & \text{if } y < 0. \end{cases}$

2. In the last problem, for each of the 4 functions state where it is continuous and where differentiable, justifying your answers (be careful on (d) ...).

3. Differentiate the following functions.

   (a) $\sin(3x) + \cos(2 + x^7)$

   (b) $\sqrt{x^2 + \sin(1 + 3x^5)}$

   (c) $x^7 \sqrt{x}$

   (d) $7x^{-4} \sqrt{x + 100}$

4. Do Textbook section 1.2 (Pages 42, 43) Exercises 62, 76

5. Do Textbook section 1.3 (Page 61) Exercises 171, 172, 181, 182

6. Do Textbook section 1.5 (Page 90) Exercises 271, 272, 273, 275

7. Do Textbook section 2.1 (Pages 131, 132) Exercises 1, 8, 15

8. From the Textbook section 2.3 (Page 166) Exercises: 114, 115, 117 (use the Shell or Disk method, as appropriate)

9. From the Textbook section 2.3 (Page 166) Exercises: 141, 153

10. From the Textbook section 2.4 (Pages 180, 181) Exercises: 173, 192, 193.

11. From the Textbook section 1.6 (Page 103) Exercises: 321, 337, 340

12. From the Textbook section 2.7 (Pages 230, 231) Exercises: 295, 297, 312, 337