Written Assignment 2
Due Tuesday, October 9th

1. In Chapter 2.3, do problems
   (a) #2
   (b) #4
   (c) #6
   (d) #8
   (e) #10.

2. For the following, graph a function $f(t)$ satisfying all of these given conditions.
   (a) $\lim_{t\to 0^-} f(t) = -1, \quad \lim_{t\to 0^+} f(t) = 2, \quad f(0) = 1$

   (b) $\lim_{t\to 0} f(t) = 1, \quad \lim_{t\to 3^-} f(t) = -2, \quad \lim_{t\to 3^+} f(t) = 2,\ f(0) = -1,\ f(3) = -2.$

3. Compute the following limits algebraically.
   (a) $\lim_{t\to 5} \dfrac{t^2 - 6t + 5}{t - 5}$
   (b) $\lim_{t\to 0} \dfrac{\sqrt{1+t} - 1}{t}$. (Hint: multiply the top and bottom of the fraction by the quantity $\sqrt{1+t} + 1$. This is called "rationalizing" or "conjugating.")
   (c) $\lim_{x\to -4} \dfrac{\frac{1}{4} + \frac{1}{x}}{4 + x}$. (Hint: add the fractions and simplify first)

4. Write, in your own words, what it means for a function f to be continuous everywhere.

5. This problem shows you why numerical methods are not always reliable. We will investigate the limit $\lim_{x\to 0} \dfrac{\sqrt{x^2+4} - 2}{x^2}$.
   (a) Try to evaluate this limit by "cheating," meaning plug in $x = 0.00000001$ (at least seven zeros).
   (b) Now evaluate the limit with the correct procedure and obtain the correct value of this limit.